(No Model.)

W. S. BECHTOL.

COMPRESSED AIR WATER ELEVATOR.

No. 583,837. Patented June 1, 1897.

Fig. 1.

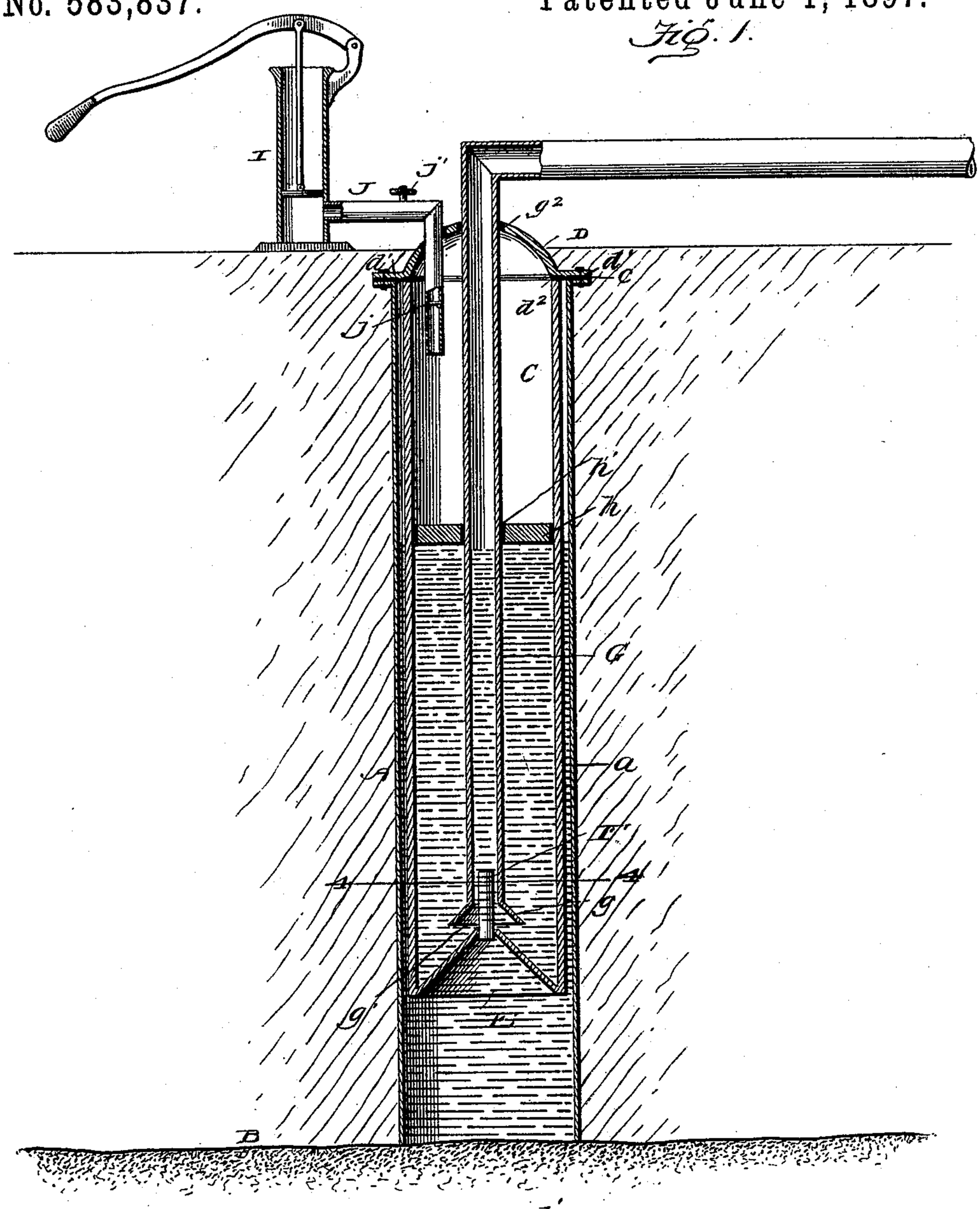


Fig. 2.

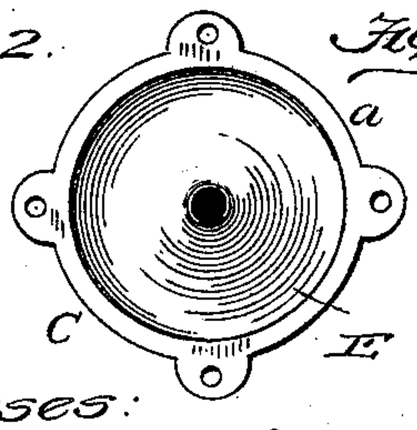


Fig. 3.

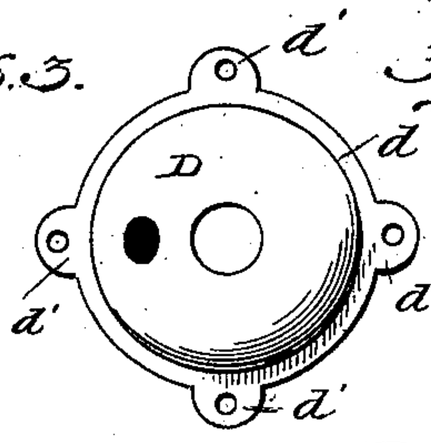
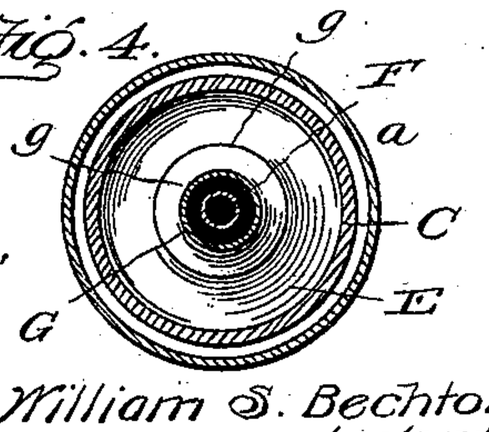


Fig. 4.



Witnesses:
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"

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UNITED STATES PATENT OFFICE.

WILLIAM S. BECHTOL, OF GOLIAD, TEXAS.

COMPRESSED-AIR WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 583,837, dated June 1, 1897.

Application filed July 18, 1896. Serial No. 599,675. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. BECHTOL, a citizen of the United States, residing at Goliad, in the county of Goliad and State of Texas, have invented certain new and useful Improvements in Compressed-Air 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.

My invention relates to improvements in compressed-air water-elevators; and the object of my invention is to provide a simple and comparatively inexpensive mechanism which after the flowing of the water has been secured maintains a flow of water from the underground vein and through the apparatus.

A further object of my invention is to so construct the apparatus as to protect the underground water-vein from the pressure of the air and water in the apparatus, which protection insures the flow of water from the water-vein through the eduction-pipe when the flow has once been established by immersing the apparatus in the water and by establishing air-pressure in the apparatus, which air-pressure can be maintained by operating the air-pump from time to time.

To the accomplishment of these ends my invention consists in the combination of the following instrumentalities, to wit: a stand-pipe provided at its upper end with a tight-fitting cover and at its lower end with an inverted-funnel-shaped head, an eduction-pipe within the stand-pipe passing through the cover thereof and having a flared lower extremity, which is arranged a suitable distance above the inverted conical head of said stand-pipe to form a space through which water is free to flow from the stand-pipe into the eduction-pipe, a short induction-pipe attached to the inverted conical head of the stand-pipe and extending upwardly a short distance into the eduction-pipe, so as to permit the water from the underground vein to flow through the inverted conical head and the short eduction-pipe, a floatable piston fitted tightly to the stand-pipe and the eduction-pipe and serving to itself sustain the pressure of air in the stand-pipe and to prevent to a great extent the air from having access to the water in the apparatus, and an air-forcing mechanism having connections with the stand-pipe above the floatable piston therein; and the invention further consists in the novel combination of devices and in the construction and arrangement of parts, which will be hereinafter more fully described and claimed.

To enable others to understand my invention, I have illustrated a preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a vertical longitudinal sectional view of my compressed-air water-elevator. Figs. 2 and 3 are detail views illustrating the flanged top end of the well-casing and the cover for said casing and the stand-pipe, respectively. Fig. 4 is a horizontal transverse sectional view on the plane indicated by the dotted line 4 4 of Fig. 1.

Like letters of reference denote corresponding parts in all the figures of the drawings.

A shallow well is indicated at A in the accompanying drawings and provided with a casing *a*, of any usual or preferred construction, said well extending down to the underground vein B or other source of water-supply. Within this casing is arranged the stand-pipe C, of metal or other suitable material. The diameter of this stand-pipe is such that it fits in the well-casing to leave a narrow space between the casing and stand-pipe, and this stand-pipe is suspended or held in the casing by any suitable means. The space between the casing and stand-pipe at the upper portion is tightly closed by a packing, as at *c*, and said casing and stand-pipe have their upper ends closed by a tight-fitting cover D. This cover is arched or crowned, as shown by Fig. 1, and it has an annular flange *d* and the perforated ears *d'*. The cover is adjusted to fit over the stand-pipe and to have its flange lap the upper edges of the stand-pipe and the casing, and said cover is bolted securely to the casing by bolts which pass through the ears *d'* and through similar ears or a flange on the casing. The joints between the cover and the casing and stand-pipe are made tight by interposing gaskets or packings d^2 between the parts in order to close the stand-pipe in an air-tight manner and to reduce to a minimum the liability of leakage of

air from the air-space in the upper end of the stand-pipe. The stand-pipe C is of such length that its lower part is immersed in the water supplied to the casing from the vein B, and said lower end of the stand-pipe is practically closed, except where the induction-pipe opens therethrough, by means of the head E, which is of inverted conical form, as shown. This inverted conical head E is united rigidly to the lower end of the stand-pipe in any suitable way, so as to make a perfectly tight joint between said head and pipe. This head may be made as an integral part of the stand-pipe or it may be attached thereto, and the head is arranged to extend upwardly into the pipe, so as to direct the water from the vein into the centrally-arranged induction-pipe F. The eduction-pipe G is much smaller in diameter than the stand-pipe and it is arranged centrally in said stand-pipe. The lower extremity of the eduction-pipe is shaped to produce a flared or bell-shaped foot *g*, and this flared foot is arranged close to, but not in contact with, the conical head E of the stand-pipe, thus leaving a space *g'* between the flared foot of the eduction-pipe and the conical head of the stand-pipe, through which space water is free to pass from the stand-pipe into the eduction-pipe.

The induction-pipe F is a short length of pipe which is attached at its lower end to the apex or highest point of the inverted conical head of the stand-pipe, so that said induction-pipe F opens through said head E at the center thereof for the water from the vein to flow through the induction-pipe. The diameter of the induction-pipe is less than that of the eduction-pipe, and said induction-pipe rises from the head E and extends a short distance upwardly and into the eduction-pipe, an annular space being left between the induction and eduction pipes for the water to pass from the stand-pipe into the eduction-pipe under the pressure of the air forced into the stand-pipe and acting upon the floatable piston H. The upper end of the eduction-pipe passes through an aperture in the crowned cover D, and the pipe is surrounded by a gasket or packing g^2 to secure an air-tight joint between the cover and eduction-pipe. This eduction-pipe may be led or carried any desirable distance to conduct water to a tank or any other storage-place or to a machine where running water may be utilized as energy for the operation of the machine.

The floatable piston H is fitted in the stand-pipe, and it has an aperture at its middle to receive the eduction-pipe. The piston is made of wood or other buoyant material, so that it will float on the surface of the water in the stand-pipe and will rise and fall with the water therein, and this piston has a packing *h* at its periphery and another packing *h'* in the central aperture, whereby said piston has tight joints with the stand-pipe and with the eduction-pipe to prevent in a great measure the air under pressure in the upper part of the stand-pipe from having access to the column of water standing in the stand-pipe.

I is the air-pump or other air-forcing apparatus. It is shown in the drawings as having a piston, the rod or stem of which is attached to an operating-handle, and it is equipped with suitable valves, but the style of the air-pump is not material. From this air-pump extends an air-pipe J, which leads through the cover D and terminates in the air space or chamber in the upper part of the stand-pipe, so as to discharge compressed air into said stand-pipe. The air-pipe has a suitable check-valve *j*, which prevents the backflow of air from the stand-pipe to the piston-cylinder of the pump, and it is also equipped with a stop-cock *j'*, which is accessible from the outside of the apparatus.

This being the construction of my apparatus the operation may be described as follows: The water from the vein passes through the head E and the induction-pipe F, and thence overflows into the stand-pipe up to the level of the water standing in the well-casing. The floatable piston H rises with the water and lies on the surface thereof. To start the water flowing through the eduction-pipe, the air-pump is set in motion and forces air under pressure into the space or chamber between the floatable piston and the cover D. As the air-pressure is increased sufficient to overcome the inertion of the column of water standing in the pipe C the piston is forced down and the water is forced out through the eduction-pipe, and when the flow of water is established through the eduction-pipe the water from the underground vein flows through the induction-pipe and then through the eduction-pipe, because the pressure of the air-column on the piston prevents the water from flowing back into the stand-pipe. It will be seen that the pressure of the air on the piston operates to force the latter downward, and the piston in turn forces the water in the stand-pipe into and through the eduction-pipe, but when the piston has reached the bottom of the eduction-pipe the air-pressure is withdrawn, which will permit the water to rise to its highest level within the stand-pipe and carry the piston upward with it ready for the beginning of a new operation of forcing water out through the stand-pipe. The conical head E of the stand-pipe acts as a barrier to the downward pressure of the water in the stand-pipe under the influence of the pressure of the air-column on the floatable piston to keep the water in the underground vein from being pressed back by the water or air in the stand-pipe, and at the same time the parts are so disposed that the water from the vein is free to flow through the induction-pipe into the eduction-pipe. The necessary pressure in the stand-pipe is kept up by the operation of the air-pump at suitable intervals, but when the air-pressure is decreased beyond a certain point the water rises in the stand-pipe.

My apparatus may be used in place of windmills and other appliances usually employed to raise the water from wells, and the water may be conducted to storage basins, lakes, tanks, or other places. The apparatus may also be used for other purposes, such as for furnishing water-supply to run turbine wheels for the generation of power required for operating machinery and for irrigation purposes, &c.

I am aware that changes in the form and proportion of parts and in the details of construction of the devices herein shown and described as the preferred embodiment of my invention may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such modifications as fairly fall within the scope of my invention.

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

1. A stand-pipe having its lower end closed, except to the free admission of liquid thereto to afford a barrier against the internal pressure of liquid or air therein affecting the source of liquid-supply in which the stand-pipe is immersed, combined with an induction-pipe which is connected to said closed lower end of the stand-pipe so as to receive from the source of liquid-supply, an eduction-pipe, a floatable piston, and an air-forcing mechanism, substantially as and for the purposes described.

2. The combination of a stand-pipe closed at its upper end and provided at its lower end with a head, an eduction-pipe with its lower end terminating adjacent to said head of the stand-pipe, an induction-pipe opening through said head of the stand-pipe and extending into the eduction-pipe, a floatable piston fitted tightly within the stand-pipe, and an air-forcing mechanism connected with the stand-pipe above the floatable piston, as and for the purposes described.

3. The combination of a stand-pipe provided with an inverted conical head at the lower end thereof, an eduction-pipe having a flared foot arranged to provide a liquid-passage between itself and the conical head of the stand-pipe, a short induction-pipe opening through the head of the stand-pipe and extending into the eduction-pipe, a floatable piston, and an air-forcing mechanism, substantially as described.

4. The combination with a well-casing, of a stand-pipe having a head at the lower end thereof, an eduction-pipe having its open lower end terminating above the head of said stand-pipe, an induction-pipe opening through the head of the stand-pipe and extending into the eduction-pipe, a cover fitted to said casing and stand-pipe, a floatable piston within the stand-pipe, and an air-forcing mechanism having a valved connection with said stand-pipe, as and for the purposes described.

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

WILLIAM S. BECHTOL.

Witnesses:
H. ANGERSTEIN,
R. L. CARTRIGHT.