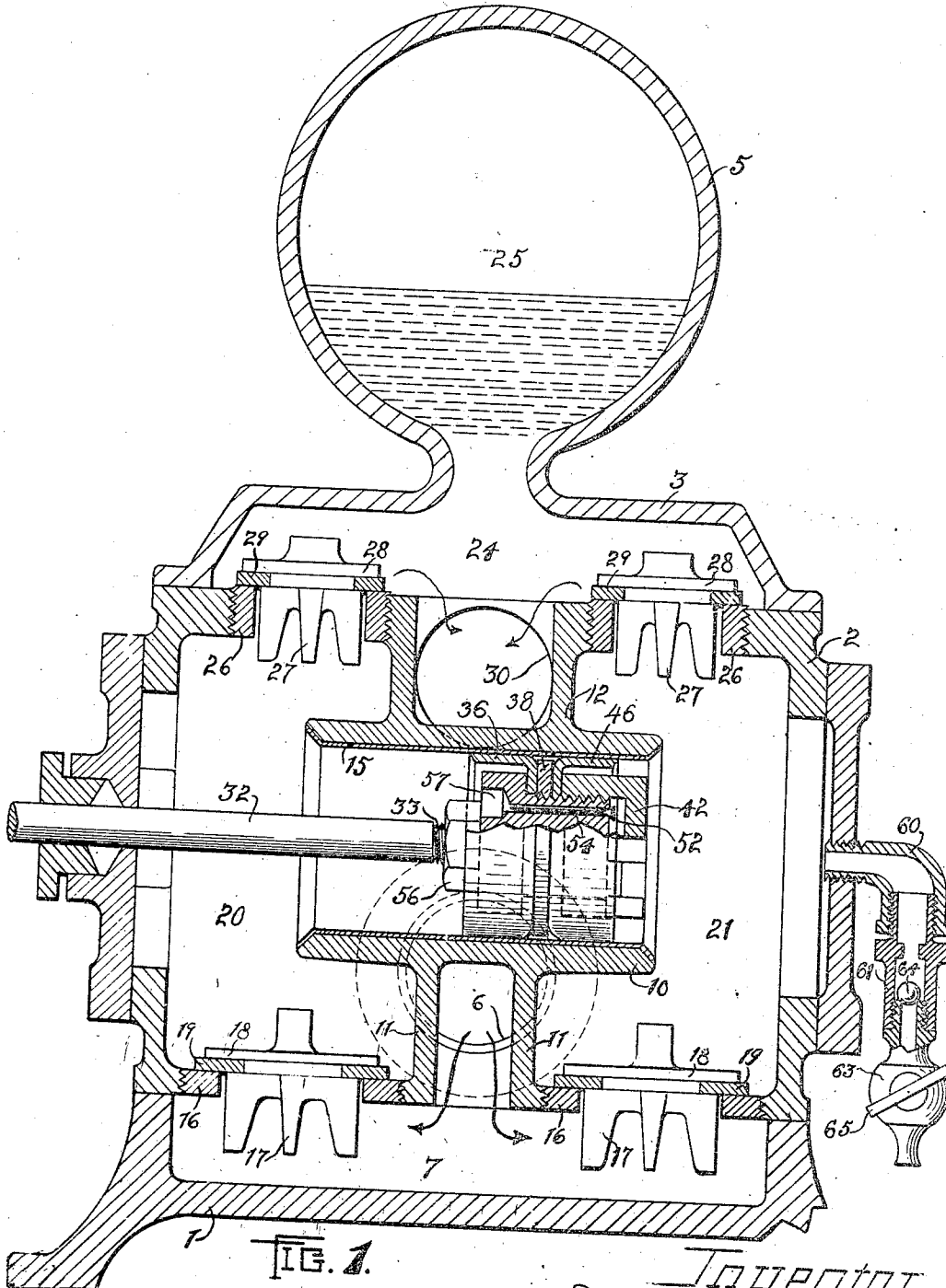


1,297,035.

J. M. STRATTON.
PUMP.
APPLICATION FILED APR. 1, 1918.

Patented Mar. 11, 1919.
2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

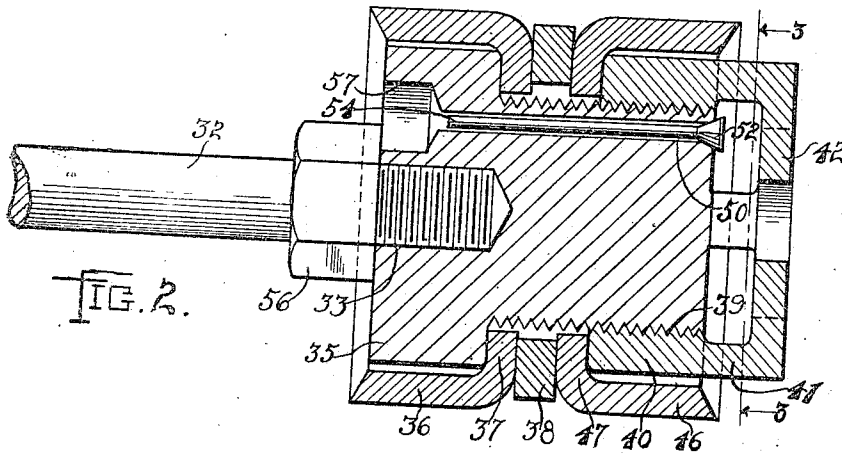


FIG. 2.

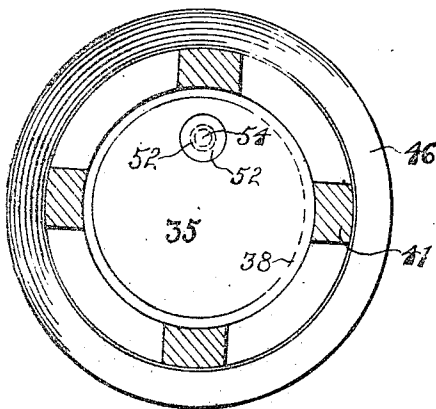


FIG. 3.

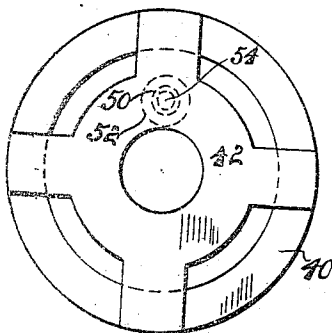


FIG. 4.

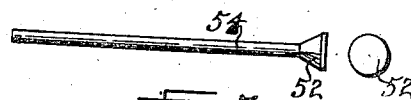


FIG. 5.

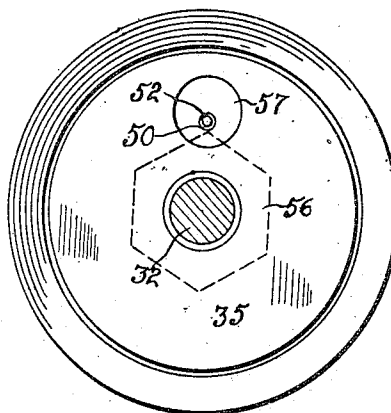


FIG. 6.

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UNITED STATES PATENT OFFICE.

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PUMP.

1,297,035.

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To all whom it may concern:

Be it known that I, JAMES M. STRATTON, residing at Salem, in the county of Columbia and State of Ohio, have invented a certain new and useful Improvement in Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to pumps adapted for use with tanks into which water is forced by the pump against air compressed therein and furnishing the pressure for forcing the water to the point of use. Frequently due to leakage in the tank or connections, such air becomes exhausted or so reduced in volume that sufficient pressure can not be obtained or that the use of a very small amount of water results in exhausting the pressure. To avoid this difficulty it is necessary to introduce small quantities of air, preferably continuously, while the pump is operating to compensate for the loss.

It is the object of the present invention to avoid the above difficulty and supply sufficient air in the most desired manner by the use of a very simple, inexpensive device not liable to get out of order, capable of very easy adjustment and automatic in its operation.

My invention is hereinafter more fully described in connection with the accompanying drawings illustrating a preferred embodiment of the same. Additional advantages will become apparent in the following description. The essential characteristics are summarized in the claims.

In the drawings, Figure 1 is a vertical sectional view through a force pump embodying my invention; Fig. 2 is an enlarged axial section through the piston constructed in accordance with this invention; Fig. 3 is a sectional end elevation of the piston on the line 3—3 of Fig. 2; Fig. 4 is an end elevation of the piston looking in the same direction as Fig. 3; Fig. 5 is a detail of the piston valve removed; Fig. 6 is a sectional end elevation of the end of the piston opposite that shown in Fig. 4.

Describing the parts by the use of reference characters, 1 indicates a suitable base supporting a casing 2, formed to comprise the suction chambers and cylinder of the pump and 3 is a casing mounted on the first-mentioned casing and forming the discharge chamber and having a suitable enlargement

5 forming the air chamber. The cylinder 10 is a tubular member integral with the casing 2 and supported by separated partitions 11 and 12, while the cylinder is open at each end and provided with a suitable noncorrosive lining 15. 6 indicates the inlet opening connected with the supply line through which water may pass between the supporting partitions 11 to the valve chamber 7 formed in the base 1.

Mounted on the lower portion of the casing 2 are valve seats 16 cooperating with valves comprising body members having guides 17 loosely movable through the seats and connected with outwardly extending disk-like flanges 18 beneath which are resilient washers 19 fitting the upper portions of the seats. These valves as illustrated are seated by gravity although it is to be understood that they may be operated by springs in any well known manner desired. These inlet valves control the passage of water from the chamber 7 to the suction chambers 20 and 21 at each end of the casing and in open communication with the ends of the cylinder 10.

At the upper portion of the suction chambers 20 and 21 are provided discharge valves of a construction similar to the inlet valves, there being suitable valve seats 26 through which project the valve guides 27 rigid with the overhanging flange 28 while resilient washers 29 carried by the valve fit between the flanges 28 and the upper surface of the valve seats. Water passing from the suction chambers through the valve seat openings under the control of the discharge valves enters the discharge chamber 24 and air chamber 25 and passes outwardly through the discharge opening 30, connected with the tank or receptacle (not shown) supplied by the pump.

Operating in the cylinder 10 is suitable piston reciprocated by the piston rod 32 having a threaded portion 33 engaging internal threads in a body member 35. This body member is provided with an enlarged head portion at the end adjacent the piston rod which is surrounded by the usual resilient packing in the form of a skirt 36, having an inwardly turned portion 37 clamped between the inner shoulder of the head and a ring 38. The body member 35 has a reduced extension externally threaded, as at 39 receiving a spider like cap having an in-

ternally threaded ring 40, outward extensions 41 and a transverse connecting spider 42 in the nature of an open disk or ring integral with the extensions 41, the open disk 5 being spaced away from the end of the body member 35. The exterior of the ring 40 is preferably of the same diameter as the head of the body member 35 whereby its inner end forms a shoulder adapted to clamp an inwardly turned portion 47 of a resilient skirt 46 turned in the opposite direction from the skirt 36. It will be seen that this cap acts to clamp both packing members and retain them in position. The ring 38 is slightly smaller in diameter than the interior of the cylinder, whereby the contact of the piston with the cylinder is formed entirely by the resilient members 36 and 46.

Extending longitudinally through the piston body is a small passage 50, substantially parallel with the axis and open at each end of the body member. At the end toward the spider cap this opening is shown as provided with inwardly beveled portion adapted to form a seat for a conical valve 52 having a long rigid stem 54 extending substantially through the passage 50 and being sufficiently smaller than the passage to leave an opening around the stem and permit a small amount of water to pass when the valve 52 is opened. It is desirable to use a lock nut 56 on the threads 33 set tightly against the piston body member 35 and to prevent this nut closing or partially closing the passage 50, I provide an enlarged cavity 57 at this end of the piston body into which this passage opens.

The pump shown and described is a double acting force pump, the water being drawn into one suction chamber, consequent upon the movement of the piston away from that chamber and forced from that chamber through its discharge valve consequent upon the movement of the piston toward the chamber.

At 60 is indicated a pipe connection threaded into the head of the chamber 21, and threaded thereto is shown a check valve chamber 61 receiving the threaded end of a pet cock body 63 forming a seat for a ball stopper 64. 65 designates a thumb piece for operating the pet cock plug. These parts form a passage leading to a suction chamber and controlled by a check valve and a manually adjustable valve.

The operation of my invention may be briefly described as follows: Upon reciprocation of the piston water is drawn into and forced from the chambers 20 and 21 in substantially the normal manner. Each movement of the piston away from the chamber 21 draws a small amount of air through the valves 63 and 64, the pet cock plug being set so that it is opened but very slightly. Air thus drawn into the chamber 21 passes

with the water into the discharge chamber, thence to the tank. The same movement of the piston causes a small amount of water to pass through the opening 50 from the chamber 20 to the chamber 21, but upon the movement of the piston toward the chamber 21 the valve 52 closes preventing passage of water or air in the opposite direction. Accordingly if air accumulates in the chamber 21 water pumped from the opposite chamber 20 through the piston displaces such air raising the pressure in the chamber 21 and forcing the air therein out through the discharge valve. Thus even though air accumulates in the chamber 21 it may not stop the pumping of water therethrough as would be the case were the piston passage and valve not used. Experience has demonstrated that without a device for pumping a small amount of water from one side of the piston to the other, air may accumulate in the suction chamber 21 and remain there, merely expanding and contracting with the movement of the piston and preventing pumping of water therethrough.

The spider 42 limits the opening movement of the valve 52 while the long stem 54 of this valve reciprocating in the passage on each stroke of the piston keeps this passage free from foreign particles and prevents clogging of the same. This spider being threaded to the piston body provides for its convenient removal allowing access to the valve 52.

In the foregoing description, it will be seen that I have provided a very simple, inexpensive device for accomplishing the objects set out. Furthermore, the construction of the piston embodying this device is very simple and effective, the body portion of the piston carrying a head forming an internal support for the packing skirt 36, keeping it distended and in contact with the lining of the cylinder, while the threaded ring 44 of the spider cap forms a similar support for the flexible skirt 46.

Having thus described my invention, what I claim is:—

1. In a force pump, the combination of a cylinder, a casing having chambers in communication with each end of the cylinder, an air inlet to one of said chambers, a piston reciprocating in said cylinder, a single passage through said piston, adapted to permit the escape of an appreciable amount of air or very small amount of water, and a freely opening valve in said passage closing during movement of the piston in the direction toward said air inlet.

2. In a force pump, the combination of a casing having a cylinder therein and combined suction and force chambers in open communication with each end of the cylinder and larger than the cylinder, a piston in the cylinder, inlet and discharge valves for

said chambers, an air inlet to one of said chambers, a passage through the piston connecting the chambers, and a valve in said passage adapted to freely open in one direction of movement and close in the other, the piston being otherwise permanently closed.

3. In a force pump, the combination of a cylinder, a casing having chambers in communication with each end of the cylinder, a piston in said cylinder, a small passage through said piston, adapted to permit the passage of only a small amount of water, and an air inlet passage leading to one of said chambers.

4. In a force pump, the combination of a casing having a cylinder therein and a suction chamber in open communication with the cylinder, a piston in the cylinder, inlet and discharge valves for the suction chamber, a passage through the piston, a valve in said passage closing on the movement of the piston toward the chamber, an air inlet passage leading to said chamber, and a check valve in said passage.

5. In a pump, the combination of a casing, a cylinder therein, a chamber in communication with the cylinder, a piston in said cylinder, a small relief passage through the piston, a valve closing said passage consequent upon the movement of the piston toward the chamber, an air inlet passage leading to said chamber, and an adjustable valve in said passage.

6. The combination in a force pump, of a casing, a cylinder therein, a suction chamber in communication with the cylinder, a piston in said cylinder, a passage through the piston, a valve for closing said passage during movement of the piston toward the chamber, an air inlet passage leading to said chamber, a check valve, and an adjustable valve in said passage.

7. A force pump having a cylinder and a piston thereof, and adapted to present water to each side of the piston, a suction chamber

in communication with the piston at one side thereof, having inlet and discharge valves, and a port through the piston, and means for closing said port when the piston is moving toward the chamber, means for admitting a small amount of air into the chamber upon the suction movement of the piston.

8. In a force pump, the combination of a cylinder, a chamber in communication therewith, a valved inlet and a valved outlet for said chamber, an air inlet passageway to said chamber, a piston in said cylinder, a passage through said piston, a valve for closing said passage during the movement of the piston toward said chamber.

9. The combination of a cylinder, a chamber in communication therewith, a valved inlet to said chamber, a valved outlet from said chamber, a piston in said cylinder having a passage through it, an air passage independent of the piston to said chamber, and a check valve in said air passage.

10. The combination of a cylinder, chambers respectively in communication with the opposite ends of the cylinder, said chambers having inlet and outlet valves, a piston reciprocating in said cylinder, a passage through said piston, an air inlet into one of said chambers, and a check valve in the inlet passageway.

11. The combination of a cylinder, chambers in communication with the opposite ends of the cylinder, a piston reciprocating in the cylinder, a passage through the piston, a valve in said passage closing in one direction of the movement and opening in the other, an air inlet passageway independent of the piston to the chamber with which said valve controls communication, and a check valve in the inlet passageway.

In testimony whereof I hereunto affix my signature.

JAMES M. STRATTON.