3 Sheets—Sheet 1.

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Fig. 1

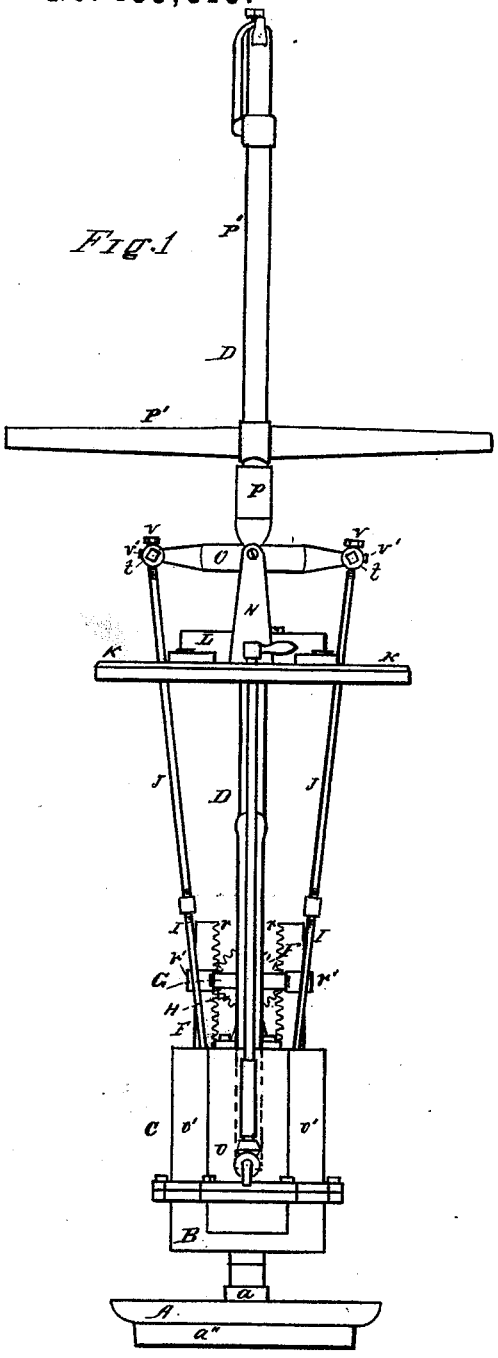
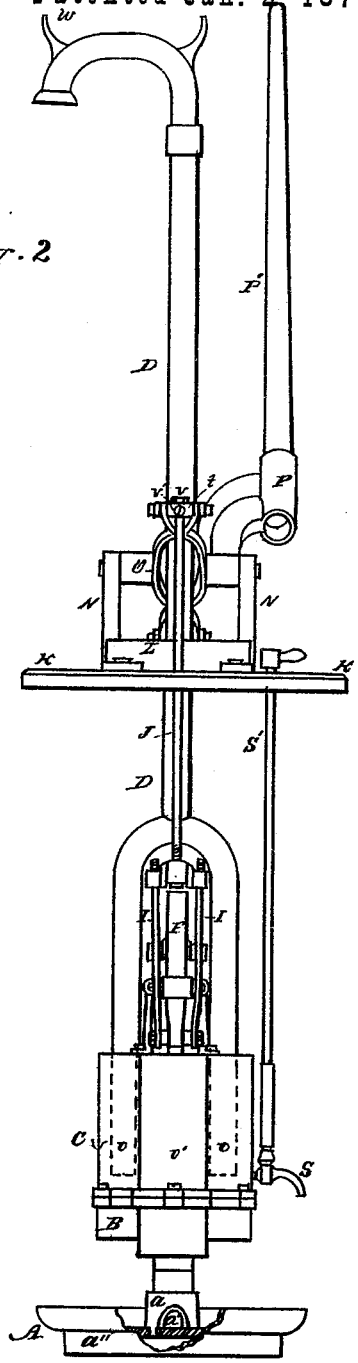


Fig. 2



WITNESSES

M. M. Bridley

W. F. Harback

INVENTOR

John S. Adams

By Bridley & Warner

Attys

3 Sheets—Sheet 2.

J. S. ADAMS.

PUMP.

No. 185,813. Patented Jan. 2, 1877.

Fig. 3

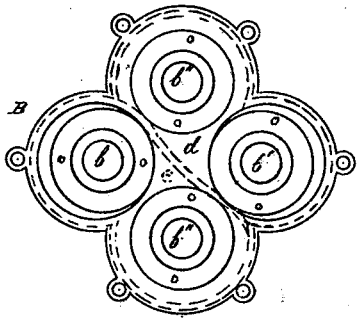


Fig. 4.

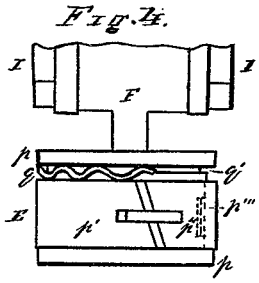


Fig. 5.

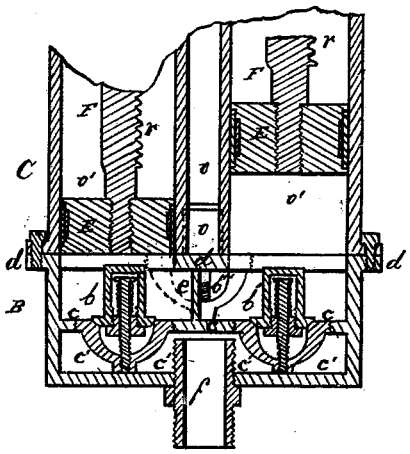
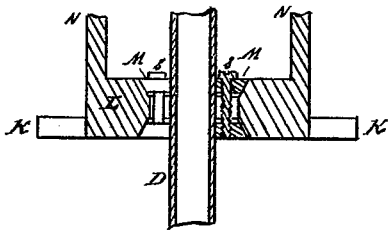


Fig. 6.



WITNESSES

M. M. Gridley.

W. F. Harbach

INVENTOR

John S. Adams

By Gridley & Warner

attys

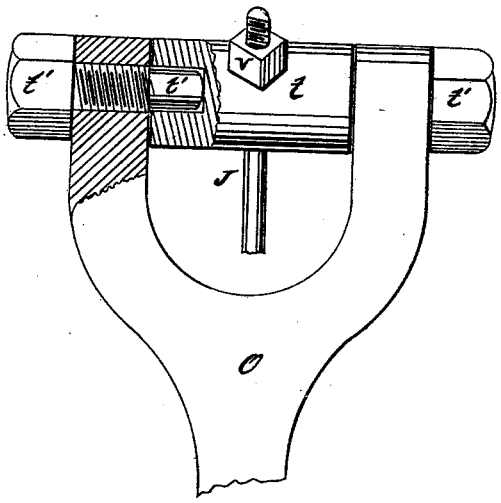
3 Sheets—Sheet 3.

J. S. ADAMS.

PUMP.

No. 185,813. Patented Jan. 2, 1877.

Fig. 7.



Witnesses:

Frederic Ullmann
Ullman & Strong.

Inventor:

John S. Adams
By T. T. Warner
(his atty)

UNITED STATES PATENT OFFICE.

JOHN S. ADAMS, OF ELGIN, ILLINOIS.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **185,813**, dated January 2, 1877; application filed November 11, 1875.

To all whom it may concern:

Be it known that I, JOHN S. ADAMS, of Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Force-Pumps, of which improvements the following is a full, clear, and exact description, which will enable others skilled in the art to which my invention appertains to make and use the said improvements, reference being had to the accompanying drawings, forming a part thereof, and in which—

Figures 1 and 2, Sheet 1, are side elevations, respectively, of a force-pump provided with my improvements; Fig. 3, Sheet 2, a top or plan view of the valve-box; Fig. 4, Sheet 2, an elevation of the piston; Fig. 5, Sheet 2, a vertical central section through the piston-cylinders and valve-box, and the parts therein; Fig. 6, Sheet 2, a vertical central section through the centering-blocks, and Fig. 7, Sheet 3, is a top or plan view, shown partly in section, of the walking-beam and some of the parts connected thereto.

Like letters of reference indicate like parts.

In the drawing, A represents the suction-pan or base of the pump, and consists of a dish-shaped piece, from the central part of which projects upwardly a tubular part, *a*, wherein are the ports *a' a'*. The bottom of the part A is provided with an annular downwardly-projecting flange, *a''*. B is the valve-box, and *b*, *b'*, *b''*, and *b'''* are valves arranged therein. *c* is a floor or horizontal partition dividing the box B into upper and lower chambers, and *c'* is the lower chamber thus made. The valves *b* and *b'* play in seats arranged in the floor *c*. *d* is a horizontal partition, which, with the exceptions hereafter made, separates the box B from the piston-cylinders and air-chambers. The valves *b''* and *b'''* play on seats in the part *d*. *e* is a vertical wall or partition dividing into two chambers the space included between the partitions *c* and *d*, so that the valves *b* and *b'''* communicate with one of these upper chambers, and the valves *b'* and *b''* with the other. *f* is a tube entering the chamber *c'*, and is attached to the part *a* by means of a screw-thread. C is that part of the pump which constitutes the air-chambers *o o*, and also the piston-cylinders *o' o'*. The air-chambers communicate with each other, and lie in the same plane with the cylinders *o' o'*. The partition *d* constitutes the bottom of the air-chambers, but the cylinders *o o* communicate with the chamber below the said partition. D is a forked discharge-pipe, the forked ends of which enter tubes, forming continuations thereof, and arranged in the air-chambers. These continuations extend nearly to the bottoms of the air-chambers, thus being directly over the valve *b''* and *b'''* while the cylinders *o' o'* are directly above the valves *b* and *b'*. E E are the pistons, and F F the piston-stems. The pistons are flanged, as usual, as shown at *p p*, to receive an expansible ring-packing, *p'*. A groove is also sunken into the central part of the periphery of the piston, as represented by the broken lines at *p'' p''*, to receive small elliptic springs *p''' p'''*, having an outward pressure. *q* is a corrugated annular spring, made preferably in sections, and arranged between the packing *p'* and one of the shoulders or flanges *p p*; and, in order that these corrugated springs may be securely held in place, I set them into a groove, *q'*. The piston-stems are cogged, as shown at *r r*, so as to operate as racks, in connection with the pinion hereinafter mentioned. G is a standard in the part C, and H is a spur-wheel or pinion having bearings in the part G, and arranged for engagement by the racks *r r*, the latter being held to this engagement by means of the clasps or lugs *r' r'*. I I are links pivoted to the lower ends of the stems F F, and J J are tension-rods attached to the upper ends of these links. K is a floor intended to cover the reservoir, cistern, or tank containing the water into which the pump, in the example shown, is intended to be submerged. The pipe D passes upward through a central opening in this floor, and L is annular center-piece surrounding this opening, and attached to the upper side of the floor. The upper and lower inner edges of the pins L are beveled, as shown in Fig. 6, and M M are centering blocks or lugs, correspondingly beveled on their outer edges, and united by means of the screws *s s*, passing freely through one set

of blocks—the upper set, for example—and into female screws in the other set, as shown. The single part of the pipe D also passes between the inner ends of the blocks M M, which are there cut to receive it. N N are uprights projecting from the part L. O is a rocking beam, pivoted in the uprights N N, and having an elongated opening to receive the discharge-pipe. The upper ends of the tension-rods J J are screw-threaded, and pass freely through the boxes *t t*, pivoted in forked ends of the beam O. *t' t'*, Fig. 7, Sheet 3, are screw-trunnions passing through screw-threaded perforations in the forked ends of the walking-beam, and entering sockets in the boxes *t t*, thus forming the pivots or trunnions on which the said boxes turn, and preventing the latter from being detached from the beam unless the said trunnions or pivots are unscrewed or removed for that purpose. *v v* are nuts run upon the upper ends of the rods J J, and *v' v'* are set-screws entering the boxes *t t*, and arranged for contact with the tension-rods. P is a socket, rigidly attached to the beam O, and adapted to receive an operating-lever, F', which may be arranged either vertically in the socket, as shown in Fig. 2, or horizontally, as shown in Fig. 1. The upper end of the tube D is preferably removable, and is bent downward, as shown.

S is a cock entering the lower part of one of the air-chambers, and S' is a rod rigidly attached to the spigot, and passing upward through the floor K. When it is intended to use a horizontal arm or lever to work the pump, the bearings of the beam O may be sufficiently high to admit of the lever being moved with convenience. When the pump is intended to be portable, and used, for example, as a garden-engine, the bearings of the beam O may be much lower down than is shown, and the floor K will not be essential. The base A, when constructed as shown and described, steadies the lower part of the pump, and prevents the sand and soil from being sucked into the ports *a' a'*. By arranging the air-chambers and piston-cylinders in the same plane, and constructing the valve-box in the manner described, compactness, ease of action, facility of construction, and economy are secured. The corrugated springs, operating in connection with the ring-packing, tend to keep the latter in contact with one of the shoulders of the piston, and the elliptic springs crowd out the ring-packing so as to recompense for wear and tear. The tension-rods, by being screw-threaded at the top and employed in connection with the nuts and fastenings described, admit of the tightening of those parts which operate as pitmen; and lost motion, as well as the noise and wear and tear produced by loose joints, may thus be prevented. The beveled center-block, in connection with the correspondingly-beveled centering-pieces and the screws for tightening the latter, admit of the discharge-pipe being firmly held in place. The rod connected to the spigot, and extending above the floor, admits of the cock being controlled with convenience, and the water may be readily drawn from the air-chambers. The pump may be operated by means of steam, suitable connections being made for that purpose.

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

1. The suction-pan A, provided with the flange *a''*, in combination with the induction-tube of a force-pump, substantially as and for the purposes specified.

2. The beveled annular block or center-piece L, provided with the uprights or bearings N N, in combination with the beveled centering-blocks M M, screws *s s*, floor K, discharge-tube, and rocking-beam, substantially as and for the purposes specified.

3. The combination of the expansible ring-packing on the pistons, with the corrugated springs *q q*, substantially as and for the purposes specified.

4. The valve-box B, consisting of an upper chamber divided into two compartments by means of the vertical wall *d*, each compartment having therein a valve-opening, and also of the lower chamber *c'*, separated from the upper chamber by means of the horizontal floor *c*, having two valve-openings arranged therein in a line at right angles, or nearly so, to the line in which the upper valve-openings lie, in combination with the part C, having therein the air-chamber *o o*, and the piston-cylinders *o' o'*, the said chambers and cylinders lying in the same plane with each other, all the said parts arranged substantially as shown and described, with relation to each other, for operation together in a pump, for the purposes set forth.

5. The part C, having therein the air-chamber *o o*, and the piston-cylinders *o' o'*, all lying in the same plane with each other, in combination, in a pump, with the forked discharge-pipe D, the forked ends thereof entering the chamber *o o*, and extending nearly to the bottom thereof, substantially as and for the purposes specified.

6. The walking-beam O provided with the lever-socket P, and having an elongated opening surrounding the discharge-pipe, and also having one or more forked ends, in combination with the uprights or standards N N, forming supports for the bearings or trunnions on which the beam rocks, substantially as and for the purposes specified.

7. In combination, the beam O having forked ends, the rocker-boxes *t t* having bearings on the removable screw-trunnions *t' t'* entering female screws in the said forked ends, and the tension-rods J J passing through the said boxes, and retained therein by means of the nuts *v v*, substantially as and for the purposes specified.

8. In a pump having double piston-cylin-

ders, the combination of the upper walking-beam O provided with the socket P, actuating-lever F′, racks or cogged piston-stems F F, standards or bearing G, spur-wheel or pinion H, clasps or lugs *r r*, pivoted links I I, and tension-rods J J, all arranged substantially as shown and described, with relation to each other, and for operation together, as and for the purposes specified.

JOHN S. ADAMS.

Witnesses:
N. C. GRIDLEY,
F. F. WARNER.