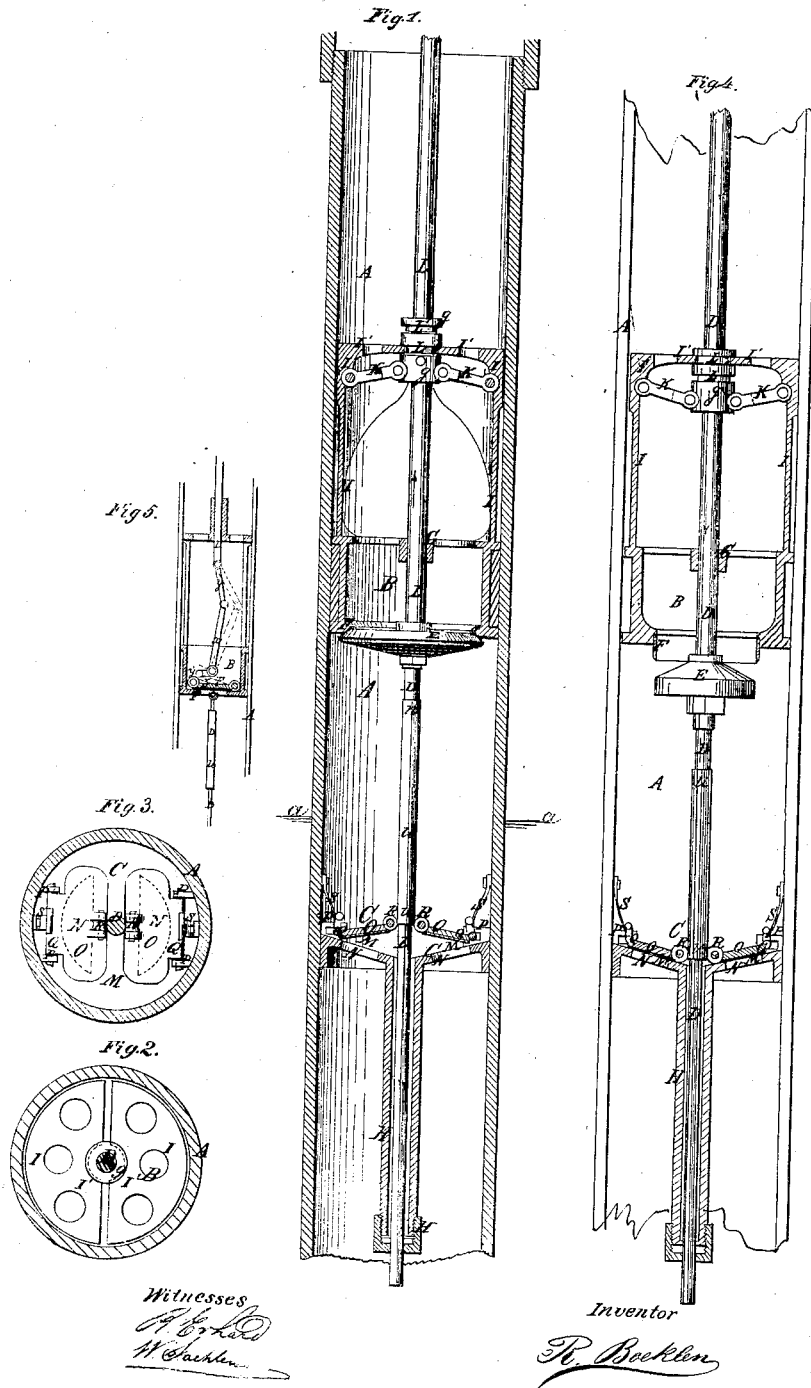


R. Boeklen Oil Pump

N^o 5,007.

Patented Nov. 21 / 1865.



UNITED STATES PATENT OFFICE.

REINHOLD BOEKLEN, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN DEEP-WELL PUMPS.

Specification forming part of Letters Patent No. 51,007, dated November 21, 1865.

To all whom it may concern:

Be it known that I, REINHOLD BOEKLEN, of the city of Brooklyn, in the county of Kings and State of New York, have made certain new and useful Improvements in Petroleum-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical central section of my improved pump, the piston being shown in the act of its upward stroke. Fig. 2 is a top view of the piston of the same. Fig. 3 is a top view of the bottom valve of the same. Fig. 4 is a view similar to Fig. 1, but showing the piston in the act of its downward stroke, and exhibiting a modification of the piston-valve. Fig. 5 represents a vertical section of a modification of my piston and piston-valve.

Similar letters of reference indicate corresponding parts in the several figures.

The nature of this invention consists, first, in providing the valves of lifting-pumps, used in oil-wells, with devices for giving a positive motion to the valves in correspondence with the motion of the piston and independent of the vacuum or pressure caused by the liquids upon which the pump is operating, whereby the usual difficulty of the gases contained in the well interfering with the proper operation of said valves is removed, and the oil, so far as accessible by the pump, is readily elevated to the top of the bore of the well.

It consists, second, in the arrangement and connection hereinafter shown, of the piston-rod with the piston, piston-valve, and bottom valve, whereby a positive and corresponding motion of the piston-valve with the piston and bottom-valve, by means of the piston-rod, is had, and whereby the pressure or vacuum caused by the liquids upon which the pump is operating is also used to help and make the operation of the valve of said piston and of said bottom valve more certain.

It consists, third, in providing the bottom valve with a positive motion in connection with the motion of the piston by means of the piston-rod or its equivalents, whereby its action is made more certain and independent of the pressure or vacuum caused by the liquids upon which the pump is operating, while at the same time the advantage arising from said pressure or vacuum may be used in combination with the device for giving positive motion,

and whereby considerable power in operating the said valve is saved.

It consists, finally, in the peculiar construction, arrangement, and combination of the devices used, and hereinafter described, for operating the piston, piston-valve and bottom valve, whereby their action is harmonious and positive, and whereby the whole is operated from the single piston-rod.

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

A, Figs. 1 and 2, represents the pump-cylinder, made with a smooth-bore, as usual.

B is the piston; C, the bottom valve; D, the piston-rod, and E the piston-valve attached firmly to the piston-rod D. The piston B is packed properly to work tight in the cylinder A, and made hollow to allow the liquid to pass through the same. The lower end of the piston is provided with a valve-seat, F, to which the piston-valve E is fitted properly, so that by raising the piston-rod D the valve E will close upon the seat F. The piston-rod D is guided in a cross-piece, G, formed in the piston, and also in a stuffing-box, H, on the lower end of the bottom valve, C, and of proper length to allow it to be properly guided in its full motion.

I I are springs attached to or formed on the top of the piston, provided with flat tops I' I' projecting toward the piston rod, and also loosely fitting the bore of the cylinder in a manner that, with a limited pressure, the said springs I I may be forced apart against the bore of the cylinder.

J is a boss permanently secured upon the piston-rod D, and is connected at its lower portion, on opposite sides, by means of links K K, to the corresponding opposite upper parts of the springs I I, and is also provided with grooves L and L' on its upper part in a manner so that the top parts, I' I', will project into the groove L, and the joints of the links K K on the boss J are above the normal or horizontal line of the outside joints on the springs I I of the said links K K while the piston-valve is closed; but if the piston-rod D and the boss J are moved downward the top parts, I' I', will withdraw from the groove L, and when so far that the joints of the links K K are all in line with each other, the springs I I are expanded, arresting the piston in the cylinder quite permanent; and if the piston-rod D is still moved farther on till the piston-valve has its full

opening, then the said joints of the links K K on the boss J should be as much below their outer joints as they have been before described to be above the same; and the top parts, I' I', should then project into the groove L', and thereby lock the piston-valve either in the groove L, when in closed position, or in the groove L' when opened.

From the foregoing the operation of the piston and its valve may be clearly seen. The piston, as shown in Fig. 1, is supposed to be in the act of its upward stroke, the piston-valve closed, and the springs I I and their top parts, I' I', lock the same in this position until the course of the piston-rod is changed; and as soon as the piston-rod is changed, and as soon as the piston-rod begins to descend, the springs I I gradually disengage from the groove L and press against the bore of the cylinder and open the piston-valve until it has its full opening, when the springs I I are fully released from pressing against the cylinder, and their top parts, I' I', engage in the groove L' and lock said valve with the piston shown in Fig. 4. The piston hereafter takes its downward stroke, and as soon as the course of the piston-rod is changed again to the upward stroke the piston-valve closes again and is locked in the groove L, as before described and shown in Fig. 1.

Instead of the conical piston-valve, as shown in Fig. 1, a cylindrical piston-valve may be preferred, in order to prevent any impurities to settle on the said valve and interfere with its operation; and, also, instead of connecting the piston-valve permanently with the piston-rod, it may be loosely connected with it by means of a lever, x, and link y, and it may be arranged to work inside of the piston with a flap-valve, z, as shown in Fig. 5; said last-mentioned figure showing a variation in the mode in which my invention may be carried out, as before stated.

Having clearly shown the construction and operation of the piston and its valve of my improved pump, I will proceed to describe its bottom valve, C, of which M represents its seat. It is made concave with two valve-openings, N N, as shown in Figs. 1 and 3.

O O are flap-valves which are hinged to the outer part of the seat M by means of slotted projections P P P P, in a manner to allow the said valves O O to slide toward and from the piston-rod D; but their outer parts, Q Q, are always kept in contact with the seat M. Their inner parts opposite to the piston-rod are provided with friction-rollers R R, properly shaped to work on the piston-rod D.

S S are springs placed in the rear of valves O O, in a manner to press the said valves O O constantly against the piston-rod D.

U is an enlargement on the piston-rod D, its length being a little less than that of the stroke of the piston-rod D.

The operation of the bottom valve is as follows, the piston of the pump supposed to be rising, the valves O O being in elevated po-

sition, and their friction-rollers R R bearing, by means of the springs S S, upon the enlargement U on the piston-rod D: Now, as soon as the piston and its rod have arrived at the end of their stroke, the enlargement on the rod D has escaped the rollers R R, and as soon as the piston begins to descend the said enlargement U forces the valves O O to their seat, while at the same time the piston-valve E is opened and the liquid above the bottom valve is arrested, the enlargement U forcing its way through the rollers R R and keeping the valves O O down upon their seat until the upper end of the enlargement U has passed the rollers R R, and the piston changing its course, closing and locking the piston-valve E. Hereby the liquid above the piston-valve is raised, while at the same time the enlargement U has also taken hold of the rollers R R and opened the bottom valve, and the piston causes a fresh supply of liquid to rise from the well above the bottom valve.

Care should be taken before the pump is set in operation that the well be supplied with air or water to take the place of the oil as it is pumped off.

From the above it may be clearly perceived that, by having the oil-pumps arranged and provided with the devices herein shown for operating the valves of the same, the same will not be liable to fail to perform their intended function properly, although the gases in the well are acting with a counter-pressure upon the same.

The proper level of the oil for successful operation should be above the bottom valve, as indicated in the drawings by the line a; but the bottom valve may be used above the piston, in which case the piston should descend below the level of the oil.

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

1. In the construction of pumps adapted for elevating petroleum and other fluids from their wells, providing auxiliary mechanism for operating their valve or valves automatically and with a positive motion, both in the up and down or back and forth strokes of the piston, substantially as and for the purpose set forth.
2. In the construction of pumps, providing auxiliary mechanism for holding their valve or valves either open or closed, substantially as and for the purpose described.
3. The manner, substantially as herein described, of arresting the piston of the pump during the time that the position of the valve or valves and the course of the piston are being changed, for the purpose set forth.
4. The construction of the bottom valve or valves so that the same shall be operated substantially as described, for the purpose set forth.

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Witnesses:

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CHARLES L. NOE.