

May 31, 1932.

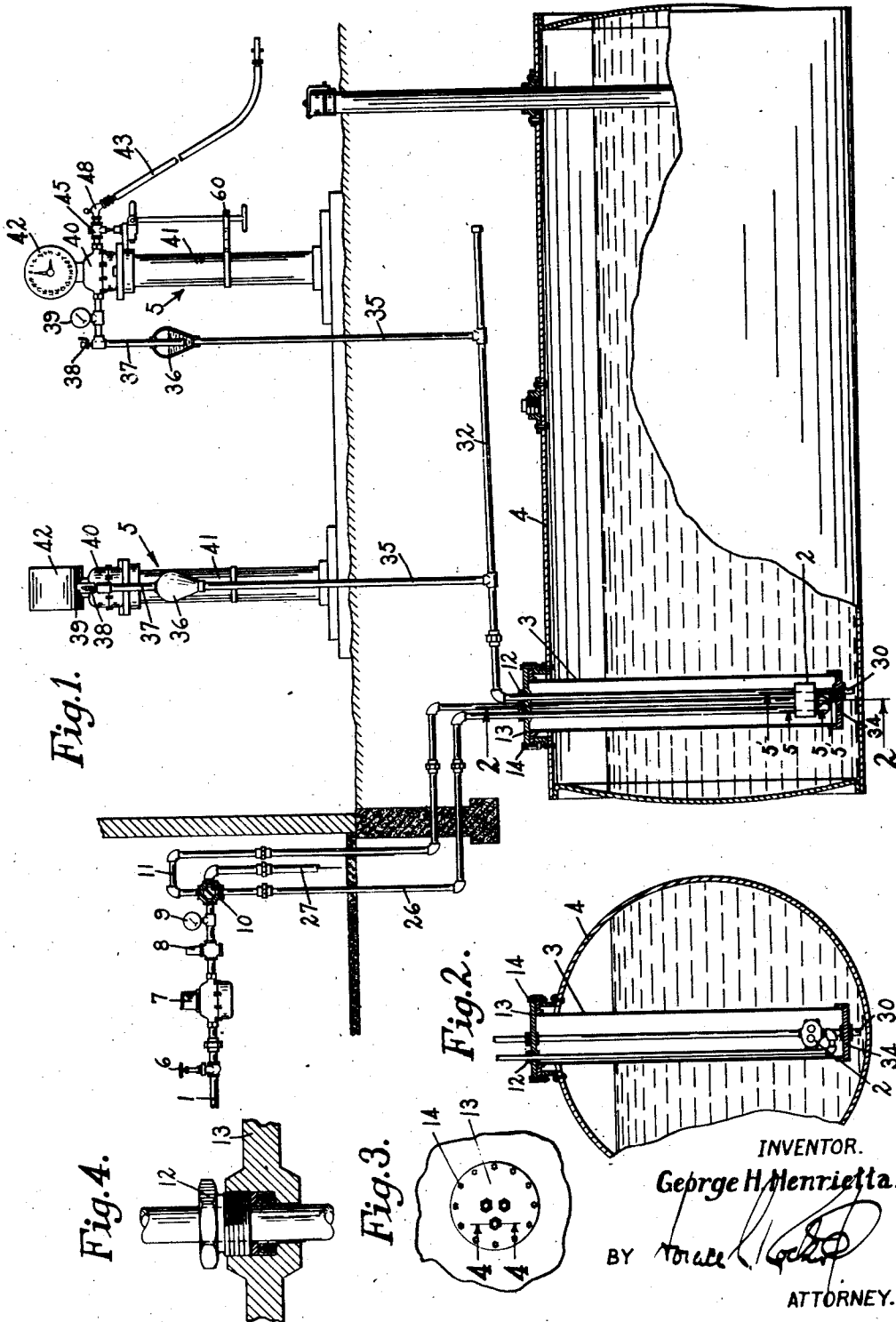
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1,861,393

LIQUID DISPENSING SYSTEM

Filed April 30, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

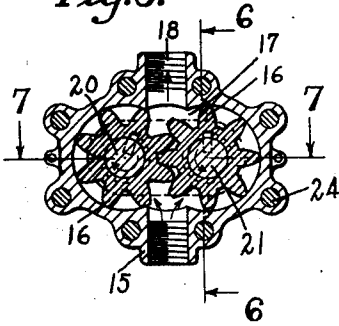


Fig. 6.

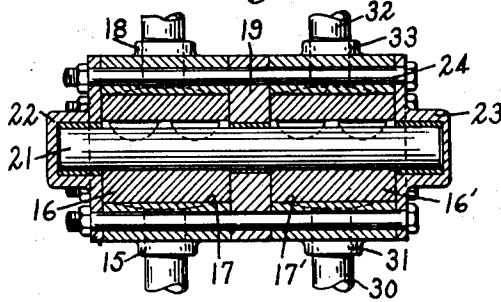


Fig. 7.

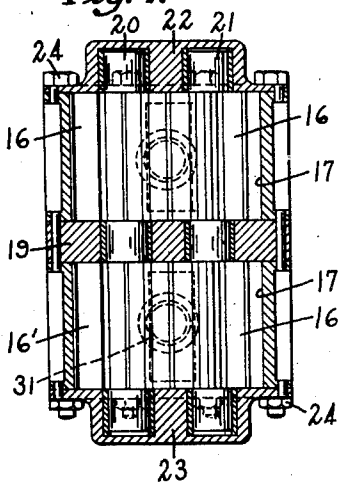


Fig. 9.

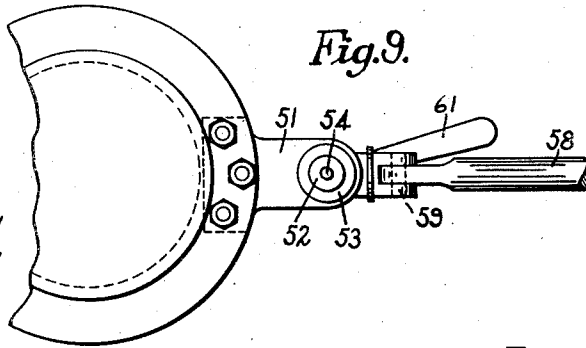


Fig. 8.

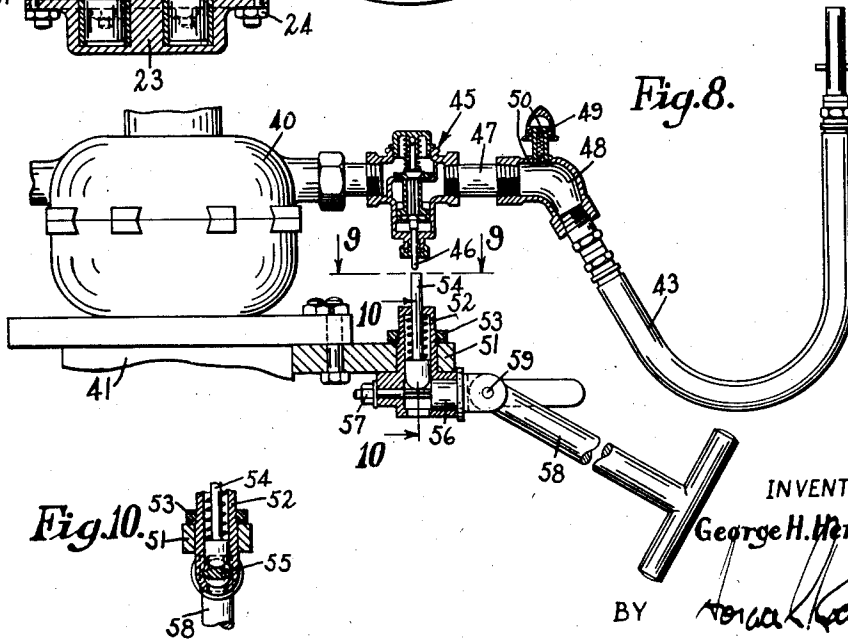
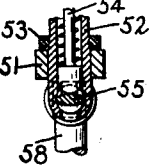


Fig. 10.



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LIQUID DISPENSING SYSTEM

Application filed April 30, 1930. Serial No. 448,573.

My invention relates to liquid dispensing systems.

It has among its objects to provide an improved liquid dispensing system, and more particularly, such a system especially adapted to use in connection with dispensing gasoline. A further object of my invention is to provide such an improved system wherein the mechanism required is such as to eliminate fire and explosion hazard while operating with certainty and having a low operating cost. A still further object of my invention is to provide improved hydraulic operating and controlling means whereby the above and other improved results are obtained. Other objects of my invention include the provision of an improved hydraulically operated motor which may be located in the gasoline tank if desired, improved connections and control means for supplying liquid from a suitable pressure source to and from the motor, improved gasoline pumping means driven by said motor, and which may likewise be in the gasoline tank, for supplying gasoline to the dispensing unit or units, and improved controlling means controlling the flow to and from the latter and the operation of said motor and pump. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawings, I have shown for purposes of illustration, one embodiment which my invention may assume in practice.

In these drawings,—

Figure 1 is a diagrammatic view of a dispensing system constructed and arranged in accordance with this embodiment of my invention;

Figure 2 is a section substantially on line 2—2 of Figure 1 showing the motor pump unit and housing;

Figure 3 is a plan view of the cover for the pumping unit housing;

Figure 4 is a detail sectional view on line 4—4 of Figure 3 showing one of the slip joints;

Figure 5 is a transverse section through the motor pump unit on lines 5—5 of Figure

1 and identic with a similar section on line 5'—5' thereon;

Figure 6 is a vertical section on line 6—6 of Figure 5;

Figure 7 is a section on line 7—7 of Figure 5;

Figure 8 is a detail view partially in section showing the control connections leading to the flexible dispensing pipe;

Figure 9 is a detail plan view taken substantially on line 9—9 of Figure 8;

Figure 10 is a sectional view on line 10—10 of Figure 8.

In this illustrative construction, it will be noted that an improved hydraulic system for retail vending is disclosed wherein water or other fluid is supplied under pressure from any suitable source of supply, herein a pipe 1 connected to a city main, to a combined motor and pump unit, generally designated at 2 and here located in a vertically disposed housing 3 in a usual gasoline tank 4, from which gasoline is supplied by the unit 2 to one or more dispensing devices 5, all as hereinafter more particularly set forth.

Considering first the motor phase of the unit 2, it will be noted that the pipe 1 is provided with a usual shut off valve 6, meter 7, pressure regulator 8, and pressure gauge 9, all preferably arranged as shown in Figure 1. It will also be noted that a four-way valve 10 is provided between these elements and pipe connections leading to the unit 2. As shown, one pipe connection 11, which is connected to the pipe 1 in one position of the valve 10, extends down through a suitably packed slip joint 12 in a cover member 13 suitably attached as by bolts 14 over the unit housing 3. This pipe line 11 is connected to a bottom inlet 15 in the motor unit which forms one-half of the unit 2. More particularly, it will be noted that in the structure illustrated this unit comprises a plurality of meshing gears 16 rotatable in a suitable water tight housing 17 and meshing along a line opposite the inlet 15 and between the same and an outlet 18 above the same.

Here, it will also be noted that the unit 2

comprises a plurality of identic units such as described, one forming the motor and the other the gasoline pump driven by said motor. As shown, these units are disposed end to end and spaced by a member 19 through which the shafts 20 and 21 of the gears 16 of the motor unit, and the gears 16' of the pump unit, are extended. These shafts are also suitably journaled in end bearing plates 22, 23. Here it will also be noted that the housings or cylinders 17, 17' for the two sets of gears are each preferably formed in one piece and clamped between the end members 22, 23 and on opposite sides of the intermediate member 19 by a plurality of bolts 24 extending lengthwise of the unit.

From the motor unit of this combined unit 2, it will be noted that the water is returned through the outlet 18 to a pipe connection 26 leading upward through the cover 13 and another packing 12 to the four-way valve 10 by which it is connected to a suitable water exhaust connection 27. Thus, it will be evident that when water is supplied through the four-way valve 10 to the pump gears 16, the latter will be rotated in such manner as to rotate their shafts 20, 21, while the water will pass through the motor to the outlet 18, and flow through the pipe connection 26 and four-way valve 10 to the water exhaust connection 27.

Associated with the gasoline pump, herein above referred to as driven by the water motor, are improved supply and discharge connections therefor. Herein, these include a supply or gasoline intake pipe 30 connected in a passage 31 which is similar to the intake passage 15 of the water motor, while a discharge connection 32 is connected to a passage 33 corresponding to the discharge connection 18 of the water motor. It will also be noted that the pipe 30 extends through a suitable threaded connection in the bottom 34 of the pump unit housing 3, and that it projects below the latter and adjacent the bottom of the tank 4. Thus, when the water motor is operated with the gears 16 rotating in the direction of the arrows shown in Figure 5, the gears 16' of the gasoline pump will be similarly rotated but in such manner as to draw in gasoline through the pipe 30 and cause the same to be discharged through the pipe 32.

The latter, it will be noted, is also connected to the dispensing means 5 through improved means. Herein, it is extended through a slip joint 12 in the cover 13, and connected to a plurality of connections 35, each of which includes an air chamber 36 disposed above the connection 35 and around a vertically placed connection 37 leading from the top of the chamber 36 toward the dispensing device proper. By the use of these air chambers 36, it will be noted that a steady discharge is obtained due to the absorption

of pulsations, with the confined air also acting as a cushion should the delivery valve, hereinafter described, be abruptly closed. Attention is also directed to the fact that a venting valve 38 is provided in the connection 37 above the air chamber 36, while a pressure gauge 39 is also provided adjacent this valve and between the venting valve 38 and the dispensing mechanism.

Herein the dispensing devices each include a liquid meter 40 which may comprise a meter of any standard type. This meter, as shown, is carried upon a usual standard 41 of the dispensing device 5 and has suitably connected to it in any well known way, an indicator mechanism 42 which is preferably of the duplex type and adapted to indicate simultaneously on opposite sides of the standard 41, as the meter 40 measures the gasoline flowing from the connection 37 to the flexible delivery pipe 43. Thus, it will be evident that whenever gasoline is supplied through the meter 40 to the flexible pipe 43, the amount of gasoline passing through the meter will be automatically indicated upon the indicator 42 in a well known manner.

Associated with the mechanism just described, and operating between the meter 40 and delivery hose 43, is improved controlling mechanism. Herein the same includes any suitable balanced type of delivery valve generally designated at 45 and having a depending controlling stem 46 vertically movable therein to control the flow through a pipe connection 47 connecting the meter and a co-operating connection or shoulder 48 to which the flexible delivery pipe 43 is connected. It will also be noted that this connection 48 carries a vacuum breaking valve of any suitable type, the same herein having a spring pressed ball 49 controlling the flow through passages 50. It will also be noted that means is provided on the standard 41 below the valve 45 for operating the plunger 46 thereof.

These means herein include a bracket 51 suitably attached to the standard 41, and having a plunger housing 52 swiveled therein and held by a lock nut 53, while a spring pressed plunger 54 moves in the member 52 to raise or lower the plunger 46 when a rotating cam 55 journaled in the lower end of the member 52, is operated. This cam 55 is carried on a member 56 clamped on the lower portion of the member 52 by means of a bolt 57, and rotatable relative to the member 52 by an elongated handle member 58 which is pivoted at 59 on a yoke integral with the parts 56 and 57, the handle 58 when not in use being disposable in a depending position in a clip 60 on the standard 41. It will also be noted that a short handle 61 is rigidly fixed to the lower part of the swiveled member 52. Thus, it will be observed that by rotation of the handle 58, the valve 46 will

be operated in such manner as to permit gasoline to flow, when desired, through the meter 40 to the delivery connection 43. Also it will be evident that, due to the swiveled arrangement of member 52, the handles 58, 61 will enable convenient operation of the device from either side of the standard 41.

In the operation of the complete system, it will be understood that the pressure ordinarily available in a city main will be sufficient to operate the mechanism, but that any other source of pressure may be used if desired. It will also be understood that the initial pressure, which should be substantially higher than necessary, is reduced by the pressure regulating device 8, and that operating pressure may be reduced to an amount but slightly overbalancing the standing column of gasoline in the distributing pipes, while the pressure may be wholly cut off by the valve 6, if desired, at times when no gasoline is being drawn, as at night. With the pressure regulator 8 suitably adjusted, it will be evident that, with the valve 6 open and with the four-way valve 10 in the position illustrated in Figure 1, water will flow from the connection 1 to the pipe 11, and through the latter enter the motor unit through the inlet 15. From the latter it will pass through the casing 17 and rotate the gears 16 before it passes out through the outlet 18, in such manner as to operate the corresponding gears 16' of the gasoline pump. Thus, as the water passes in one circuit from the main 1 to the motor gears 16 and from the same through the outlet 18, pipe connection 26, and four-way valve 10, to the water exhaust 27, gasoline will be drawn in another circuit through the pipe 30, intake 31, and propelled by the pump gears 16' of the gasoline pump out through the outlet 32 through the pipe connection 35. If the valve 45 is open, the gasoline will flow out through the delivery pipe 43, being metered as it flows by the meter 40, and the hydraulic motor gears 16 will continue to function simultaneously with the gasoline pump gears 16'. When, however, the valve 45 is closed, the effect of this closure is to cause a back pressure to be developed sufficient to stop automatically the active pumping operation of the pump gears 16' and therefore, of the corresponding motor gears 16, although both sets of gears will continue to rotate slowly, as a result of slippage occurring in the water and gasoline circuits, in such manner as to tend to maintain the required pressure. Thus, while normally inactive, both the motor and the pump are controlled by the opening and closing of this valve 45, the same normally idling and increasing or decreasing their speed of operation as the pumped flow is caused to be increased or decreased. Attention is here also directed to the fact that due to the use of a four-way valve 10, it is possible to reverse

the operation of the motor and pump, and thus return the gasoline to the storage tank, when desired, as at the close of the day. Attention is also directed to the fact that the slippage of water past the motor, and of gasoline from pipe 32 back to the tank when gasoline is not being drawn, is negligible in quantity and desirable in effect, as it tends to maintain the required definite pressure on the meter while keeping the pumping unit in proper condition for prompt response. It will also be noted that the pressure is adjusted by the pressure regulator 8 not only to start the system at the proper pressure, but also to hold it at the desirable pressure range wherein the meter operates most efficiently, as for example, within a pressure range of from 12 to 15 pounds per square inch. It will further be noted that the pressure gauge 9 indicates any departure from the correct setting of the regulator 8, while the gauges 39 located on the dispensing units indicate whether the gasoline is under a correct pressure prior to delivery, and further enable pressure during delivery to be conveniently ascertained at any time, so that the pressure may be increased or decreased by adjustment of the regulator if necessary.

It will be noted that the mechanism disclosed minimizes fire risk while being sure in operation. It also eliminates all necessity for using an electric motor drive, as well as the by-pass connections or relief valves required where electric motors are used. Further, it makes possible a wholly new motor operation in which the operating speed varies with the gasoline delivery flow in a manner impractical with an electric motor, and one, which would stall and burn out such a motor in the absence of expensive special motor construction or equipment. It also permits the use of a wholly new and simplified motor control as compared with electric motors. It will also be evident that the mechanism is very simple and rugged and adapted to have a long life while requiring a minimum of attention. It is also capable of being installed and operated very economically wherever a suitable pressure supply is available. Attention is also directed to the facility with which the illustrated type may be installed in a tank and to the accessibility of the various controls and of the motor pump unit in the event access thereto is required. Through the provision of the supplementary valves on the dispensing connections, the gasoline pipes may also be vented of air during priming, or used to permit the entry of air, when it is desired to return the gasoline to the tank. Attention is also directed to the location of the valve 45 close to the meter 40 so that the hose 43 may be easily and completely drained, and to the provision of the vacuum breaking valve 49 which facilitates hose drainage after use. It

will also be observed that due to the valve operating handle 58, the mechanism is adapted to be very conveniently operated over a wide range, the handle 58 being capable of functioning through a horizontal arc of about 270 degrees and a vertical arc of about 120 degrees. It will also be noted that through directly connecting the register 42 with the meter 40, direct visual evidence of the flow is given. Attention is also directed to the fact that, in this construction, it is possible to connect a plurality of dispensing devices to a single tank and operate them by a single pump unit, while if desired, a plurality of pumping units also may be used in connection with the same storage tank.

While I have in this application specifically described one embodiment which my invention may assume in practice, it will be understood that the same is shown for purposes of illustration only, and that the invention is not limited thereto but may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:—

1. In a liquid dispensing system, an hydraulically driven motor, pumping mechanism driven thereby, and means for controlling the pump discharge to control said motor.

2. In a liquid dispensing system, an hydraulically driven motor, pump mechanism driven by said motor, and dispensing mechanism having means for controlling the operation of said motor by controlling the action and reaction of the pumped flow.

3. In a liquid dispensing system, a continuously operative pressure operated motor, a pump continuously driven thereby, and means for controlling the pumped flow at will to increase or decrease the speed of operation of said motor and pump.

4. In a liquid dispensing system, a fluid pressure operated motor, pump mechanism driven thereby and having a discharge line, and co-operating motor and pump controlling means acting on the pump discharge and maintaining a definite pressure on the latter whether the same is delivering liquid or idle.

5. In a liquid dispensing system, a tank, an hydraulically driven motor therein, a pump in said tank driven by said motor, and dispensing connections supplied from said pump and having pumped flow controlling means controlling said motor.

6. In a liquid dispensing system, a tank, a fluid pressure operated motor therein, a pump in said tank driven by said motor, and dispensing connections supplied from said pump having a pumped flow controlling valve controlling the starting and stopping of active operation of said motor.

7. In a liquid dispensing system, a tank, an hydraulically driven motor therein, a pump

in said tank driven by said motor, and dispensing connections supplied from said pump having an air chamber between the same and said pump and pumped flow controlling means controlling the speed of said motor.

8. In a liquid dispensing system, a tank, a constantly operated hydraulically driven motor, a pump driven by said motor and having an intake connection to said tank, and dispensing connections supplied from said pump having a discharge controlling valve controlling the starting and stopping of active operation of both motor and pump and an air chamber between said valve and pump.

9. In a liquid dispensing system, means providing an hydraulic flow, a driving motor driven by the liquid flow therein, means providing a pumped liquid path and having a pump therein driven by said motor, and means for controlling the flow through said last mentioned path.

10. In a gasoline dispensing system, an hydraulic circuit having a motor driven thereby, a tank, and a gasoline pump driven by said motor and having intake and dispensing connections and a static column in the latter normally over-balanced by the pressure in said hydraulic circuit.

11. In a liquid dispensing system, a tank, a pump casing therein, a combined motor and pump in said casing, fluid supply and exhaust connections for said motor leading out of said casing, a pump discharge connection leading out of the latter, and a pump intake opening into the tank.

12. In a liquid dispensing system, a tank, an hydraulically driven motor means, pump means driven thereby and having an intake in said tank and a discharge line, and means controlling the supply through said line controlling the operation of both said motor and pump means.

13. In a liquid dispensing system, a tank, an hydraulically driven motor means therein, pump means therein driven by said motor means in said tank, a casing enclosing said motor and pump means within said tank, and a pump intake extending from said casing into said tank.

14. In a liquid dispensing system, a tank, hydraulic motor means, pump means driven thereby and having an intake in said tank and a discharge line connected thereto, and means for reversing said motor and returning to said tank liquid pumped into said discharge line.

15. In a liquid dispensing system, a combined hydraulic motor and pump comprising operatively connected pairs of meshing rotors, liquid supply and discharge connections to one set of the same forming a motor, and wholly separate supply and discharge connections for the other set forming a pump.

16. In combination, a casing, combined fluid pressure operated motor and pump

means therein, an intake leading through the bottom of said casing to the intake of the pump, intake and discharge connections for the motor leading through the top of said casing, and a discharge connection for the pump also leading through the top of said casing.

17. In a liquid dispensing system, liquid dispensing means comprising a supply line and means for maintaining a substantially constant pressure therein, an air chamber therein, a meter receiving flow through said chamber, a venting valve between said chamber and meter, indicator mechanism operative by said meter, a delivery connection, and a discharge controlling valve between said meter and said delivery connection.

18. In a liquid dispensing system, liquid dispensing means comprising a supply line and means for maintaining a substantially constant pressure therein, an air chamber therein, a meter receiving flow through said chamber, a venting valve between said chamber and meter, a pressure gauge between said venting valve and meter, indicator mechanism operative by said meter, a delivery connection, a discharge controlling valve between said meter and said delivery connection, and a vacuum breaking valve between said valve and the free end of said delivery connection.

19. In a liquid dispensing mechanism, a discharge line having a controlling valve therein, mechanism for operating said valve comprising a plunger, a rotary cam cooperating therewith, and a swivelled support carrying both said plunger and cam.

20. In a liquid dispensing mechanism, a delivery connection, a valve controlling the flow therethrough, and operative connections for opening and closing said valve having a handle and a universal connection between the same and said valve.

21. In a liquid dispensing system, fluid pressure operated motor means, pump means operated thereby, dispensing means having a liquid meter therein and having controlling means controlling said motor and pump by controlling the pumped flow, and pressure regulator means controlling the pressure of the liquid supplied to said motor and delivered through said meter.

22. In a liquid dispensing system, fluid pressure operated motor means, pump means operated thereby, dispensing means having a liquid meter therein and having controlling means controlling said motor and pump by controlling the pumped flow, pressure regulator means controlling the pressure of the liquid delivered through said meter and disposed between said motor and its pressure source, and co-operating pressure indicating means between said pressure regulator and said meter.

23. In a liquid dispensing system, a tank, pressure operated motor means therein, pump

means therein operated by said motor, supply and discharge means connected to said motor including a four-way valve and a pressure regulator controlling the supply through the latter, and liquid dispensing means receiving the pumped liquid and having means for controlling the speed of both motor and pump by controlling the pumped flow.

In testimony whereof I affix my signature.
GEORGE H. HENRIETTA.

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