C. H. SELIN.

PUMP.

APPLICATION FILED MAY 28, 1921.

1,437,686.

Patented Dec. 5, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

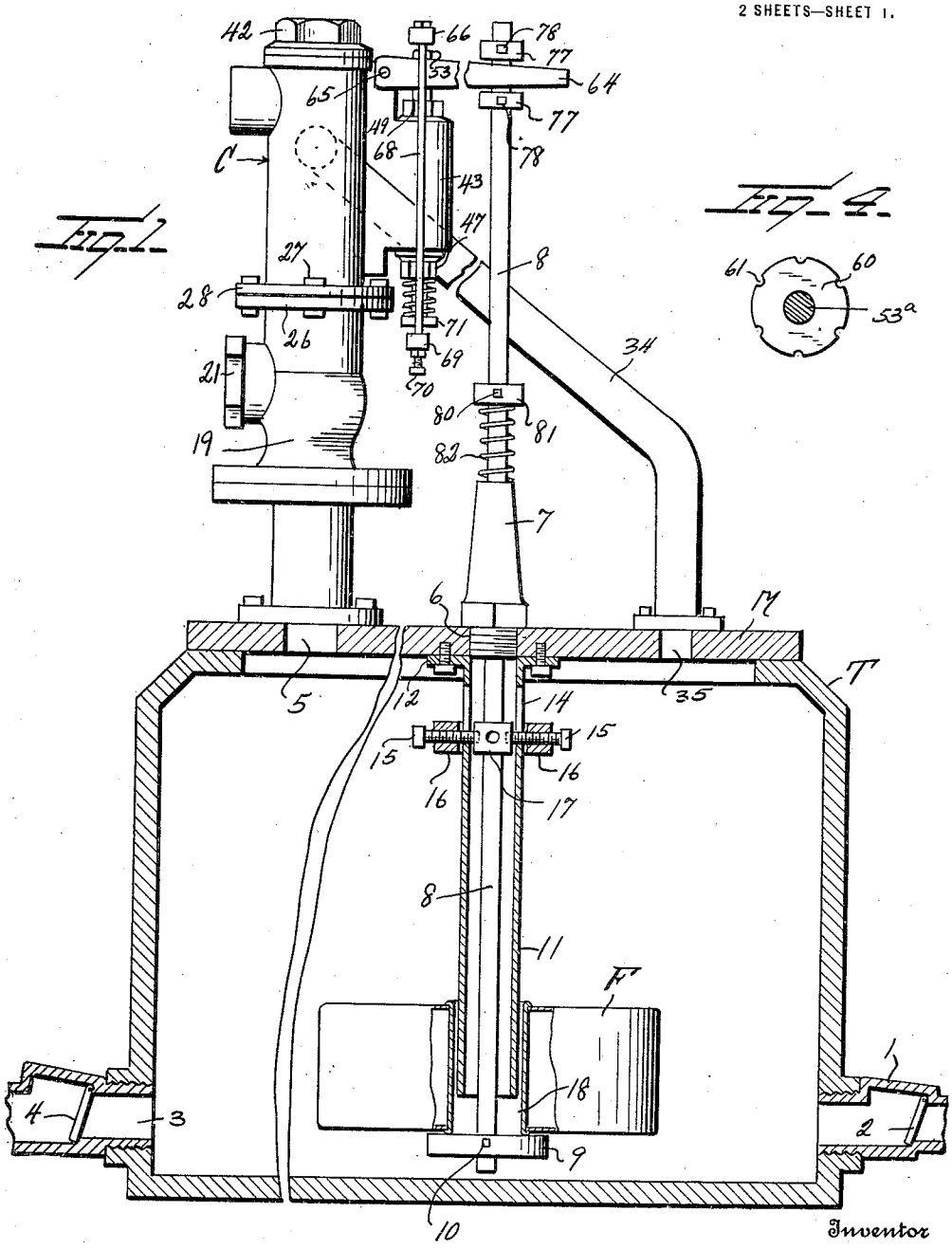


Fig. 4.

Inventor

C. H. Selin

By Watson E. Coleman

Attorney

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2 SHEETS—SHEET 2.

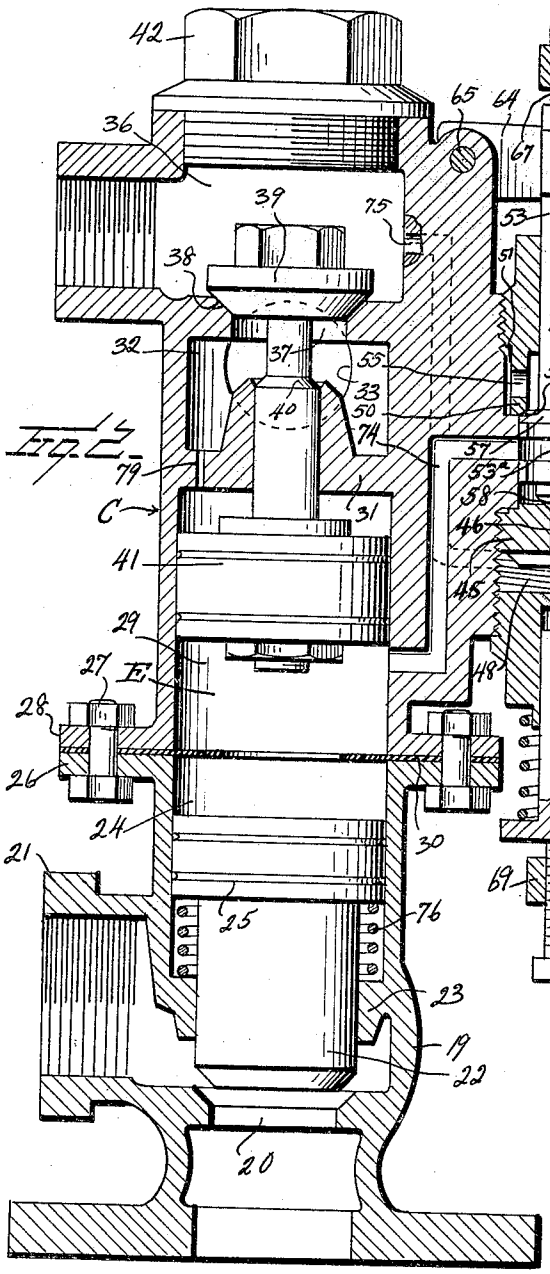


Fig. 2.

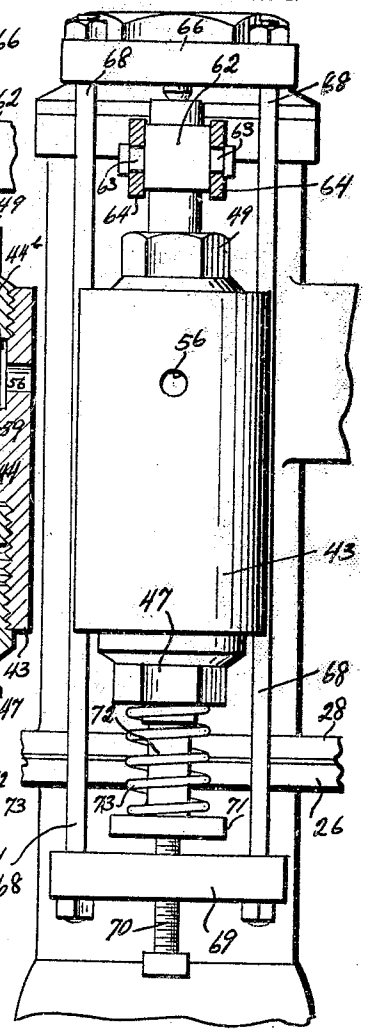


Fig. 3.

Inventor

C. H. Selin

By Watson E. Coleman

Attorney

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UNITED STATES PATENT OFFICE.

CHARLES H. SELIN, OF BROOKLYN, NEW YORK.

PUMP.

Application filed May 28, 1921. Serial No. 473,423.

To all whom it may concern:

Be it known that I, CHARLES H. SELIN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain improvements in pumps, and it is an object of the present invention to provide a novel and improved device of this general character embodying a structure wherein the main valve and the pilot valve are enclosed in a single casting.

Another object of the invention is to provide a novel and improved device of this general character wherein the pilot valve is normally held to its seat by a spring together with means whereby the tension of the spring may be varied or regulated in accordance with the requirements of practice.

An additional object of the invention is to provide a novel and improved device of this general character embodying a main valve opening under pressure and wherein is embodied a vent with which coacts a normally open valve closing by pressure controlled by a pilot valve.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved pump whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:

Figure 1 is a view partly in section and partly in elevation illustrating a pump constructed in accordance with an embodiment of my invention and in applied position with respect to a drainage tank or reservoir.

Figure 2 is an enlarged view partly in section and partly in elevation of my improved pump as herein disclosed.

Figure 3 is a view in elevation of my improved pump as herein disclosed and viewing the same substantially at right angles to the elevation in Figure 2.

Figure 4 is a sectional view taken between the valve heads of the pilot valve.

As disclosed in the accompanying drawings, T denotes a tank or reservoir of a general type employed in connection with the drainage aboard vessels and particularly seagoing ships, although it is to be understood that said tank or reservoir T may be employed in connection with stationary work on land.

The lower portion of the tank or reservoir T in a side wall thereof is provided with an intake 1 under control of a check valve 2, and a second wall of the tank or reservoir T in its lower portion is provided with a discharge 3, with which is associated a check valve 4. The tank or reservoir T includes a removable top or cover member M provided with a vent or port 5.

The central portion of the top or cover M is provided with an opening 6 in which is suitably engaged the lower end portion of an upstanding tubular member 7 through which is slidably disposed a rod 8. The lower portion of the rod 8 extends within the tank or reservoir T and terminates at a point normally in relatively close proximity to the bottom of said tank or reservoir T. Secured to the lower or inserted end portion of the rod 8 is a head or disk 9. In the present embodiment of my invention, the head or disk 9 is secured to the rod 8 by a clamping screw 10 or the like whereby the postion of said head or disk 9 upon the rod 8 may be varied or adjusted as the requirements of practice may prefer or necessitate.

The lower or inserted end portion of the rod 8 also passes through a sleeve 11 substantially defining the opening 6 and which sleeve 11 is provided at its upper end with an upstanding flange 12 whereby the sleeve 11 may be effectively secured to the top M. The sleeve 11 is provided in its upper portion with the longitudinally disposed slots 14, through which freely extend the elongated clamping screws 15. These screws 15 are threaded through an annular member or collar 16 surrounding the sleeve 11 and having free movement lengthwise of said sleeve 11. The inner end portion of the clamping screws or members 15 are also disposed through a collar 17 arranged within the sleeve 11 and surrounding the rod 8, said screws or members 15 having binding action upon said rod 8 whereby the collars 16 and 17 are effectively maintained in desired posi-

tion on the rod 8. The slots 14 provide means whereby the position of the collars 16 and 17 may be adjusted as preferred or required in a direction lengthwise of the rod 8.

While Figure 1 of the drawings show two clamping screws or members 15, it is to be understood that they may be of any desired number.

F denotes a buoyant member or float of an annular type providing a central opening 18 through which the sleeve 11 extends and whereby the float F has free sliding movement lengthwise of the sleeve 11. The sleeve 11 is of particular importance and advantage when my device is employed on sea going vessels, as the said sleeve provides an effective guard against breakdowns due to rolling and pitching of the vessel.

The movement of the float F lengthwise of the sleeve 11 is limited by the head or disk 9 and the annular member or collar 16, as will hereafter be explained, and said head or disk 9 and the annular member or collar 16 also provides means, to be explained later, whereby the float F operates to impart endwise movement to the rod 8.

Bolted or otherwise secured to the top or cover M is a relief valve body or casing 19, the bore of which being in communication with the vent or port 5. The body or casing 19 is provided with an internal valve seat 20 and said body or casing 19 outwardly of the internal valve seat 20 has in communication therewith a vent 21 adapted in communication with the atmosphere.

Coacting with the valve seat 20 is a plunger valve 22 snugly extending through a guide septum or plate 23 within the body or casing 19. The portion of the body or casing 19 outwardly of the septum or plate 23 constitutes a cylinder 24 in which is snugly fitted a piston 25, said piston being carried by the outer end portion of the plunger valve 22. It is to be particularly noted that the area of the piston 25 is greater than that of the valve seat 20.

The outer end of the body or casing 19 and more particularly the cylinder 24 is open and said open end is defined by an outstanding annular flange 26 to which is bolted or otherwise secured, as at 27, an outstanding flange 28 defining the lower open end of a cylinder 29 formed in the casing C. Interposed between the flanges 26 and 28 is a gasket 30 so that the joint between said flanges will be pressure proof.

The inner head 31 of the cylinder 29 separates said cylinder from the chamber 32. In communication with the chamber 32 is a pressure outlet 33 from which leads a pressure line 34 in communication with the tank or reservoir T through a port 35 provided in the top or cover M.

Casting C outward of the chamber 32 is provided with a pressure inlet 36 in communication with the chamber 32 through an opening or port 37. The outer portion of the opening or port 37 is provided with a valve seat 38 with which cooperates a valve 39. The valve 39 is provided with an inwardly directed stem 40 which is slidably disposed through the head 31 of the cylinder 29. Snugly fitting within the cylinder 29 and secured to the stem 40 is a piston 41. The outer or top wall of the inlet 36 comprises a pressure regulating cap 42 in threaded engagement with the casting C as particularly illustrated in Figure 2 of the accompanying drawings. Comprised in the casting C is a substantially cylindrical body 43 having disposed axially thereof a bore 44 the opposite end portions of which being enlarged as at 44^a and 44^b. Threaded within the lower portion 44^a is a member or body 45 having a central opening or port 46. Also threaded within the portion 44^a of the member 44 of the body 43 is a cap 47, the applied cap 47 and the member or body 45 being spaced to afford a chamber 48 therebetween.

Threaded within the portion 44^b of the member 44 of the body 43 is a cap 49 provided with a depending annular flange or skirt 50 which coacts with the inner wall of the enlarged portion 44^b and which is spaced from the side wall of said enlarged portion whereby an annular chamber 51 is provided. The lower or free marginal portion of the flange or skirt 50 constitutes a valve seat 52 to be hereinafter referred to. The flange or skirt 50 is also spaced from a valve stem 53 slidably disposed through the cap 49 and said flange or skirt is spaced from said stem to provide an annular chamber 54. The chambers 51 and 54 are in communication one with the other through the ports 55 provided in the flange or skirt 50. The chamber 51 is in communication with the atmosphere through the port 56 provided in the wall of the body 43.

The inserted end portion of the stem 53 is provided with the longitudinally spaced valves or heads 57 and 58, the same being connected by a reduced portion 53^a of the stem. The valve 57 coacts with the valve seat 52 hereinbefore referred to, while the valve 58 coacts with the opening or port 46 hereinbefore referred to. Associated with the valve or head 57 is a guide disk 59 and a similar disk 60 is associated with the valve or head 58. The peripheries of the disks 59 and 60 are provided with the grooves or channels 61 for a purpose to be hereinafter more particularly referred to.

The outer end portion of the stem 53 is provided with an enlargement 62 provided with oppositely directed trunnions 63 which are pivotally engaged with the lifting arms 64 at a point in relatively close proximity to the pivotal connection 65 of said arms

with the casting C so that upon swinging movement of the arms 64 corresponding endwise movement will be imparted to the stem 53 and the valves or heads 57 and 58 carried thereby.

Extending transversely of the arm 64 and positioned above the stem 53 is a cross member 66 provided at its central portion with a depending conoidal member or head 67, said member or head having direct contact with the adjacent or outer end of the stem 53. Secured to the opposite end portions of the cross member 66 are the bars 68 which extend downwardly at opposite sides of the body 43 and terminates a desired distance therebelow. Connecting the lower extremities of the arms or bars 68, is a second cross member 69. Threaded upwardly through the central portion of the member 69 is a bolt or shank 70. The upper end portion of the shank 70 contacts with a head 71 carried by the lower or outer end portion of an elongated member or shank 72, the member 72 telescoping within the cap 47 so that said member 72 may be adjusted lengthwise. Interposed between the cap 47 and the head 71 is an expansible member or coil spring 73 encircling the elongated member or shank 72 and which operates to constantly urge the bars 68 and the head 66 downwardly whereby the valve or head 58 normally closes the opening or port 46 and whereby the valve or head 57 is normally in an open position with respect to its seat 52. The tension of the member or spring 73 may be regulated or varied as desired by proper adjustment of the bolt or shank 70.

The cylinders 24 and 29 are in continuation one of the other and the portions of said cylinders 24 and 29 between the pistons 25 and 41 constitute an expansion chamber E. In communication with the chamber E and the bore 44 of the body 43 is a port or passageway 74, the communication between said port or passageway 74 and the bore 44 being normally at a point between the valves or heads 57 and 58 hereinbefore referred to. A second port or passageway 75, indicated by dotted lines in Figure 2, leads from the pressure inlet 36 to the chamber 48.

The plunger valve 22 hereinbefore referred to is constantly urged into open position by an expansible member or coil spring 76 encircling the valve 22 and interposed between the piston 25 and the septum or plate 23.

Extending between the outer end portions of the arms 64 is the upper end portion of the rod 8 and secured to the rod 8 and above and below the arms 64 for contact therewith are the collars or sleeves 77 held in desired position upon the rod 8 by the clamping screws 78 or the like.

The pressure may be air, steam or other fluid and with the pressure maintained within the inlet 36 and the passageway or port 75, the upward movement of the float F, will cause said float F to contact with the member or collar 16 and move the rod 8 upwardly sufficient to unseat the valve or head 58 and to close the valve or head 57. The pressure will then pass from the inlet 36 through the passageway or port 75 to the chamber 48 and from the chamber 48 through the port 46 into the bore 44 and through the peripheral grooves 61 in the lower disk or head 60 to the port or passageway 57. The pressure passes through the port or passageway 57 to the chamber E between the pistons 25 and 41. The pressure will build up in the chamber E forcing the piston 25 downwardly to seat the valve 22 and thereby close the vent 21. At the same time the piston 41 will move upwardly and unseat the valve 39. The pressure will then pass from the inlet 36 into the chamber 32 and through the port 33 and the line 34 and will enter within the tank or reservoir T through the port 35 in the top or closure member M and above the liquid within said tank or reservoir. Admitting the pressure on top of the water, sewerage or other liquids admitted within the tank or reservoir T, which is of a closed type, results in such liquid being expelled through the discharge 3. As the level within the tank or reservoir T lowers the float F will move downwardly and when the same comes into contact with the head or disk 9, the weight of the float F will result in the rod 8 moving downwardly with a corresponding movement to the stem 53. This downward movement of the stem 53 returns the valve or head 58 to its seat and moves the valve or head 57 into open position. This cuts off the pressure in the chamber E and such pressure escapes through the passageway of the member 74 through the peripheral groove 61 in the disk or head 59 into the chamber 54 and from the chamber 54 through the port 55 into the chamber 51 and to the atmosphere through the port 56.

As the pressure is reduced in the chamber E the valve 39 returns to its seat and the valve 22 moves into open position. With the valve 22 in open position, the pressure within the tank or reservoir T is discharged through the vent 21. The valve 22 moves from its seat by two forces, namely, by the pressure within the tank or reservoir T after the valve or head 58 seats, and also by the action of the expansible member or spring 76. The valve 22 remains open during the refilling of the tank or reservoir T.

The cylinder 29 inwardly of the piston 41 and the chamber 32 are in communication by a port 79 provided in the head 31 and this port 79 serves to prevent balancing the pressure on opposite sides of the piston 41.

Fixed to the rod 8, by the binding screw 80 or the like, in relatively close proximity to the member 7 is a collar 81. Interposed between the collar 81 and the adjacent end of the member 7 is an expansible member or coil spring 82 encircling the rod 8. This expansible member or spring 82 is particularly adapted for use in the event the rod 8 and various collars carried thereby exceed a predetermined weight and preferably in excess of two pounds.

As is clearly illustrated in Figure 2, the gasket 30 extends inwardly of the cylinders 24 and 29, and whereby an abutment is provided for limiting the upward or inward movement of the piston 25.

It is also to be understood that the arms 64 have sufficient freedom of movement with respect to the trunnions 63 to prevent binding when the arms are moved upwardly or downwardly as hereinbefore referred to.

From the foregoing description it is thought to be obvious that a pump constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:

1. In combination with a closed tank provided with an inlet and an outlet and with a vent, a member provided with an expansion chamber and with a second chamber in communication with a pressure inlet, said member being also provided with a vent in communication with the vent of the tank, a valve controlling the flow through the vent of the member and extending within the expansion chamber, the portion of the valve within the expansion chamber constituting a piston, means for normally urging the valve into an open position, a normally closed valve member controlling the communication between the pressure inlet and the second chamber and also extending within the expansion chamber, the portion of the valve member within the expansion chamber constituting a piston, and means operating upon the rise of the fluid level within the tank to admit pressure from the pressure inlet into the expansion chamber between the pistons to cause the first named valve to move into closed position and a second named valve to move into open position, said means operating upon the fall of the liquid level to shut off the pressure into the expansion chamber and to vent the same.

2. In combination with a closed tank provided with an inlet, an outlet and with a vent, a member provided with an expansion chamber and with a second chamber in communication with a pressure inlet, said member being also provided with a vent in communication with the vent of the tank, a valve controlling the flow through the vent of the member and extending within the expansion chamber, the portion of the valve within the expansion chamber constituting a piston, means within the expansion chamber and co-acting with the piston for urging the valve into open position, a normally closed valve member controlling the communication between the pressure inlet and the second chamber and also extending within the expansion chamber, the portion of the valve member within the expansion chamber constituting a piston, and means operating upon the rise of the fluid level within the tank to admit pressure from the pressure inlet into the expansion chamber between the pistons to cause the first named valve to move into closed position and a second named valve to move into open position, said means operating upon the fall of the liquid level to shut off the pressure into the expansion chamber and to vent the same.

3. In combination with a closed tank provided with an inlet and an outlet and with a vent, a member provided with an expansion chamber and with a second chamber in communication with a pressure inlet, said member being also provided with a vent in communication with the vent of the tank, a valve controlling the flow through the vent of the member and extending within the expansion chamber, the portion of the valve within the expansion chamber constituting a piston, means for normally urging the valve into an open position, a normally closed valve member controlling the communication between the pressure inlet and the second chamber and also extending within the expansion chamber, the portion of the valve member within the expansion chamber constituting a piston, means operating upon the rise of the fluid level within the tank to admit pressure from the pressure inlet into the expansion chamber between the pistons to cause the first named valve to move into closed position and a second named valve to move into open position, said means operating upon the fall of the liquid level to shut off the pressure into the expansion chamber and to vent the same, and means within the expansion chamber for limiting the movement of the first named valve in a direction away from its seat.

4. In combination with a closed tank provided with an inlet and an outlet and with a vent, a member provided with an expansion chamber and with a second chamber in communication with a pressure inlet, said

member being also provided with a vent in communication with the vent of the tank, a valve controlling the flow through the vent of the member and extending within the expansion chamber, the portion of the valve within the expansion chamber constituting a piston, means for normally urging the valve into an open position, a normally closed valve member controlling the communication between the pressure inlet and the second chamber and also extending within the expansion chamber, the portion of the valve member within the expansion chamber constituting a piston, means operating upon the rise of the fluid level within the tank to admit pressure from the pressure inlet into the expansion chamber between the pistons to cause the first named valve to move into closed position and a second named valve to move into open position, said means operating upon the fall of the liquid level to shut off the pressure into the expansion chamber and to vent the same, a wall of the pressure inlet constituting a pressure regulating cap.

In testimony whereof I hereunto affix my signature.

CHARLES H. SELIN