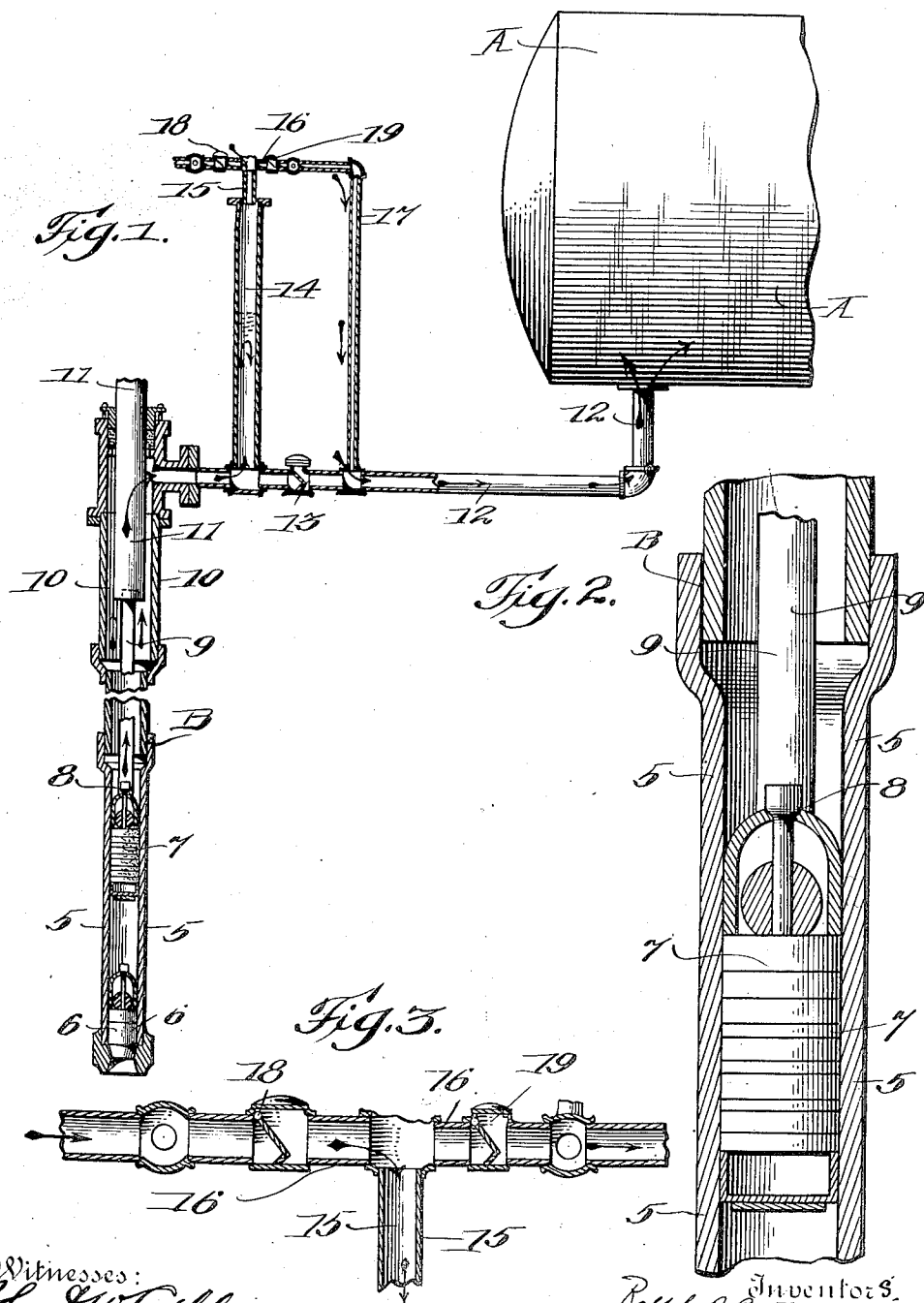


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 PNEUMATIC PRESSURE APPARATUS FOR WATER TANKS.
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Patented May 10, 1910.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC PRESSURE APPARATUS FOR WATER-TANKS.

957,304.

Specification of Letters Patent.

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Application filed January 30, 1907. Serial No. 354,823.

To all whom it may concern:

Be it known that we, RALPH B. CARTER, a citizen of the United States, and a resident of Haworth, in the county of Bergen and State of New Jersey, and JAMES L. MAULL, a resident of the city of New York, borough of Manhattan, county and State of New York, have invented certain novel and useful Improvements in Pneumatic Pressure Apparatus for Water-Tanks, of which the following is a specification.

This invention relates to certain novel and useful improvements in a pressure apparatus adapted especially for use in connection with storage tanks, and particularly such tanks as are commonly employed for storing water for use in residences and other structures.

As is well known, it is a common practice today, especially in buildings isolated from a source of water supply, to pump water from a well, cistern or the like, and store the same in a tank from whence it is drawn as needed. Sometimes in connection with the storage tank a pneumatic or air pressure apparatus is employed by means of which air is supplied to the tank. When the water is to be drawn from the tank, as by the operation of opening a faucet, the air compressed in the tank acts to force the water at the proper head through the outlet. It is our intention to provide an apparatus by means of which the tank may be supplied with water and the necessary air for exerting pressure to give the water the proper head or force when drawn through an outlet.

With this end and others of a similar nature in view, the invention consists in the construction, combination and arrangement of parts set forth in and falling within the scope of the appended claims.

In the accompanying drawings wherein we have illustrated one embodiment of our invention, Figure 1 is a view partly in elevation and partly in section showing a portion of the tank, and a partial view of a pump with the air and water connections located therebetween; Fig. 2 is an enlarged detail sectional view of the piston of the pump, or that part which is commonly located within the well or reservoir; Fig. 3 is a detail sectional view showing the location of the air inlet valves, a portion of the pipe leading to the air and water chamber and the discharge valve for the air.

Referring now to the accompanying drawings in detail, the letter A indicates a tank or chamber for the reception of the water, which tank partakes of the function of a storage device and may be of any suitable character or form.

The letter B indicates a pump adapted to be located in a well, cistern or reservoir. This pump comprises also the cylindrical portion 5 having located therein the water inlet valve 6. The water displacement plunger is shown at 7 and is connected at 8 with the plunger rod 9. The upper portion 10 of the pump cylinder is of larger diameter in cross section than the lower portion 5, and reciprocating therein is the water displacement plunger 11. This plunger is also relatively larger in cross diameter than the water displacement plunger 7 and the fact of making the plunger 11 larger or of greater displacing ability than the part 7 forms an important feature of the invention. Leading from the upper cylinder 10 to the tank A is the pipe or conduit 12 having located therein the trap valve 13 so arranged as to prevent the back flow of fluid from the tank to the cylinder. Connected to the pipe 12 between the valve 13 and the upper cylinder 10 is the air and water chamber 14 to which is connected at its upper portion the air duct or pipe 15 communicating with the main air line 16, which latter leads to the atmosphere or to a force pump.

17 indicates an air discharge pipe or branch leading from the main or supply pipe 16 to the pipe 12, the branch 17 communicating with said pipe 12 at a point between the valve 13 and the tank. A check valve 18 is located to the left of the air duct 15 to prevent the back flow of air from the chamber, while a similar check valve 19 is located in the branch pipe 17 beyond such air duct 15 and is designed to prevent the back flow of air from the pipe 17.

The description so far given relates mainly to the structural features of the invention and we will now proceed to describe the purpose and operation of the apparatus.

One of our purposes is to provide a single pumping mechanism by means of which both air and water may be pumped into the storage tank in proper proportion. We are enabled to accomplish this by making the upper portion of the pump casing or barrel larger than the lower portion thereof and

also enlarging in cross diameter the plunger portion 11. The result is that when the pump plunger 7 tends to force or carry the water upward in the casing or barrel it is not equal in displacing capacity to the plunger part 11. In a word, the plunger 11 is capable of moving more fluid than can be supplied to it by the plunger 7 and to exercise its full capacity such plunger part 11 draws in water from the chamber 14 to supplement the amount of water supplied to it by the plunger 7 and the effect of thus lowering the water in the chamber 14 is to draw in air through check-valve 18 and air-duct 15. The air so drawn in by the falling of the water in the chamber 14 is, in the working of the plunger, forced into the tank A along with the water and it is by such action that we are enabled to supply the tank with water under pressure of air. The water on the downward movement of the plunger passes into the pipe 12 and a portion thereof passes through the check-valve 13 and thence to the tank. A quantity of water, however, enters in the chamber 14. On the upward stroke of the pump air is drawn in through the pipe 15 into the chamber 14, for, as the level of water in said chamber drops, owing to the upward movement of the displacement plunger 11, air of course is drawn into this chamber to occupy the space vacated by the water. On the downward stroke again the column of water in the chamber 14 rises and acting as a piston compresses the air in such chamber and forces the same through the pipe 17 into the tank.

It is also one of the purposes of our invention to so arrange the air-inlet on the connections between the pump-cylinder and the tank that the air which is drawn inwardly will be trapped and prevented from entering the pump-cylinder, where it would create trouble, and where a considerable portion would be lost by leakage around the stuffing-box.

It will be noted that we have provided an exceedingly simple apparatus for supplying both water and air to a storage tank, and while we have herein shown and described by way of illustration one particular embodiment of our invention, we wish it to be understood that we do not confine ourselves to all the precise details set forth, as modification and variation may be made without departing from the spirit of the invention or the scope of the claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. The combination with a tank; of com-

municating cylinders of different transverse areas, a valved inlet to the small cylinder, a valved piston mounted to reciprocate within said cylinder, a piston within the other cylinder, means for reciprocating the pistons in unison, a pipe connecting the cylinders and tank, and a valved air inlet upon said pipe.

2. The combination with a tank; of connected cylinders of different transverse areas, the small cylinder having a valved inlet, a valved piston mounted to reciprocate within said cylinder, a piston mounted to reciprocate within the other cylinder, a rigid connection between the pistons, means for reciprocating the pistons, a connection between the cylinders and the tank, a valve within said connection for preventing back flow of fluid therethrough, and a valved air inlet upon said connection.

3. The combination with a storage receptacle, of means for supplying air and water thereto comprising a pump casing or barrel, a connection between the casing or barrel and the receptacle, a fluid chamber located in said connection and communicating with the atmosphere, an air pipe located between the fluid chamber and the receptacle, water displacing device in said barrel or casing, and a combined water and air displacing device arranged above the water displacing device.

4. The combination with a storage receptacle, of means for supplying water and air thereto comprising a pumping mechanism embracing in its construction a casing or barrel, displacement mechanism therein comprising a water displacing plunger and a combined water and air displacing plunger of relatively greater capacity than the water displacing plunger, a valve connection between the pump casing or barrel and the storage receptacle, a combined water and air chamber located in the connection between the pump and the valve in the connection, an air connection leading to the top of said chamber, an air supply line leading from said air connection to the connection between the pump and the receptacle and valves located in said air connection and air pipe.

In testimony whereof we have signed our names in the presence of two subscribing witnesses.

RALPH B. CARTER.
JAMES L. MAULL.

Witnesses:

RICHARD B. CAVANAGH,
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