

June 10, 1930.

C. H. EHLERS

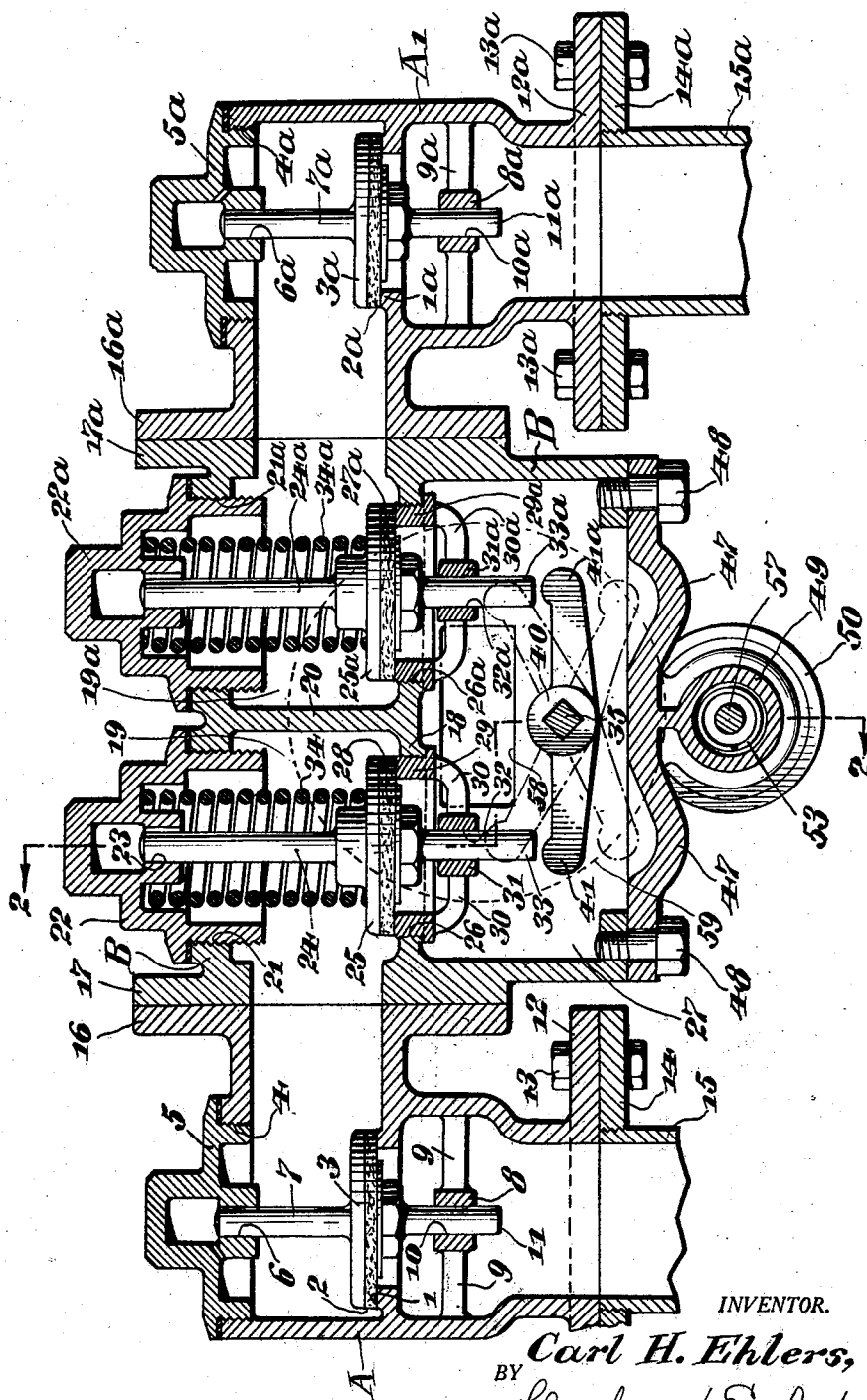
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LIQUID DISPENSING SYSTEM

Filed Nov. 6, 1925

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Fig. 1.



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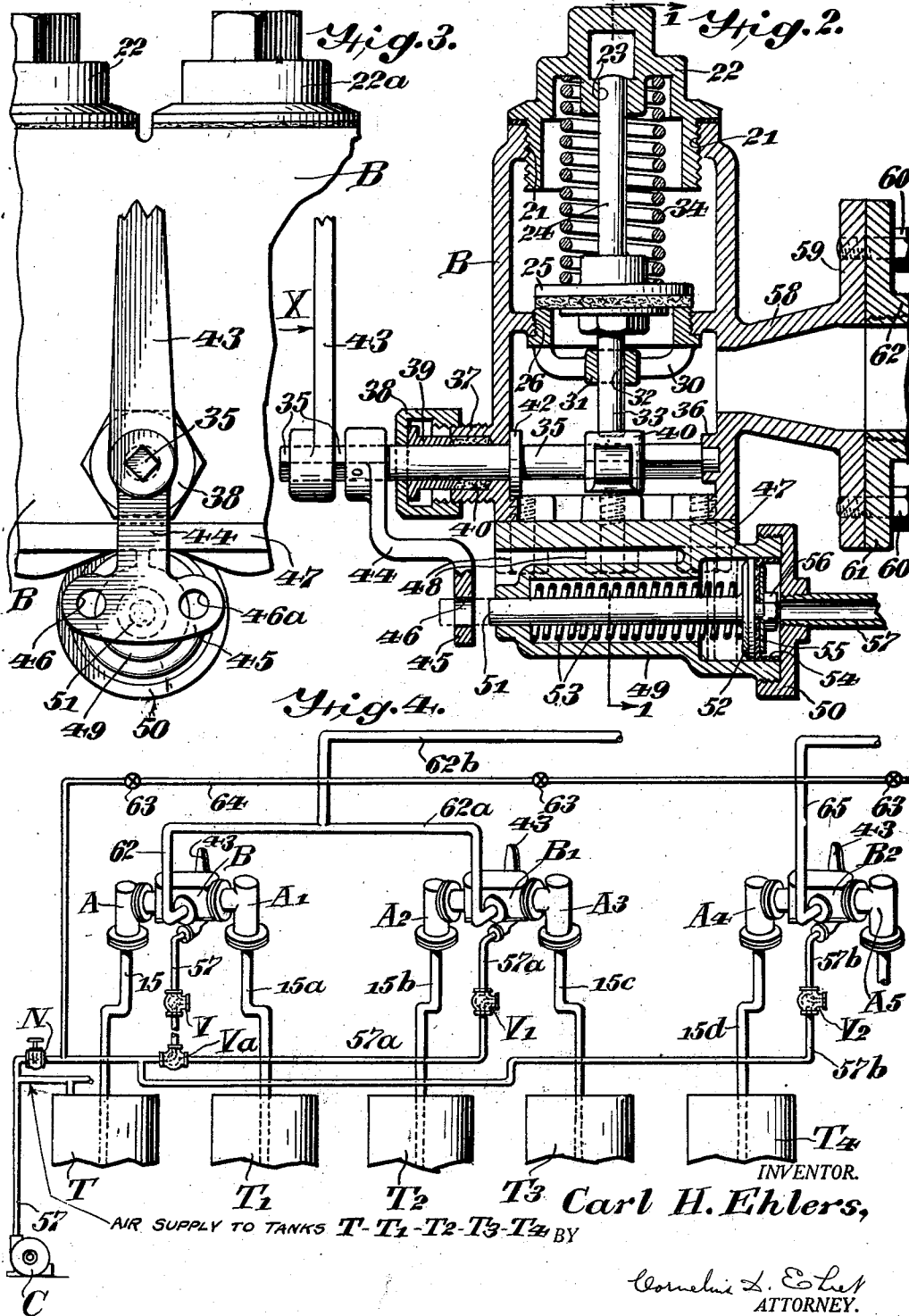
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

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LIQUID-DISPENSING SYSTEM

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My invention relates to a system and apparatus utilizable for controlling the flow of a liquid.

In accordance with my invention, suitable mechanism comprised in a system supplying a liquid under pressure from a plurality of separate tanks or receptacles is suitably controlled to the end that liquid may be withdrawn from but one tank at a time.

Further in accordance with my invention, suitable valve structure is retained in a position permitting flow of a liquid by control mechanism readily releasable to check the liquid flow in case of an emergency, or for any other reason.

Further in accordance with my invention, valve structure, as aforesaid, is retained in a position permitting flow of a liquid from a tank or receptacle by a gaseous pressure control device readily releasable to check the liquid flow, and more particularly, said control device comprises a member movable in response to the application of gaseous pressure to hold the valve structure in a position permitting liquid flow and movable in another direction upon decrease in gaseous pressure to release the valve structure.

My invention resides in the system and apparatus hereinafter described and claimed.

For an understanding of my invention and for an illustration of one of the forms my invention may take, reference is to be had to the accompanying drawing, in which:

Fig. 1 is a vertical sectional view of apparatus constructed in accordance with my invention, taken on the line 1—1 of Fig. 2.

Fig. 2 is a vertical sectional view on line 2—2 of Fig. 1.

Fig. 3 is a fragmentary elevational view looking in the direction of arrow X on Fig. 2.

Fig. 4 is a diagrammatic view of a dispensing system utilizing structure constructed in accordance with my invention.

Referring to Fig. 1, a check valve body A is provided with a seat 1, preferably ground and exposing a plane surface receiving a disk 2 of leather or other suitable material, comprised in the check valve 3. A threaded recess 4 in valve body A is closed by a cap 5 provided with a passageway 6 slidably receiving

a shank 7 of check valve 3. A guide member 8 suitably supported in valve body A, as by the radially extending ribs 9, is provided with an opening 10 aligned with passageway 6, said opening 10 slidably receiving another shank 11 of check valve 3.

Valve body A may be placed in communication with a tank or receptacle in any desired manner, preferably, however, by utilizing a flange 12 secured by bolts 13, or equivalent retaining structure, to a corresponding flange 14 comprised in a pipe or conduit 15 leading to a tank or receptacle T, Fig. 4.

Valve body A may also be placed in communication in any desired manner with a casing or housing containing suitable control valve mechanism, hereinafter described, preferably, however, by providing a flange 16 in an offset portion of said body and securing said flange to a corresponding flange 17 comprised in the casing B in any suitable manner (not shown).

Casing B is divided into upper and lower compartments by a horizontally extending wall 18, and the upper compartment is further subdivided into two chambers 19 and 19^a of substantially the same dimensions by a vertically extending wall 20.

Chamber 19^a of casing B terminates in a flange 17^a corresponding to flange 17 and a check valve body A¹ is attached to said flange 17^a. Inasmuch as body A¹ and the mechanism associated therewith is a duplicate of body A and its associated mechanism, the foregoing description will not be repeated. However, in each instance, the same reference numeral with the subscript "a" added will be applied to the parts in body A¹ corresponding to the parts previously described in connection with body A.

Referring to Fig. 4, the pipe or conduit 15^a connected to valve body A¹ is shown as leading to a tank or receptacle T¹.

A threaded recess 21 in casing B opening into chamber 19 is closed by a cap 22 provided with a passageway 23 slidably receiving a shank 24 of the control valve 25. A threaded recess 26 places chamber 19 and the lowermost compartment 27 in communication, except when disk 28, of leather or equivalent

material, rests upon the plane-surfaced valve seat 29. A plurality of arms 30 carried by seat 29 terminate in a guide member 31 provided with an opening 32 aligned with passageway 23 and slidably receiving another shank 33 of control valve 25. A coil spring 34, or equivalent, confined around shank 24 between the interior surface of cap 22 and valve 25, biases the leather disk 28 of said valve into engagement with its seat 29.

Chamber 19^a is provided with control valve structure, a duplicate of that described above in connection with chamber 19. For the sake of brevity, a specific description of such structure will not be included herein, but in each case the same reference numeral with the subscript "a" added will be applied to the parts in chamber 19^a corresponding to the parts previously described in connection with chamber 19.

Referring to Figs. 1 and 2, a cam shaft 35 is shown as journaled in a bearing 36 and a threaded extension 37, both formed preferably integrally with casing B. A follower nut 38 threaded to extension 37 is utilized to move a gland 39 axially of shaft 35 to compress the packing 40 in a manner well understood in the art.

A polygonal portion of cam shaft 35 carries a collar 40 having an opening corresponding to the configuration of said shaft. Arms 41 and 41^a extend in opposite directions from collar 40 to points adjacent the ends of shanks 33 and 33^a. Axial movement of shaft 35 may be prevented in any suitable manner, preferably, however, by utilizing a collar 42 secured to shaft 35 and engaging the wall of casing B opposite from bearing 36.

Exteriorly of casing B, cam shaft 35 carries an actuating lever 43 and a locking lever 44 terminating in a plate-like portion 45 provided with spaced openings 46 and 46^a (Fig. 3).

A closure plate 47 suitably secured to casing B, as by bolts 48, carries a cylinder 49 threaded at one end to receive a cap 50. The free end of a piston 51 comprises a piston head 52 and a threaded stem extending through a leather washer 54 suitably secured thereto, as by the metallic washer 55 and nut 56 carried by said stem. When piston 51 is moved toward the left (Fig. 2), against the pressure of a coiled spring 53, or equivalent, as hereinafter described, the end of said piston removed from piston head 52 passes into an opening 46 or 46^a of plate 45, depending on the position of actuating lever 43.

A pipe or conduit 57 leading from some source of gaseous pressure, as the air compressor C, Fig. 4, is received in an opening in the cap 50. A needle valve N, or equivalent, suitably located in conduit 57, serves to minimize the volume of air passing through said conduit while maintaining the desired pressure.

Another valve, as the three-way valve V, is

also located in conduit 57, preferably immediately adjacent the casing B.

The lower compartment 27 of casing B is provided with a suitable discharge port, as the conduit 58, preferably provided with a flange 59 suitably secured, as by bolts 60, to a corresponding flange 61 of a pipe or conduit 62 leading to a suitable destination, as one or more meters and nozzles (not shown).

Under normal conditions, the free end of piston 51 is held in one of the openings 46 or 46^a of plate 45 by the air pressure applied to one face of piston head 52 by the compressor C. To reduce this air pressure, an attendant may actuate valve V, or one of the relief valves 63 in a conduit 64 having no outlet, but connected to conduit 57.

The operation is as follows:

Tanks T and T¹ contain a liquid, as oil, under pressure, as air or hydraulic pressure, herein shown as air pressure, Fig. 4, which tends to move the oil through pipes 15 and 15^a in the direction of the valve bodies A and A¹.

Referring to Fig. 1, movement of actuating handle 43 to rotate shaft 35 in a clockwise direction will cause arm 41 to engage shank 33 and lift control valve 25 from its seat against the pressure of spring 34. Thereafter, oil will flow from tank T through pipe 15, valve body A, and thence to chamber 19 and the lower compartment 27 of casing B. From the latter, the oil flows through conduits 58 and 62 to the point where it is withdrawn from the storage system. It will be noted that check valve 3 rises in response to the liquid pressure to permit passage of oil in the manner aforesaid. If for some reason, however, oil should attempt to flow in a reverse direction, check valve 3 would remain on its seat and prevent passage of the oil to tank T.

While swinging actuating handle 43 to lift control valve 25 from its seat, it was necessary to manually force piston 51 and piston head 52 toward the right (Fig. 2) against the air pressure from conduit 57 or relieve the air pressure by opening valve V to the atmosphere, so that the opening 46^a of locking lever 44 could be positioned in alignment with the free end of piston 51. When so positioned, the free end of said piston is moved toward the left (Fig. 2) into opening 46^a under the influence of the existing air pressure. Thereafter, control valve 25 is held open and oil may be withdrawn from tank T, as desired.

If for any reason, such as the occurrence of a fire at one of the nozzles, it should be desired to quickly close the control valve 25 to cut off the source of oil supply, it is only necessary to open one of the valves 63 to the atmosphere. These valves are conveniently located at various points, preferably

away from the immediate vicinity of a nozzle, and when one is opened, the air pressure in conduit 57 and the end of cylinder 49 connected thereto is immediately decreased and spring 53 becomes effective to move the end of piston 51 out of the opening 46^a in locking lever 44. Upon so doing, spring 34 snaps control valve 25 into engagement with its seat 29 and tank T is cut out of service.

When it becomes necessary to withdraw liquid from tank T¹ rather than tank T, the attendant may actuate valve V to close the path of communication to compressor C and open the end of cylinder 49 and the part of conduit 57 connected thereto to the atmosphere, whereupon spring 53 retracts the end of piston 51 from opening 46^a, and handle 43 may be swung in reverse direction to place tank T¹ in service. Obviously, in this manner, either tank T or T¹ may be cut into service, as desired, the free end of piston 51 entering one of the openings 46 or 46^a depending on the direction of movement of lever 43. However, of the tanks T and T¹, it is possible to cut but one tank into service at a time, since when valve 25 is moved from its seat, the corresponding valve 25^a remains seated, and vice versa.

Referring to Fig. 4, there are illustrated three groups of tanks, of which two groups are connected to a common outlet, while another group is connected to a different outlet.

It will be observed that three duplicate valve structures of the type hereinbefore specified are utilized, and that casings B and B¹ respectively enclose two of such valve structures. Valve bodies A² and A³ of casing B¹ are connected, respectively, to tanks T² and T³ by conduits 15^b and 15^c. A conduit 57^a branching from a three-way valve V^a interposed in conduit 57 leads to the cylinder of casing B¹ corresponding with cylinder 49 of casing B, and another three-way valve V¹ corresponding with valves V and V^a is interposed in conduit 57^a preferably immediately adjacent casing B¹. A conduit 62^a leading from the discharge port of casing B¹ is joined to conduit 62, which, as stated above, may lead to one or more meters and nozzles connected to conduit 62^b.

With an installation of this character, valve V^a may be actuated to place either, but not both of the cylinders carried respectively by casings B and B¹ in communication with compressor C. Actuation of said valve in one direction places cylinder 49 of casing B in communication with the compressor and, accordingly, upon closing valve V from the atmosphere, liquid may be withdrawn from either tank T or T¹ as desired and as described above. Under such circumstances, liquid cannot be withdrawn from tanks T² or T³.

However, if valve V^a is actuated in another direction, cylinder 49 of casing B is closed from compressor C and conduit 57^a places

the cylinder in casing B¹ corresponding with said cylinder 49 in communication with the compressor. Then, by closing valve V¹ from the atmosphere, liquid may be withdrawn from either tank T² or T³ as desired. Under such circumstances, however, liquid cannot be withdrawn from tanks T or T¹.

Valve body A⁴ of casing B² may be connected by a conduit 15^d to a tank T⁴ containing oil of a different grade than that contained in tanks T, T¹, etc. Valve body A⁵ of said casing B² need not necessarily be utilized, but may be held in reserve for future use. A conduit 57^b branching from conduit 57 leads to the cylinder of casing B², corresponding with cylinder 49 of casing B and a three-way valve V², corresponding with valves V and V¹, is interposed in conduit 57^b.

A conduit 65 leading from the discharge port of casing B² passes the liquid to any suitable destination, as one or more meters and nozzles distinct from those first mentioned.

It will be observed that liquid may be withdrawn from tank T⁴ simultaneously with withdrawal from one of the tanks T, T¹, T², or T³, but that from this group liquid may be withdrawn from but one tank at a time. Further, it will be observed that valve V^a may be actuated to control withdrawal from one of the tanks T, T¹, T² or T³ as desired without affecting the flow from tank T⁴.

It will also be observed that operation of any one of the valves 63 will open conduits 57 and 57^b to the atmosphere and that if valve V^a has been actuated to place conduit 57^a in communication with compressor C, that conduit will likewise be opened to the atmosphere upon operation of any one of said valves 63. Accordingly, if the valve structures connected to any of the tanks are held open by their respective pistons 51, the decreased air pressure will immediately become effective to cut all tanks out of service and prevent any withdrawal of liquid. In other words, operation of one of the valves 63 closes down the entire system.

What I claim is:

1. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure normally preventing passage of liquid to said conduit from said tanks and operable to effect solely passage of liquid to said conduit from a selected tank, means for holding said valve structure in position to pass liquid to said conduit from said selected tank, and means controlling said last mentioned means for permitting said valve structure to resume normal position.

2. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure biased into position preventing passage of liquid to said conduit from said tanks and operable to

effect solely passage of liquid to said conduit from a selected tank, pneumatic-controlled means for holding said valve structure in position to pass liquid to said conduit from said selected tank, and means for releasing said last mentioned means to permit said valve structure to resume its original position.

3. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure biased into position preventing passage of liquid to said conduit from said tanks and operable to effect solely passage of liquid to said conduit from a selected tank, a piston, means for moving said piston to hold said valve structure in position for passing liquid to said conduit from said selected tank, and means for moving said piston in reverse direction to permit said valve structure to resume its original position.

4. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure normally positioned to prevent passage of liquid to said conduit from said tanks, a piston, a spring biasing said piston in one direction, pneumatic means normally holding said piston in another direction against the expansive tendency of said spring to hold said valve structure in a selected position, and means for disabling said pneumatic means to permit movement of said piston in said one direction.

5. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure normally preventing passage of liquid to said conduit from said tanks, means for holding said valve structure in position to pass liquid to said conduit from a selected tank, and means operative in a plurality of regions for controlling said last-mentioned means for permitting said valve structure to resume normal position.

6. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure biased into position preventing passage of liquid to said conduit from said tanks, pneumatic-controlled means for holding said valve structure in position to pass liquid to said conduit from a selected tank, and means operative in a plurality of regions for disabling said last-mentioned means to permit said valve structure to resume its original position.

7. In a liquid dispensing system, a plurality of liquid containing tanks connected to a discharge conduit, valve structure normally positioned to prevent passage of liquid to said conduit from said tanks, a piston, a spring biasing said piston in one direction, pneumatic means normally holding said piston in another direction against the expansive tendency of said spring to hold said valve

structure in a selected position, and means operative in a plurality of regions for disabling said pneumatic means to permit movement of said piston in said one direction.

8. In a liquid dispensing system, a tank connected to a discharge conduit, valve structure normally preventing passage of liquid to said conduit from said tank, pneumatic-controlled means for holding said valve structure in position to pass liquid from said tank to said conduit, and means operative in a plurality of regions for disabling said last mentioned means to permit said valve structure to resume normal position.

9. In a liquid dispensing system, a plurality of tanks, a conduit leading to one destination for passing liquid from one group of said tanks, a second conduit leading to another destination for passing liquid from another tank, valve structures interposed in said conduits normally preventing passage of liquid from any of said tanks, and common means for holding said valve structures in position to pass liquid from one tank of said group and from said other tank.

10. In a liquid dispensing system, a plurality of tanks, a conduit leading to one destination for passing liquid from one group of said tanks, a second conduit leading to another destination for passing liquid from another tank, valve structures interposed in said conduits normally preventing passage of liquid from any of said tanks, means for holding said valve structures in position to pass liquid from one tank of said group and from said other tank, and means controlling said last-mentioned means for permitting said valve structures to resume normal position.

11. In a liquid dispensing system, a plurality of tanks, a conduit leading to one destination for passing liquid from one group of said tanks, a second conduit leading to another destination for passing liquid from another tank or group of tanks, valve structures interposed in said conduits normally preventing passage of liquid from any of said tanks, pneumatic-controlled means for holding said valve structures in position to pass liquid from one tank of each group, and means controlling said last mentioned means for permitting said valve structures to resume normal position.

12. In a liquid dispensing system, a plurality of tanks, a conduit passing liquid from one group of said tanks, a second conduit connected with said first mentioned conduit for passing liquid from another group of said tanks, valve structures interposed in said conduits normally preventing passage of liquid from any of said tanks, means for selecting and segregating the group of tanks from which liquid is to be withdrawn, pneumatic-controlled means for holding the valve structure of the selected group in position

to withdraw liquid from less than all the tanks of said group, and means controlling said last mentioned means for causing said valve structure to resume normal position.

5 13. In a liquid dispensing system, a plurality of tanks, a conduit leading to one destination for passing liquid from one group of said tanks, a second conduit leading to the same destination for passing liquid from another group of said tanks, a third conduit
10 leading to another destination for passing liquid from another tank, valve structures interposed in said conduits normally preventing passage of liquid from any of said tanks, means for selecting and segregating
15 one of said groups of tanks from which liquid is to be withdrawn, pneumatic-controlled means for holding the valve structure of the selected group in position to withdraw liquid from less than
20 all the tanks of said group, pneumatic-controlled means for holding the valve structure in said third mentioned conduit in position to independently withdraw liquid from said
25 tank, and means for permitting the actuated valve structures to simultaneously resume normal position.

14. A liquid dispensing system comprising a plurality of groups of tanks, valve mechanisms controlling withdrawal of liquid from
30 the tanks of a group, means for actuating said valve mechanisms alternately, fluid-pressure-operated means locking one of said valve mechanisms in open position, and a valve in
35 one position causing application of fluid pressure to the fluid-pressure-operated means of one group of tanks and cutting off the fluid pressure from the fluid-pressure-operated means of the other group of tanks.

40 15. A liquid dispensing system comprising a plurality of groups of tanks, valve mechanisms controlling withdrawal of liquid from the tanks of a group, means for actuating said valve mechanisms alternately, fluid-pressure-
45 operated means locking one of said valve mechanisms in open position, a valve in one position causing application of fluid pressure to the fluid-pressure-operated means of one group of tanks and cutting off the fluid pressure
50 from the fluid-pressure-operated means of the other group of tanks, and means for bleeding the fluid pressure.

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