J. Y. Smith,

Water Elevator,

No. 48,106. Patented June 6, 1865.

Fig. 1.

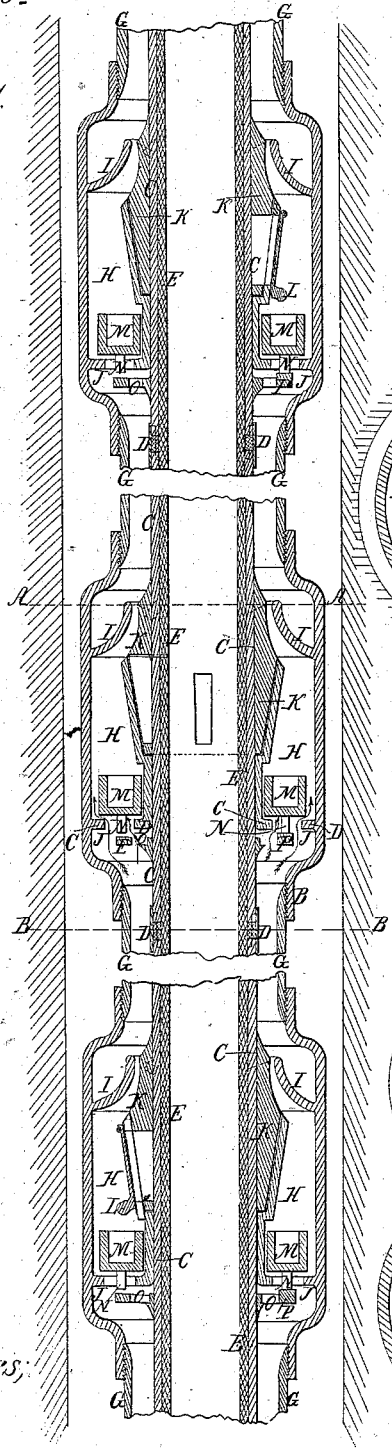
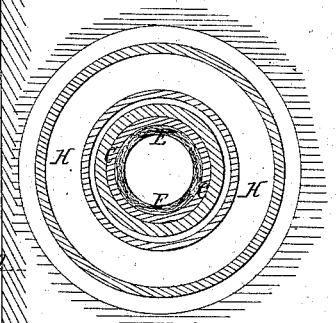


Fig. 2.



Section at A

Fig. 3.

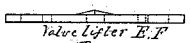


Fig. 4.

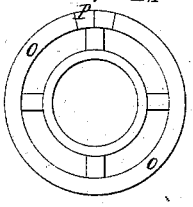


Fig. 5.

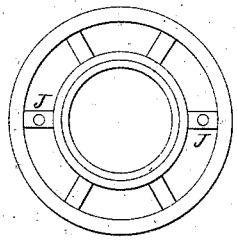
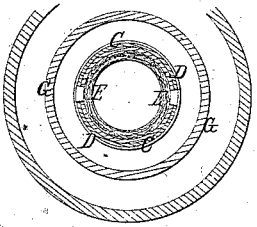


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN Y. SMITH, OF ALEXANDRIA, VIRGINIA.

IMPROVEMENT IN OIL-EJECTORS.

Specification forming part of Letters Patent No. **48,106**, dated June 6, 1865.

To all whom it may concern:

Be it known that I, JOHN Y. SMITH, of Alexandria, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Apparatus for Raising Liquids—for instance, oil from oil-wells; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

My present invention relates to machinery for raising liquids, for which an application for Letters Patent of the United States has been made by me and is now pending; and it consists in various improvements in the construction and operation of such machinery, whereby greater efficiency and economy in working the same are attained.

The distinguishing features of this improved apparatus consist, first, in the enlarged valve-chambers interposed between the sections of the main pipe; second, in the peculiar construction and form of the steam-valves; third, in the combination, with the enlarged valve-chambers and conical steam-valves, of annular valves for admitting the liquid and retaining the same; fourth, in the arrangement of revolving plates provided with cams, so as to lift the valves for dropping the required quantity of liquid to produce condensation; fifth, in the application of weighted valve-covers, so as to close the valves if the external pressure exceed that from within.

To enable others to make and use my invention, I shall now proceed to describe the same by reference to the drawings, in which—

Figure 1 is a vertical sectional elevation of the apparatus, representing the valves in different positions. Fig. 2 is a horizontal section on line A; Fig. 3, a side elevation of the revolving plate with cam for lifting the valves; Fig. 4, a plan view of the same; Fig. 5, a plan view of the valve-seat, and Fig. 6 a horizontal section on line B in Fig. 1.

The apparatus thus represented in said figures consists of a central pipe, C, composed of longitudinal sections united by stop-joints, over which a sleeve, D, is run to securely maintain the parts in the same line. The pipe which is used to convey steam to great depths is lined with a hemp hose, E, or other non-conductor of heat. Around this pipe is arranged tube G, also composed of sections, which are united, by means of screw-thread joint or otherwise, with valve-chambers H, which are interposed between the sections at convenient or proper distances apart. This tube is hermetic, and is intended to convey the fluid to be raised from wells or ships to any given point. The valve-chambers are cylindrical in form, and of a diameter larger than that of the outer tube, G, and are held in their proper relations to the inner pipe and the steam-valves by means of a reflector or shield, I, and the skeleton partition J, cast to the interior of the valve-chamber.

To the central pipe, which, during the operation of the apparatus, is revolved upon its axis, are cast or otherwise affixed conical valves K with a longitudinal opening or slot. These valves are tapering downward, so that by the weight of the central pipe a perfect fit is effected on the correspondingly-shaped valve-seats. The latter are, as before stated, formed in one piece with the casing of the valve-chamber, and the outlet or opening of each is provided with a flap or clappet valve, weighted at its lower end, so as to automatically close said opening.

The object of this arrangement is to prevent ingress of the liquid which may have been raised into valve-chamber from entering the steam-pipe, should the pressure of steam from some cause or other become inferior to the pressure of the liquid. If, therefore, the pressure of the liquid exceed that from within the pipe, then the clappet-valve will be closed, and thus seat the valve-opening, through which the exit of steam takes place. If, on the other hand, the steam be of the required pressure, the said clappet-valve will be raised and allow the steam to rush out every time the opening in the valve on the revolving central pipe comes opposite the stationary opening in the valve-seat fast to the valve-chamber. In the partitions or skeleton valve-seats J are arranged openings, through which stems N of the light annular valves M pass, whose office it is to admit liquid from below into the valve-chamber above, and to retain it there until raised again into the upper valve-chamber by the successive condensations of the steam. This has been done in the apparatus heretofore used in a rather slow manner, the condensations of steam not being effected so rapidly as desirable. To remedy this I have devised the following arrangement: To the revolving pipe, and immediately underneath the valve-seat J, is secured a plate, O, to the upper side of which is cast or otherwise at-

tached a cam or projection, P, in the path of the downwardly-projecting stem N of the valve M, so that on each revolution the valve is for an instant lifted off its seat, allowing a small quantity of liquid already collected in the chamber above to drop into the chamber below, which is filled with steam. The injection of the cold liquid into the chamber filled with steam causes instantaneous condensation, which, producing vacuum, actuates the liquid below to rise into the chamber. By this means great rapidity of operation has been attained.

Having thus described my said improvements and the manner in which the same is or may be carried into effect, I claim—

1. The combination of a pipe or tube in sections of enlarged valve-chambers, when arranged intermediately between the tube or pipe sections and concentrically therewith, substantially as set forth.

2. In combination with a revolving central steam-pipe and stationary outer tube, the conical valves upon the former and their valve-seats upon the latter, substantially as and for the purpose set forth.

3. The means herein described of producing condensation of steam in the chambers, for the purpose of raising the liquid or oil by injecting or dropping a portion of the liquid raised into the said chamber, substantially in the manner herein set forth.

4. The attachment to the revolving central steam-pipe of a cam-plate or the equivalent thereof, in combination with stems or projections on the valve, so that by revolving the pipe the valve shall be lifted off its seat for dropping the requisite amount of liquid for condensation of steam, substantially as set forth.

5. In combination with valve-chambers constructed and operating as described, the weighted valve-covers, so as to close the valve-opening if the external pressure of the liquid exceed that from within, substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

J. Y. SMITH.

Witnesses:

A. POLLOK,

EDM. F. BROWN.