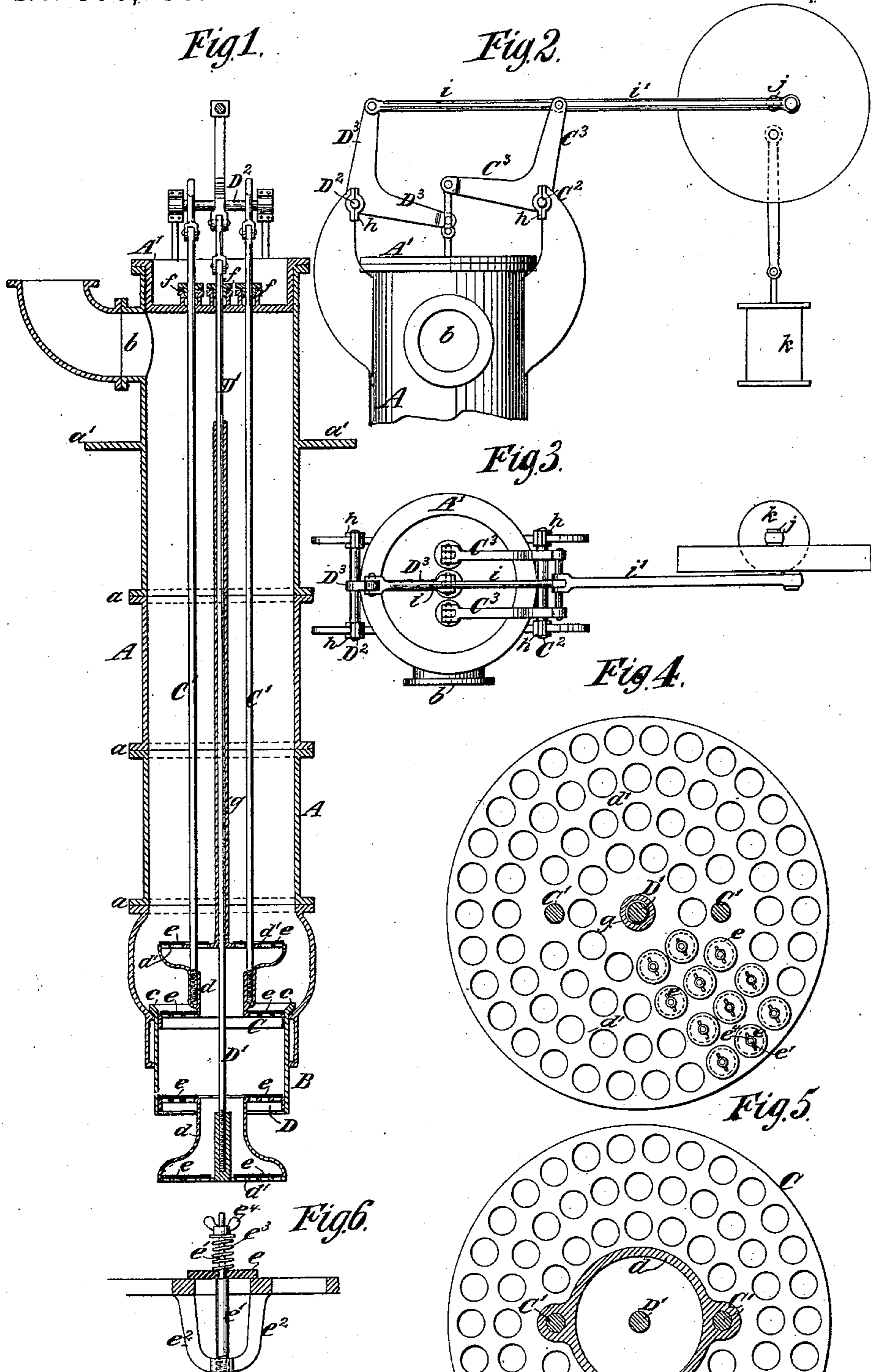


(No Model.)

W. D. ANDREWS.
PUMP.

No. 306,798.

Patented Oct. 21, 1884.



Witnesses:
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UNITED STATES PATENT OFFICE.

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PUMP.

SPECIFICATION forming part of Letters Patent No. 306,798, dated October 21, 1884.

Application filed February 25, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. ANDREWS, of Brookhaven, in the county of Suffolk, in the State of New York, have invented a new and useful Improvement in Pumping-Machines, of which the following is a specification.

My improved pump or pumping machinery is more particularly intended for elevating water from a well or water-tight reservoir which is supplied with water from a large number of tube wells or driven wells arranged and connected as shown in my several applications for Letters Patent, which are numbered 122,026, filed February 25, 1884, 122,276, filed February 28, 1884, and 122,277, filed February 28, 1884; but the invention is in whole or in part applicable to pumps for raising water from any pond, stream, or other source of supply, and particularly from wells or bodies of water which are considerably below the level at which the actuating mechanism of the pump is placed.

In carrying out my invention I employ a single piston in a working-barrel, or two pistons and operating mechanism for moving them simultaneously toward and from each other. In both cases the water all passes through the piston or pistons in which are suitable valves.

My invention consists in the combination, with an upright cylinder or casing having a working-barrel fitted to its lower part and open at the top, or closed and provided with a discharge-pipe, of a piston consisting of an annular body fitting the working-barrel and provided with valves, and an upward tubular extension, which is preferably made flaring toward the top, and is also provided with valves. By this construction I obtain a valve-area in the piston nearly double what could be obtained if the valves were all in the body of the piston, and consequently the water is moved with less friction and greater economy. When the two pistons are formed with hollow or tubular extensions, the lower piston will have a downward extension, made downwardly flaring, and extending to a point below the lower end of the working-barrel, as will be more fully hereinafter described.

In the accompanying drawings, Figure 1 is

a vertical section of a pump embodying my invention and having two pistons. Fig. 2 is a side elevation of the upper portion of the upright cylinder or casing, and mechanism for operating the two pistons. Fig. 3 is a plan of the parts shown in Fig. 2. Fig. 4 is a plan, on a larger scale, of the extension valve-seat of the upper piston. Fig. 5 is a horizontal section through the extension of said upper piston, and a plan of the annular piston-body; and Fig. 6 is a detail sectional view on a larger scale, showing one form of valve which may be employed.

Similar letters of reference designate corresponding parts in all the figures.

A designates the upright cylinder or casing, which may be of cast-iron, made in sections, which are secured together by flanged joints *a*. The top of this cylinder or casing may be closed or open, according to whether or not the pump is to be used to force the water above the upper end of said casing or cylinder. In this example of my invention the cylinder or casing A is closed at the upper end by a head, A', and immediately below said head is provided with a discharge-outlet, *b*, to which a discharge-pipe may be connected. Inasmuch as the upper side of the outlet *b* is coincident with the under side of the head, no air will accumulate below said head. When the upper end of the cylinder or casing A is open, the discharge may be through an ordinary pitcher-spout outlet. At the exterior of the cylinder or casing are flanges or brackets *a'*, by which it is supported, and at the lower end thereof is a working-barrel, B, which projects below the lower end of the cylinder or casing, and is supported through a flange, *c*, at its upper end, resting upon a shoulder on the cylinder. The flange *c* may be bolted to the cylinder, if desired; but when two pistons are employed there will be no great tendency to move the barrel, because the friction exerted by the moving pistons will act simultaneously in opposite directions.

C D designate the two pistons, consisting each of an annular body, which is fitted to the working-barrel B, and may be provided with any suitable packing, and a tubular or hollow

extension, d , which is made flaring in a direction away from the body, and the closed end of which forms a valve-seat, d' . The extension d of the upper piston, C, extends upward, and at a distance from the piston is made upwardly flaring to nearly the diameter of the piston itself, and both its valve-seat d' and the annular body of the piston itself are furnished with numerous valves e . By this construction of piston I provide a very large valve-area and enable the water to be moved with comparatively little friction. The extension d of the lower piston is downward, and at a distance from the piston said extension flares downward to near the diameter of the body of the piston. The annular body of the lower piston, D, and the valve-seat d' of its extension are furnished with numerous valves e . The extensions of the two pistons D and C extend to such a distance above and below them that they never enter the working-barrel B, and therefore do not obstruct the ingress of water through the annular body of the piston D nor its egress through the body of the piston C. The cylinder A above the working-barrel B is enlarged to afford provision for the flow of water past the extension of the upper piston, C.

Fig. 4 represents the valve-seat d' of the upper piston, C, and Fig. 5 represents the annular body of such piston, the extension being shown in transverse section.

The valves employed may be of any suitable construction.

In Fig. 6 I have represented a desirable form of valve.

The valve e is capable of rising bodily on a stem, e' , which is fixed in a yoke, e'' , extending downward from the seat, and is closed or returned by a spring, e''' , upon the stem, secured between the valve and a thumb-nut, e''' , whereby the tension of the spring may be varied. The upper piston, C, is operated by two rods, C' C', which extend upward through stuffing-boxes f in the head A', and the lower piston, D, is operated by a single piston-rod, D', extending upward through a tube or sleeve, g , projecting from the upper piston, C, and through a stuffing-box, f . The tube or sleeve g , in combination with the rod D', aids in guiding the two pistons and prevents any buckling or bending of the single long rod D'.

At opposite sides of and above the cylinder A are rock-shafts C² D², supported in bearings h , and on the shaft C² are two bell-crank levers, C³, the horizontal arms of which are connected with the piston-rods C' C'.

On the shaft D² is a bell-crank lever, D³, the horizontally-extending arm of which is connected with the piston-rod D' of the lower piston, D. The upwardly-extending arms of the bell-crank levers C³ are connected by a rod, i , with the corresponding arm of the lever D³, and to the said arms of the levers C³ is connected a rod, i' , which receives motion from a crank-shaft, j , operated by an engine, k . This en-

gine may be of any usual or suitable construction.

I have only shown one example of mechanism for producing the simultaneous movement of the pistons C and D; but other combinations of parts may be used for this purpose.

It is advantageous to have the working-barrel B readily removable from the cylinder A, as it can then be taken out for repairs, for renewal, or to substitute one larger or smaller, as circumstances may require. To this end the working-barrel is made of such size that it may be readily slipped down through the cylinder to its place at the lower end thereof. The lower end of the casing or cylinder A, or at least the end of the working-barrel B, should extend downward below the surface of the water from which the pump takes the supply; but when only the piston C is used the lower piston, D, should be replaced by a foot-valve. Where two pistons are employed, the water all passes through each piston during its downward stroke, being impelled upward by the simultaneous upward movement of the other. There being no reverse motion in the water, the impetus it acquires insures a continuous, if slightly decreased, upward and onward movement, even when the pistons are momentarily stationary at opposite ends of their strokes.

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

1. The combination, with an upright cylinder or casing having at its lower part a working-barrel, of a piston consisting of an annular body provided with valves, and an upward tubular extension also provided with valves, substantially as herein described.

2. The combination, with an upright cylinder or casing having at its lower part a working-barrel, of a piston fitting said working-barrel, and consisting of an annular body provided with valves and an upwardly-flaring tubular extension forming a valve-seat, d' , substantially as herein described.

3. The combination, with an upright cylinder or casing and a working-barrel fitted to the lower end thereof, and capable of being introduced and removed through said cylinder or casing, of a piston consisting of an annular body provided with valves and an upward tubular extension also provided with valves, substantially as herein described.

4. The combination, with the cylinder or casing A, having at its lower part a working-barrel, B, and having above said barrel an annular enlargement, of the piston consisting of an annular body provided with valves, and an upwardly-flaring tubular extension also provided with valves, substantially as herein described.

5. The combination, with an upright cylinder or casing having at its lower part a working-barrel, of two pistons consisting of annular bodies provided with valves, and upward and downward tubular extensions also pro-

vided with valves, substantially as herein described.

6. The combination, with the cylinder or casing A and the removable working-barrel
5 B, the cylinder having an annular enlargement above said working-barrel, of the upper valvular piston, C, having an upwardly-flaring extension and valve-seat d d' , the lower valvular piston, D, having a downwardly-flar-

ing extension and valve-seat d d' , and mechanism for moving said pistons simultaneously toward and from each other, substantially as herein described.

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