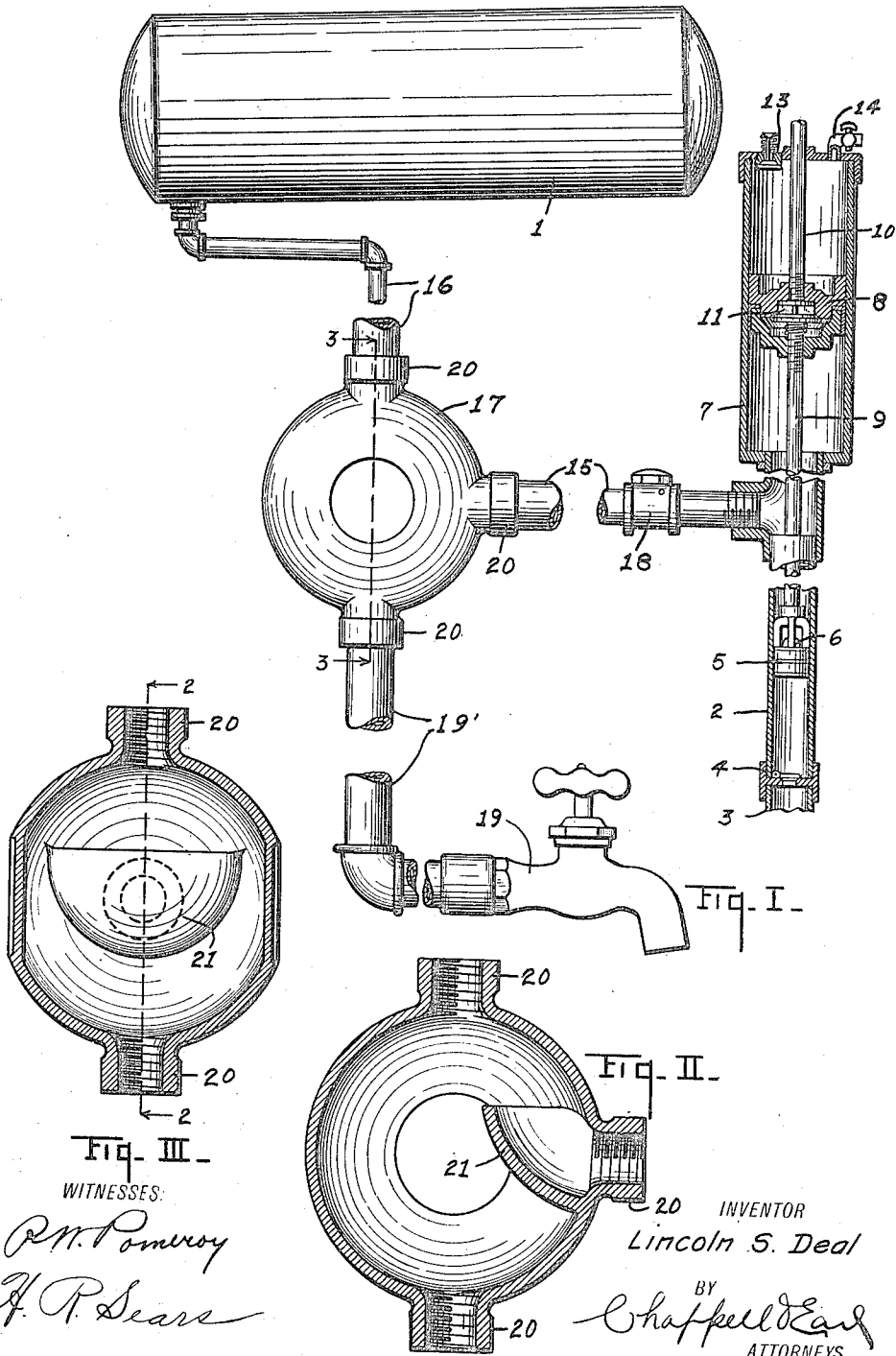


L. S. DEAL.
AIR AND WATER SEPARATOR.
APPLICATION FILED APR. 26, 1916.

1,214,902.

Patented Feb. 6, 1917.



UNITED STATES PATENT OFFICE.

LINCOLN S. DEAL, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO COMSTOCK AUTOMATIC PUMP CO., OF COMSTOCK, MICHIGAN.

AIR AND WATER SEPARATOR.

1,214,902.

Specification of Letters Patent.

Patented Feb. 6, 1917.

Application filed April 26, 1916. Serial No. 93,702.

To all whom it may concern:

Be it known that I, LINCOLN S. DEAL, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, and State of Michigan, have invented certain new and useful Improvements in Air and Water Separators, of which the following is a specification.

This invention relates to improvements in air and water separators.

In certain water systems it is the practice to maintain the water in a tank under air pressure by the use of a pump adapted for pumping air and water simultaneously and it is frequently convenient and the practice to make the service connection to the pipe connecting the pump to the storage tank, and in such an arrangement when water is drawn from the system while the pump is in operation more or less air escapes with the water causing objectionable splashing and noise.

It is the main object of this invention to provide an improved air and separating device adapted to be installed in connection with a pump and storage tank and the service connection thereof, which effectively prevents the air escaping with the water when water is drawn off while the pump is in operation.

A further object is to provide a device of this character which is simple and economical in structure and easily installed.

Further objects, and objects relating to details of construction and operation will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a side elevation of a structure embodying the features of my invention, the pump being shown mainly in vertical section.

Fig. II is a vertical section through the separating chamber on a line corresponding to line 2—2 of Fig. III.

Fig. III is a sectional view through the

separating chamber casing on a line corresponding to line 3—3 of Fig. I.

In the drawing, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, 1 represents the pressure storage tank. The pump illustrated is that shown in the joint application of this applicant and Carl J. Veley, filed April 15, 1914, Serial No. 831,900, allowed May 14, 1915, and is the one preferably used by me, although any suitable pump may be used as the pump proper forms no part of my present invention.

The pump illustrated consists of the cylinder 2 connected to the well pipe 3. A check valve 4 is provided at the lower end of the cylinder 2. The plunger 5 within the cylinder 2 is provided with a ball check valve 6. Connected to the cylinder is a second cylinder 7 of substantially larger diameter than the cylinder 2. A piston 8 is provided for the cylinder 7. The piston 8 is connected to the plunger 5 by means of the rod 9, the pump rod 10 being connected to the piston 8 so that the piston and plunger reciprocate together. The cylinder 7 is provided with an air inlet valve 13 which is opened by the downstroke of the piston 8 to admit air to the cylinder 7 above the piston. This valve is closed on the upstroke of the piston so that the air passes through the valve 11 into the cylinder below the piston. A vent cock 14 is provided for the upper end of the cylinder 7 and when this is open no air is pumped. The cylinder 7 is connected to the storage tank 1 by means of the pipes 15 and 16 and the separating chamber 17. On the upstroke water is lifted by the plunger 5 into the cylinder 7 and since the cylinder 7 is of greater diameter than the cylinder 2, air passes the valve 11. On the downstroke the air and water are forced out of the cylinder 7 past the check valve 18 through the separating chamber and into the storage tank, unless the service faucet 19 should be open when the pump is in operation, in which case the water will pass directly to the faucet while the air is separated therefrom in the separating chamber and passes to the storage tank. The service pipe 19' is connected to the bottom of the

separating chamber, while the storage tank pipe 16 is connected to the top thereof, the pump 15 being connected at one side.

The separating chamber is preferably substantially spherical as illustrated and provided with nipple extensions 20 threaded to receive the pipe connections. Within the separating chamber is a spherically curved partition 21 disposed to embrace the inlet opening from the pump spreading and directing the water and air issuing therefrom upwardly toward the tank connection. This spreading and upward deflecting of the fluid causes the air to rise into the storage tank even when water is drawn from the system simultaneously with the operation of the pump. When air escapes with the water it causes uneven delivery and splashing and objectionable noise. This is overcome by my improvements.

The separating chamber should be of a size substantially greater than the pumping and draw-off capacity of the system and the spherical form is desirable in that there are no obstacles to the upward current from the pump inlet and the upward current does not materially interfere with the downward current thereof, in the event that the amount of water drawn off exceeds the pump capacity. I have illustrated my improvements in the form in which I embodied the same for use. I have not attempted to show certain modifications which might be desirable for adapting my improved separating device for use under different conditions as I believe the disclosure made will enable those skilled in the art to which my invention relates to embody or adapt the same as may be desired. I desire, however, to claim my improvements specifically in the form illustrated, as well as broadly, within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a structure of the class described, the combination with a pump adapted to pump air and water, a pressure storage tank, and a draw-off pipe, of a separating chamber casing having a side connection to said pump, a top connection to said tank and a bottom connection to said draw-off pipe, said casing being provided with a partition em-

bracing said pump connection so that the water and air entering therethrough is spread and discharged upwardly into the chamber.

2. In a structure of the class described, the combination with a pump adapted to pump air and water, a pressure storage tank, and a draw-off pipe, of a separating chamber casing having a side pump connection, a connection to said tank above said pump connection and a connection to said draw-off pipe below said pump connection, said chamber being provided with means for discharging the water and air entering through said pump connection upwardly into the chamber toward said tank connection.

3. A structure of the class described comprising a substantially spherical casing having an inlet connection at one side, a tank connection at the top and a delivery system connection at the bottom, there being an upwardly projecting spherically curved deflecting wall embracing said inlet connections, the upper edge of said wall being above the upper edge of the inlet opening whereby the fluid entering therethrough is spread and discharged upwardly.

4. A structure of the class described, comprising a casing having an inlet connection at one side, a tank connection in a plane above said inlet connection, and a delivery system connection in a plane below said inlet connections, there being a partition wall embracing the inlet connections whereby the fluid entering therethrough is spread and discharged upwardly toward the tank connection.

5. A structure of the class described comprising a casing having an inlet connection at one side, a tank connection in a plane above said inlet connection, and a delivery system connection in a plane below said inlet connection, said casing being provided with means whereby the fluid entering through said inlet connection is discharged upwardly toward the tank connection.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

LINCOLN S. DEAL. [L. s.]

Witnesses:

LUELLA G. GREENFIELD,
MARGARET L. GLASGOW.