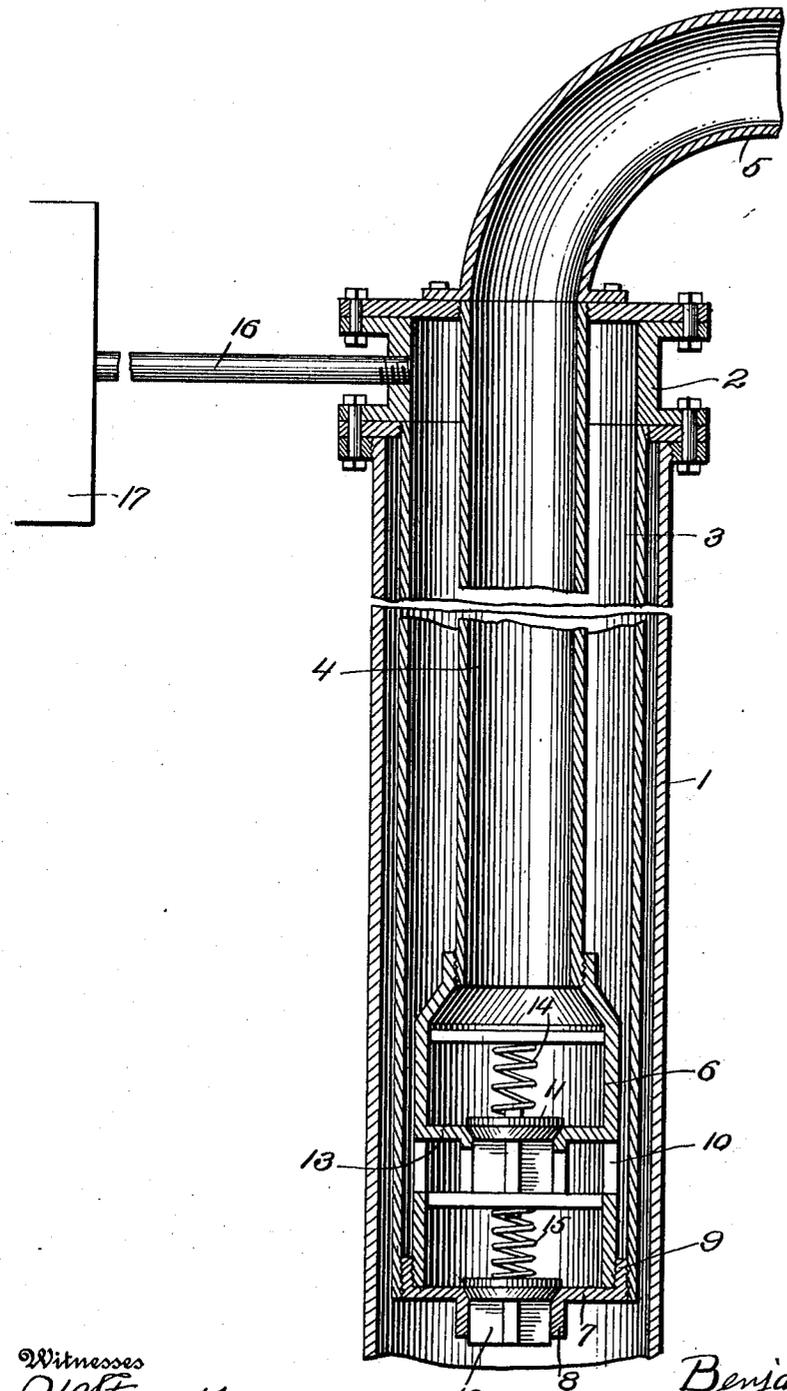


B. R. PILCHER.
 PNEUMATIC WATER ELEVATOR.
 APPLICATION FILED AUG. 23, 1910.

1,003,946.

Patented Sept. 19, 1911.



Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN R. PILCHER, OF DOTHAN, ALABAMA.

PNEUMATIC WATER-ELEVATOR.

1,003,946.

Specification of Letters Patent. Patented Sept. 19, 1911.

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To all whom it may concern:

Be it known that I, BENJAMIN R. PILCHER, a citizen of the United States, residing at Dothan, in the county of Houston and State of Alabama, have invented certain new and useful Improvements in Pneumatic Water-Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in pneumatic water elevators, and has for an object the arrangement of means adapted to utilize the oscillation of compressed air for forcing water from a well or other receptacle.

A further object of the invention is the arrangement in a pneumatic water elevator, of an inlet valve and check valve arranged in a discharge pipe and associated with means for admitting water intermittently moved or oscillated by compressed air for intermittently forcing water through said check valve and permitting water to flow through said intake valve.

A still further object of the invention is the arrangement in a pneumatic water elevator, of a pipe for containing compressed air associated with means for oscillating the air, a second mentioned pipe passing through the first mentioned pipe, and a plurality of valves arranged at the end of the second mentioned pipe, said second mentioned pipe being formed with apertures between said valves, whereby water under pressure may pass from said first mentioned pipe into said second mentioned pipe and through one of said valves, and water may pass from beneath all of said pipes when the pressure in said first mentioned pipe has been relieved.

With these and other objects in view the invention comprises certain novel constructions, combinations, and arrangement of parts as will be hereinafter more fully described and claimed.

In the accompanying drawing the figure is a longitudinal vertical section through an embodiment of the invention.

In forming a pneumatic elevator for elevating liquid, as for instance water, a pipe is provided which is inserted into the well casing of a well or into any receptacle, and which is in free communication with an air pump which maintains air under pressure

in the pipe, and oscillates said air. Within the pipe just mentioned is a second pipe connected therewith at the bottom, and provided with a pair of spaced valves, one of which acts as an intake valve, and the other as a check valve. A plurality of apertures are provided in the second mentioned pipe beneath said valves, so as to permit pressure to pass from the first mentioned pipe to the second. These two pipes, together with the valves carried thereby, are placed in the well or other receptacle so that the valves are submerged for more than the distance that the water or other liquid is to be elevated. The air is then compressed in the first mentioned pipe, and after compressed until the water has raised in the second mentioned pipe to the discharge point, oscillated to any desired extent for intermittently discharging water.

In order that the invention may be more clearly understood an embodiment of the same is shown in the accompanying drawing, in which 1 indicates a pipe or casing for a well, to which a head piece 2 is secured. Connected with the casing 1 or supported in any desired manner is an outer tube 3 and an inner tube 4. Inner tube 4 has connected therewith a discharge tube 5 for the water from the well. The lower end of pipe 4 is provided with a valve housing 6 and a combined valve and end 7. The end 7 is provided with a short pipe or tube 8 which, however, may, if desired, be considerably longer so as to extend down to near the bottom of the well. End 7 is provided with a flange 9 threaded internally and externally in order to be secured to housing 6 and to tube 3. This effectually closes the ends of tubes 3 and 4, and also connects these two tubes or pipes together. Housing 6 is provided with a plurality of apertures 10 so as to permit the lower end of tube or pipe 3 to be in free communication with the interior of housing 6 between valve members 11 and 12. Valve member 11 is provided with a seat 13, while valve member 12 is provided with a seat in end 7. Suitable compression springs 14 and 15 are provided for maintaining the valves 11 and 12 properly seated at all times when not forced therefrom. Valve member 11 and valve member 12, together with their respective seats, form check and intake valves respectively.

When in use the tubes 3 and 4 and asso-

ciated parts are lowered into a well until the check valve is below the water in the well further than the distance from the upper level of the water to the discharge opening of pipe 5. This will cause water to flow through the intake valve, and also the check valve, until the water has reached its proper level in pipes 3 and 4. The elevator is then in position for operation, as soon as the air pressure is turned or oscillated. A pump 17 is connected with pipe 16, and air pressure is provided in the upper part of pipe 3. This air pressure in pipe 3 is raised until the water therein has been forced down and the water in pipe 4 elevated to the discharge point. The pressure is maintained at this tension at all times, but when it is desired to discharge water from pipe 5 the air in pipe 3 is merely oscillated by a suitable pump 17. The pump 17 will force air into pipe 16, and from thence into pipe 3, and consequently force practically all of the water in pipe 3 therefrom through openings 10, and the check valve, into pipe 4 from which the excess of water is discharged. Upon the return stroke of the pump the pressure in pipe 3 will return to its former tension and the natural head or pressure of water in the well will force water through the intake valve, and from thence into openings 10 into pipe 3 until it has raised to substantially its former height. Another reciprocation of the air pump will again force additional pressure into pipe 3 in a similar manner as before stated for forcing water in pipe 3 through openings 10, housing 6, and from thence into pipe 4. This operation is continued as long as it is desired to elevate water from the well without waste or losing any of the air under pressure. By this arrangement it will be observed that the water in pipe 3 is oscillated and the air is also in a certain sense oscillated, but the air is not permitted to pass through openings

10. The water flows through the intake valve, into pipe 3, and is then forced therefrom and again flows back in, and this action is continued alternately by increase and decrease pressure of the air in pipe 3, so that after the proper tension of air has been provided in pipe 3 all that is necessary is to provide a pump or cylinder with a piston and mechanism for moving the piston back and forth for increasing and decreasing the pressure or tension already provided. The pump is used not to pump additional air into the pipe, but simply to vary the tension thereof as required.

What I claim is:

In a water elevator, a well casing, an air casing inserted concentrically within the well casing and secured to the upper end thereof, a discharge pipe inserted within the air casing, a housing carried at the lower end of the air pipe, means securing the discharge pipe and the housing to the air casing in air tight condition, a valve seat opening formed in the lower end of the air casing, a spider carried by the housing disposed above the valve opening, a valve seated in the valve opening, a spring inserted between the valve and the spider, a diaphragm disposed in the housing adjacent to and above a plurality of openings formed through the side of said housing and having a valve seat formed centrally thereof, a spider formed in the housing above the last mentioned valve, a spring disposed between the spider and its valve said valve openings being substantially equal in area to and disposed beneath the discharge pipe.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN R. PILCHER.

Witnesses:

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ROBT. T. LANG.