N. MALMQUIST.

Lift and Force Pumps.

No. 200,923. Patented March 5, 1878.

Fig. 1.

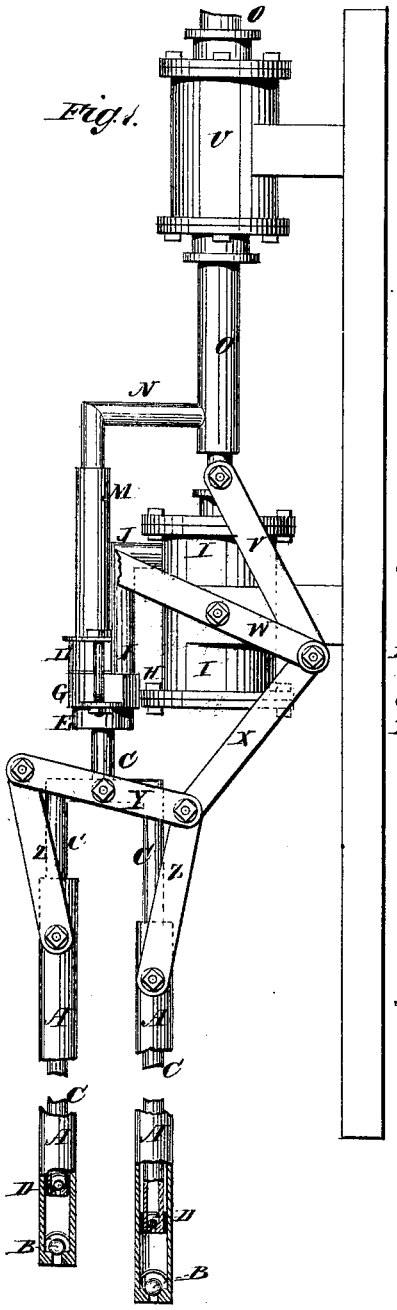


Fig. 2.

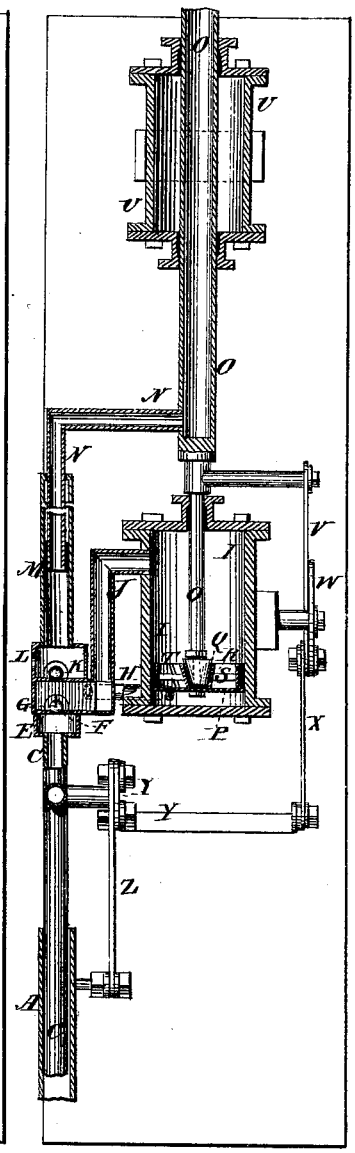


Fig. 3

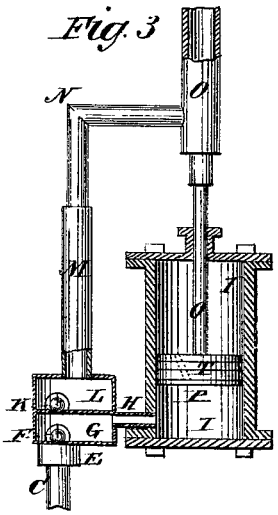


Fig. 5

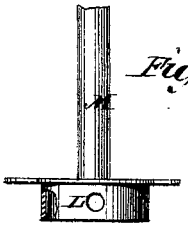


Fig. 6

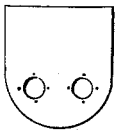
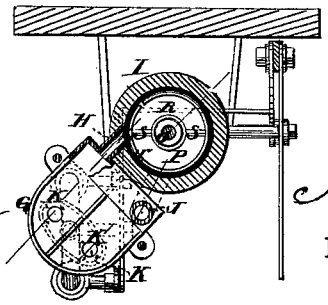


Fig. 4.



WITNESSES:

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NEIL MALMQUIST, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND JOHN LOYD, OF SAME PLACE.

IMPROVEMENT IN LIFT AND FORCE PUMPS.

Specification forming part of Letters Patent No. **200,923**, dated March 5, 1878; application filed December 4, 1877.

To all whom it may concern:

Be it known that I, NEIL MALMQUIST, of the city, county, and State of New York, have invented a new and useful Improvement in Lift and Force Pumps, of which the following is a specification:

Figure 1 is a side view of my improved pump. Fig. 2 is a longitudinal section of the same. Fig. 3 is a detail section of the force-pump. Fig. 4 is a cross-section of the force-pump, showing the valve-chest in top view. Fig. 5 is a front view of the upper part of the valve-chest. Fig. 6 is a detail view of the division-plate of the valve-chest.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved pump for raising water out of mines, deep wells, and other places where the water is to be raised to a great height, and which shall be simple in construction and effective in operation.

The invention consists in the combination of the two pairs of tubes and their valves, the valve-chest and its valves and passages, the cylinder and its piston, and the tubes; in the combination of the four connecting-rods, the equal-armed lever, and the operating-lever with the movable tubes for operating the pump; in the valve-chest formed of the lower chamber, the intermediate chamber, divided into two compartments by a vertical partition, and provided with the inlet-valves, the passages, and the outlet-valves, and the upper chamber.

A are two tubes, extending down to the bottom of the well, mine, or other place from which the water is to be raised, and which have valves B in their lower ends. C are two tubes placed within the tubes A, provided with valves D in their lower ends, and having their lower ends packed, so that the tubes A may slide upon them water-tight. The upper ends of the two tubes C unite in a single tube, which, at a point fifty or sixty feet above the lower ends of the tubes A, enters the lower chamber E of the valve-chest, from which two valves, F, open upward into the second or intermediate chamber G upon the opposite sides of the vertical partition that divides said chamber into two compartments. From one of the compartments of the intermediate chamber G a tube or passage, H, leads into the lower part of the cylinder I. From the other compartment of the intermediate chamber G a tube, J, leads into the upper part of the said cylinder I. From the intermediate chamber G, upon the opposite sides of its partition, two valves, K, open into the upper chamber L of the valve-chest, which may be provided with a discharge opening, spout, or stop-cock for the discharge of the water at that point, when desired.

In an opening in the top of the upper chamber L is secured the lower end of a short tube, M, within which works the lower arm of a bent tube, N. The lower end of the bent tube N is packed, so that it may work water-tight in the tube M, and its upper end is rigidly connected with the tube or hollow piston-rod O. The lower part of the tube or piston-rod O is closed or made solid, passes through a stuffing-box in the upper head of the cylinder I, and has a piston, P, attached to its lower end.

To the lower end of the piston-rod O is attached a cone, Q, which fits into an elastic split band, R. The elastic split band R is connected by radial arms S with a split band, T, which bears against the inner surface of the cylinder I, so that the band T may be pressed out against the said cylinder to take up the wear by drawing the cone Q down into the inner band R.

The tube or hollow piston-rod O is designed to be connected with a boiler, to supply it with feed-water, and passes through a steam-cylinder, U, also connected with said boiler, (the connection is not shown in the drawings,) so that the feed-water may be heated before being fed to the said boiler.

To the hollow piston-rod O is pivoted one end of a connecting-rod, V, the other end of which is pivoted to the forward end of the lever W. The lever W is pivoted to the cylinder I, or to some other suitable support, and to its forward end is also pivoted the end of a connecting-rod, X, the other end of which is pivoted to the end of an equal-armed lever, Y. The lever Y is pivoted at its center to the tubes C at their point of uniting into a single tube, or to some other suitable support. To

the ends of the lever Y are pivoted the upper ends of two connecting-rods, Z, the lower ends of which are pivoted to the two tubes A, so that the pump may be operated by operating the said lever W.

The pump may be operated by steam-power, if desired, applied to the lever W, or to the hollow piston-rod O. With this construction the water will be drawn and lifted through the tubes A C to the lower chamber E of the valve-chest. Then, as the piston P moves in either direction, the water rises through one or the other of the valves F, and follows it, which water, as the piston P returns, is forced back into the chamber G, rises through the valves K into the chamber L, and escapes through the discharge-orifice, or is forced up through the pipes M N O to the boiler.

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

1. The combination of the tubes A and C and their valves B and D, the valve-chest E G L and its valves F K and passages H J, the cylinder I, the piston P, and the tubes M N O, substantially as herein shown and described.

2. The combination of the connecting-bars V X Z, the equal-armed lever Y, and the operating-lever W with the tubes O A for operating the pump, substantially as herein shown and described.

3. The valve-chest formed of the lower chamber E, the intermediate chamber G, divided into two compartments by a vertical partition, and provided with the inlet-valves F, the passages H J, and the outlet-valves K, and the upper chamber L, substantially as herein shown and described.

NEIL MALMQUIST.

Witnesses:
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