

J. Old,
Oil Pump,

N^o 18,089.

Patented June 6, 1865

Fig. 2.

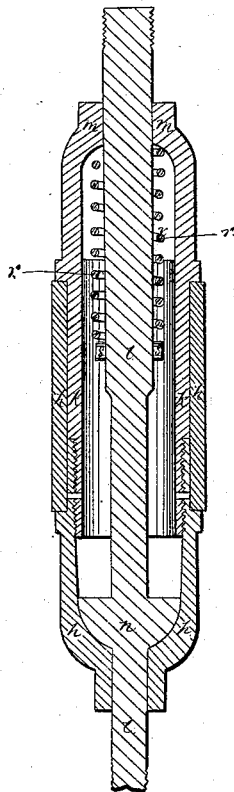
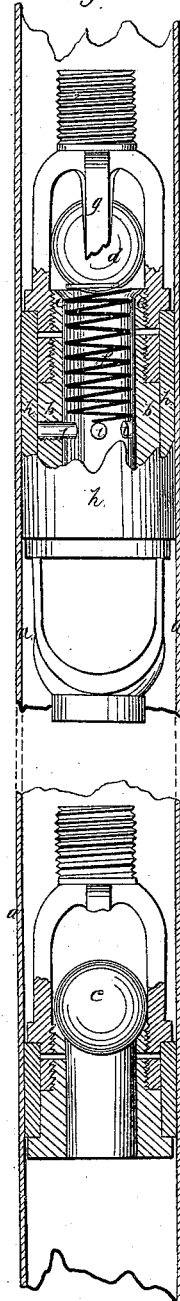


Fig. 1.



Witnesses:
Henry S. S. S.
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Inventor:
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UNITED STATES PATENT OFFICE.

JAMES OLD, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN DEEP-WELL PUMPS.

Specification forming part of Letters Patent No. 48,089, dated June 6, 1865.

To all whom it may concern:

Be it known that I, JAMES OLD, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Working-Valve of Pumps for Deep Wells; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional representation of a pump-chamber, showing the upper and lower valves. Fig. 2 is a sectional representation of the upper valve of a pump of somewhat different construction from that shown in Fig. 1.

In Artesian wells, and other wells of considerable depth, where there is a long column of water or oil to be raised the hydrostatic pressure is frequently so great as to present a serious obstacle to the rising of the upper or working valve, which makes it very difficult to work the pump. To obviate this difficulty I insert a spring in the upper valve-box under the valve of sufficient strength to overcome this pressure to such a degree as to enable the upper valve to open and close, as the valve-box is alternately lowered and raised with ease and certainty, notwithstanding the pressure of water or oil.

My invention consists, therefore, in the use of a spring under the upper or working valve for the purpose before stated.

To enable others skilled in the art to construct and use my improvement in pump-valves, I will proceed to describe and explain it more fully.

In the accompanying drawings, Figure 1 represents a pump-chamber having a lower or stationary valve-box seated in its lower end, the valve of which opens upward in the ordinary way. *a* is the pump-chamber, in which the working valve-box *b* moves up and down. *c* is the lower valve, which may be of any usual description. The working-valve box *b* is a metallic cylinder or hollow piston surrounded with leather *h*. On top of the hollow piston *b* is an arch, *g*, inclosing a spherical ball, *d*, which rests, when the valve is closed, on a slightly-tapering valve-seat, *e*. The shape of the upper valve is, however, immaterial. Inside of the valve-box *b* are three pins, *i*, or

other device—such as a collar—to support the lower extremity of a spiral spring, *f*, placed in the interior of the valve-box *b*, the upper extremity of the spring resting, when the spring is relaxed, on the under side of the valve, so as to raise it slightly off its seat, as shown in the drawings. It is evident that with the upper valve thus raised from its seat by means of a constantly-acting spring, the pump would not operate to raise water unless some force were applied above the valve to overcome the pressure of the spring and shut the valve down when the valve-box is raised. The spring employed is therefore made of such strength as nearly but not quite to counterbalance the pressure of the column of water or oil in the tubing of the well above the upper valve. When the pump is operated and the upper valve-box is depressed, the spring prevents the upper valve, *d*, being held down by hydrostatic pressure, and aids it in rising; but when the valve-box is raised the weight of the column of liquid above it shuts the valve notwithstanding the upward pressure of the spring.

In the pump just described the upper valve is made to open upward, and is closed by its own weight and that of the column of liquid in the well-tubing above it; but another description of valve is sometimes used, in which the upper valve is attached to the piston-rod, and is made to open downward, being placed below instead of above the valve-seat. The moving valve-box is not attached directly to the piston-rod, but is operated by the piston-rod by means of the valve, so that when the piston-rod descends it first opens the upper valve while the valve-box is yet stationary by lowering it, and then depresses the valve-box or piston, and on the upstroke the piston first closes the upper valve and then raises the valve-box. This is to prevent the upper valve being opened on the rising of the piston-rod by the upward pressure of gas, which often is present in large quantities in deep wells; but with such pumps it often happens that when the piston-rod descends, instead of first opening the upper valve, the hydrostatic pressure on top of the valve-box is so great as to cause it to begin to descend as soon as the piston, so that the valve is not first opened as it should

be. I therefore propose to apply my improvement to this description of pumps as well. This application of my invention is shown in Fig. 2, which I will proceed to describe.

In the drawings, *k* is the hollow cylinder or piston of the upper valve-box. *l* is the piston-rod, which, instead of being attached to the piston, is passed through the collar *m* at top of the piston. At the lower end of the piston is an arch, *p*, inclosing the upper valve, *n*, which may be spherical, conical, flat, or other convenient shape, but opens downward, being seated in or under the valve-seat *o*. The valve *n* is attached to the lower extremity of the piston-rod *l*, so that when the piston-rod is raised the valve *n* is closed by pressing up against the valve-seat *o*, and acts as a button to raise the piston or valve-box, *k*, and when the piston is depressed the valve *n* is opened, and, pressing against the arch *p*, causes the downstroke of the piston. Inside of the valve-box or piston *k* and around the piston-rod I place a spiral spring, *r*, which bears at the upper end against the collar *m* of the valve-box, and at its lower end against a pin or collar,

s, on the piston-rod *l*. This spring, when relaxed as in the drawings, raises the valve-box or piston *k* on the piston-rod *l*, so as to open the valve *n*. The spring *r*, like the spring *f* in Fig. 1, is not of sufficient force to keep the valve *n* open when the piston is raised, but counteracts the hydrostatic pressure, which would tend to keep the valve *n* closed on the descent of the piston-rod, as before stated.

What I claim as my invention, and desire to secure by Letters Patent, is—

The use of a spring so placed in combination with the upper valve of pumps for deep wells as to counterbalance wholly or in part the hydrostatic pressure of the superincumbent column of liquid and insure the opening of the valve on the descent of the piston, substantially as hereinbefore described.

In testimony whereof I, the said JAMES OLD, have hereunto set my hand.

JAMES OLD.

Witnesses:

ALLAN C. BAKEWELL,
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