L. Thomas,

Oil Pump.

No. 32,658. Patented June 25, 1861.

Fig. 1

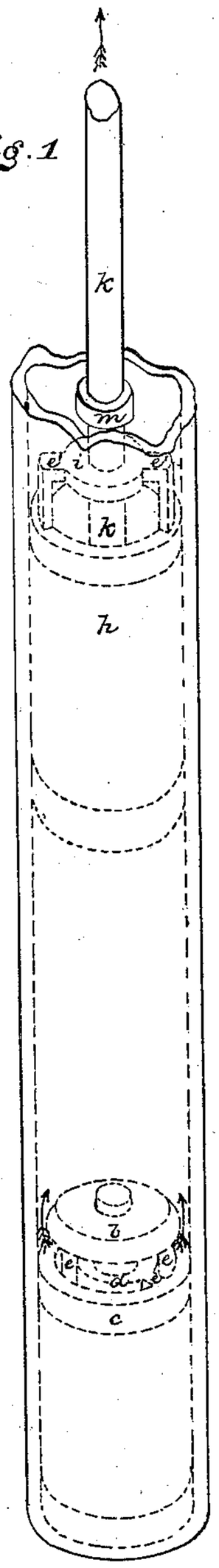
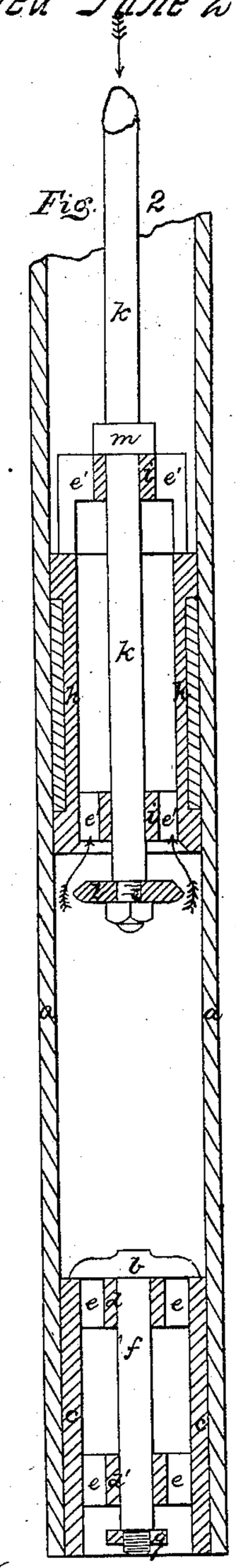


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

LEOPOLD THOMAS, OF ALLEGHENY CITY, PENNSYLVANIA.

VALVE.

Specification of Letters Patent No. 32,658, dated June 25, 1861.

To all whom it may concern:

Be it known that I, LEOPOLD THOMAS, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Valves for Oil-Pumps; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawing, forming part of this specification, in which—

Figure 1 is a perspective representation of a portion of the chamber of a pump, showing the plunger and lower valve in dotted lines. Fig. 2 is a sectional representation of the chamber, plunger and lower valve of the pump.

In both figures like letters of reference denote similar parts.

My improvement consists in a peculiar construction and arrangement of the upper or plunger valve, which is designed especially for pumps to be used in oil wells, but is also applicable to pumps used for raising other fluids.

The object which I have in view in my invention, is to secure the certain and prompt opening and closing of the upper valve, or valve in the plunger, which in oil wells is frequently prevented, in pumps of ordinary construction, owing to the upward pressure of gas issuing from the well, which frequently occurs so violently, as to keep the valve in the plunger open during the upward stroke of the plunger, even when said valve is a metallic ball.

It is usual to construct lifting pumps with the plunger valve opening upward, said valve being commonly either hinged to the valve seat, or placed loosely in it, as an inverted cone, or frustum of a cone or spherical ball, made of metal, so as to fall by its own weight in its seat, when the upward pressure of the liquid, caused by the downward stroke of the plunger, ceases.

Where there is any liability to any upward force being applied to the upper valve, on the upward stroke of the plunger, which must arise from some cause independent of the action of the plunger, such as a rush of gas from an oil well, the heavier the upper valve is, (in pumps such as are ordinarily used) the better, but even when the upper valve is made of metal, or pressed down by weights inserted in the plunger, the force of the gas is frequently so great, as entirely to prevent the closing of the valve when the plunger is raised.

As I have stated, the upper or plunger valve of oil pumps, is ordinarily made to rise as the plunger is lowered, and falls into its seat when the plunger is raised; but in my improved pump, the operation of the valve is reversed, as it is made to descend from its seat when the plunger is lowered, and to rise up, when the plunger is raised, and these motions of the valve are effected, not by the motion of the plunger, but independently thereof and while the plunger is at rest.

To enable others skilled in the art to construct and use my invention, I will proceed to describe its construction and operation.

In the drawing *a* is the chamber of the pump which is of ordinary construction. At the bottom of the chamber is a valve working in a stationary valve seat and opening upward. This valve may be of any ordinary construction, although I prefer to employ one constructed and operating as follows; *c* is the valve seat which is a hollow cylinder, flat on top, and having at the top a ring *d* and near the bottom a similar ring *d'* both connected to the cylinder by radial arms *e e e* so that the fluid may pass freely through the cylinder. The valve is a metallic disk *b* flat on its under side, and having a rod *f* depending from its center, which passes through the rings *d d'*. A nut *g* at the end of the rod *f* serves to keep the lower valve from rising up so far as to become unseated, and regulates the length of the upward motion of the lower valve *b*. Such a valve will always work vertically in its seat, and may be made heavier or lighter, as occasion may require. The plunger of the pump, is also a hollow cylinder *h* very similar in construction to the seat of the lower valve already described. It has at the top a central ring *i*, and at the bottom another ring *i'* through which the piston rod *k* works vertically; these rings *i* and *i'* are attached to the plunger by radial arms *e' e' e'* so as to allow the fluid to pass up through the cylinder. The circumference of the plunger is packed with leather or otherwise, as may be preferred. The plunger is not attached to the piston rod *k* but slides up and down on it, between the valve *l* and a collar or screw nut *m* on the piston rod above the plunger. The valve is a flat metallic disk *l* which either fits accurately against the un-

der surface of the cylindrical plunger, or is seated into it, but not in any way attached thereto. This valve *l* is rigidly attached to the extremity of the piston rod *k* so as to rise and fall with it. If the collar *m* on the piston rod *k* is a screw nut, the length of stroke of the valve *l* relatively to its valve seat in the plunger may be regulated thereby.

The operation of this valve is very simple and efficacious. Suppose the piston rod *k* to be at the end of its downward stroke, and the plunger *n* near to the lower valve *b*, the upper valve being yet open; then as soon as the piston rod begins to rise, on its upward stroke, it instantly closes the valve *l* by raising it up with the piston while the plunger *n*, not being attached to the piston rod *k* remains stationary. As soon however as the valve *l* is closed by being brought in contact with the lower face of the plunger *n* the plunger itself is lifted by the valve, which is thus kept closed until the end of the upward stroke. As soon as the piston begins to descend on its downward stroke the plunger *n* is again stationary for a moment, while the piston rod forces down the valve *l* from its seat in the plunger, until the collar *m* on the piston rod *k* comes in contact with the ring *i* on the top of the plunger and forces down the plunger *n* with the valve in the position shown in Fig. 2. Thus the motion of the valve *l* is caused entirely by the piston, both to open and close it, and is effected at the commencement of the downward or upward stroke of the piston rod, and before the motion of the plunger commences, while the motion of the plunger up and down is caused by the upward pressure of the valve *l* and the downward pressure of the collar *m*.

The action of the valve being due to the direct action of the piston rod, is not liable to be disturbed by any opposing force arising independently of the action of the pump, such as gas in the well, it is therefore only necessary to apply power enough to the piston rod to overcome the upward pressure of such extraneous force.

Having thus described my improvement in valves for pumps, I do not claim the use of a valve working vertically in its valve seat, and detached therefrom; but

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

Attaching the piston rod of lifting pumps, by which the plunger is operated, to the upper valve itself, in such a manner as that the first part of the motion of the piston rod either on its up or down stroke, shall be, to open or close the valve, as the case may be, while the plunger itself is moved by the further stroke of the piston rod, substantially in the manner hereinbefore described.

In testimony whereof, I, the said LEOPOLD THOMAS, have hereunto set my hand.

LEOPOLD THOMAS.

Witnesses:
M. G. CURLING,
C. W. LEWIS.