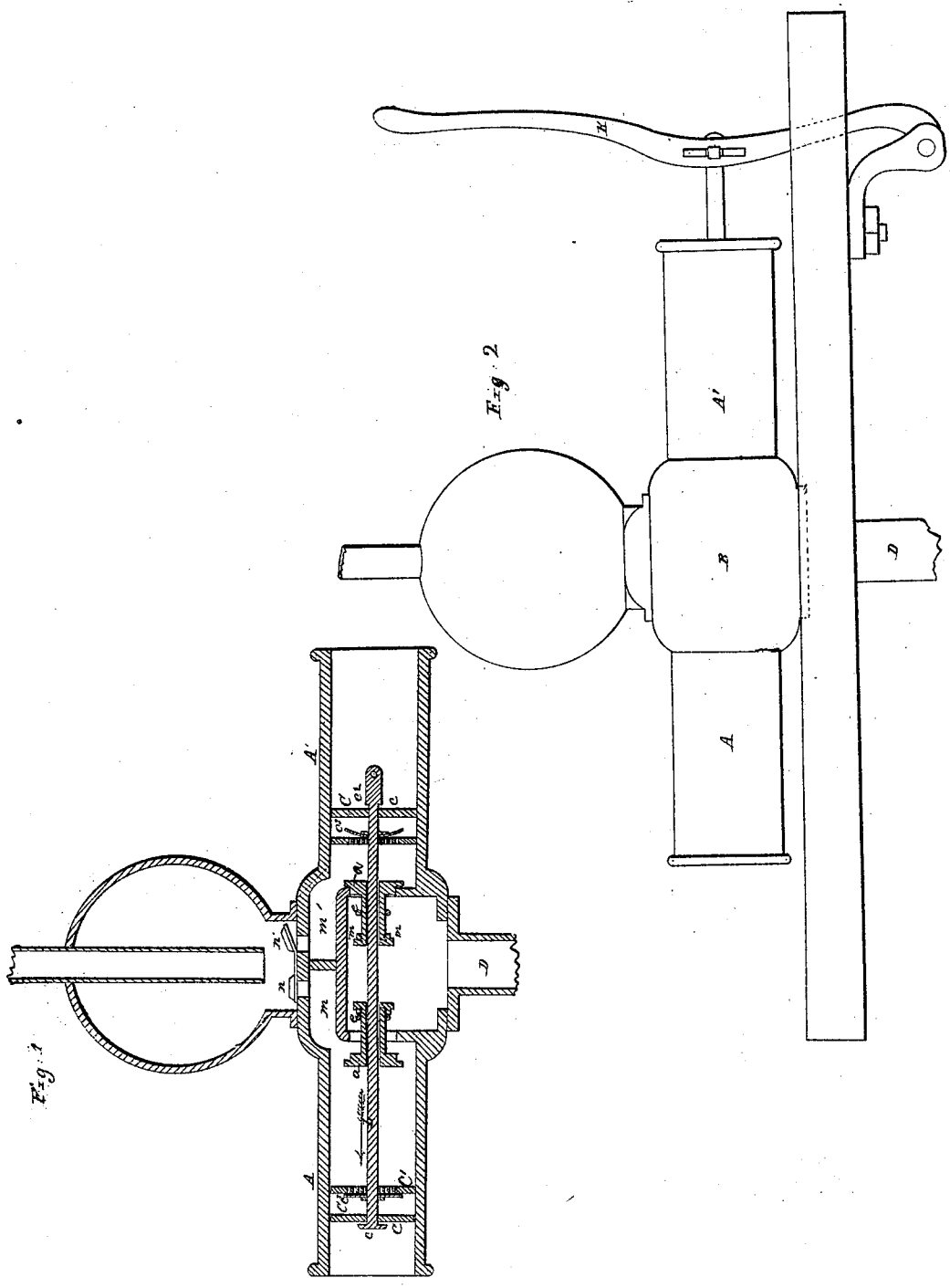
E. A. Jeffery,

Double-Acting Pump,

No. 6,937. Patented Dec. 11, 1849.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWIN A. JEFFERY, OF CORNING, NEW YORK.

PACKING PUMP-PISTONS.

Specification of Letters Patent No. 6,937, dated December 11, 1849.

To all whom it may concern:

Be it known that I, EDWIN A. JEFFERY, of Corning, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full, clear, and exact description of the characteristics which distinguish my invention from all others heretofore known, reference being had to the accompanying drawing, in which—

Figure 1 represents an elevation of my pump and Fig. 2 is a vertical longitudinal section of the same.

My invention consists in so constructing the pistons of pumps that a quantity of water shall always intervene between their interior surface and the external air being in fact the substitution of water to pack the piston for metal gasket, leather and other substances heretofore employed for that purpose.

In the drawing A A′ are the barrels of two single acting pumps placed horizontally in line with each other the two barrels being united by a chest B containing the valves and water passages, and having a common supply and discharge pipe. An opening is made in the inner end of each barrel for the entrance of the water which opening is closed by a valve *a* arranged to open into the barrel. A piston rod *b* to which the pistons C are attached is passed through both barrels, this piston rod passes through the entry valves *a* which slide upon it, leakage being prevented by suitable packing boxes *a* stop *e* is adapted to each valve to prevent it from being opened too far by the friction of its packing on the piston rod. The valve chest is divided into two main water passages by a partition extending longitudinally above the entry valves from the bottom of one pump to the bottom of the other the lower passage communicates directly by the suction pipe D with the source from which the water is drawn. That portion of the chest above the partition is subdivided into two distinct discharge passages *m m′* which communicate at their lower extremities with their respective pump barrels and at their upper extremities with an air vessel mounted on top of the valve chest. The openings into the latter are each furnished with a discharge valve *n n′* both of which are lap valves and are cut out of a single piece of leather large enough to form the joint between the air vessel and the valve chest. The pistons C, are each formed of two disks *c c′* fitted to the barrel, the inner (*c′*) being fixed on the piston rod and the outer (*c*) sliding upon it from and toward the inner, the distance to which it can move from the latter being limited by a stop (c^2) attached to the piston rod. The inner disk is perforated with one or more holes which are closed by a valve (c^3) opening toward the sliding disk. The piston rod is conveniently worked by connecting one of its ends with the lower extremity of an upright lever K to whose upper arm the power is applied.

The hand of the operator being applied to the hand lever K the coupled pistons are moved horizontally to and fro; as the piston of the barrel moves outward the entry valve (*a*) being carried along with the piston rod by the friction of the packing until its further motion is prevented by its stop (*e*) is suddenly opened to its full extent and the water rushes into the void left by the withdrawal of the piston, when the motion of the piston rod (*b*) is reversed the entry valve being carried along with it is suddenly closed and the water is forced through the discharge valve *n* into the air vessel, as the piston is forced inward in the barrel the water issuing through the openings in the inner disk of the piston forces the outer disk out against its stop and fills the space between the two disks, when the piston is again withdrawn the pressure of the atmosphere together with the friction against the interior of the barrel acting upon the sliding disk compresses the inclosed water whose exit is prevented by the closing of the valve (c^3) and thus forms a perfect packing which prevents the entrance of the external air. The packing water is of course wasted to a small extent at each stroke of the piston by leakage between the disks and the inner surface of the barrel, but this leakage is too inconsiderable where the parts are fitted in a workmanlike manner to be worthy of note. If the inner disk should not be accurately fitted to the barrel, the water packing will be forced into the barrel by the pressure of the atmosphere on the outer disk but if this water was not there the external air would enter and by expanding under the diminished pressure caused by the withdrawal of the piston would prevent the entrance through the entry valve of a much larger quantity of water than would be equal to the

bulk of the air which entered the barrel at the atmospheric pressure. As the piston is forced against the water in the barrel, the space left between the disks by the leakage of the water into the barrel is replaced by an equal quantity through the valve openings and thus the water packing is kept constantly replenished.

The following reasons will show that the pump thus constructed will work better than any heretofore known; first its barrels are horizontal and its discharge passages lead out of the uppermost parts of the barrels, hence any air which may have entered with the water through the suction pipe will be first discharged from the barrel and when the piston arrives at the end of its stroke the clearance in the end of the barrel and the discharge passage are left filled with water which being unexpansive does not prevent the barrel from being filled entirely from the suction pipe. Second the entry valves from the friction of their packing are worked by the piston rod, and are opened and closed without any pressure from the entering or effluent water hence these valves will always open whether the vertical distance from the pump to the water be small or great and although working horizontally will always close at the commencement of the return stroke whether the barrel be filled wholly or partially with water. To these advantages my pump unites all the advantage of a vertical barrel in which the water floating on top of the piston prevents the entrance of external air into the barrel through leaks in the piston, by my construction a disk of water, sufficient even if unreplenished to supply the leakage for many consecutive strokes is interposed between the external air and the space within the piston, thus preventing the entrance of the least quantity of air through the leaks in the piston.

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

The pump piston constructed essentially of two disks and a valve substantially as herein set forth, whereby it is rendered capable of keeping itself packed with water.

In testimony whereof I have hereunto signed my name.

EDWIN A. JEFFERY.

Witnesses:

STEPHEN W. WOOD,

P. H. WATSON.