

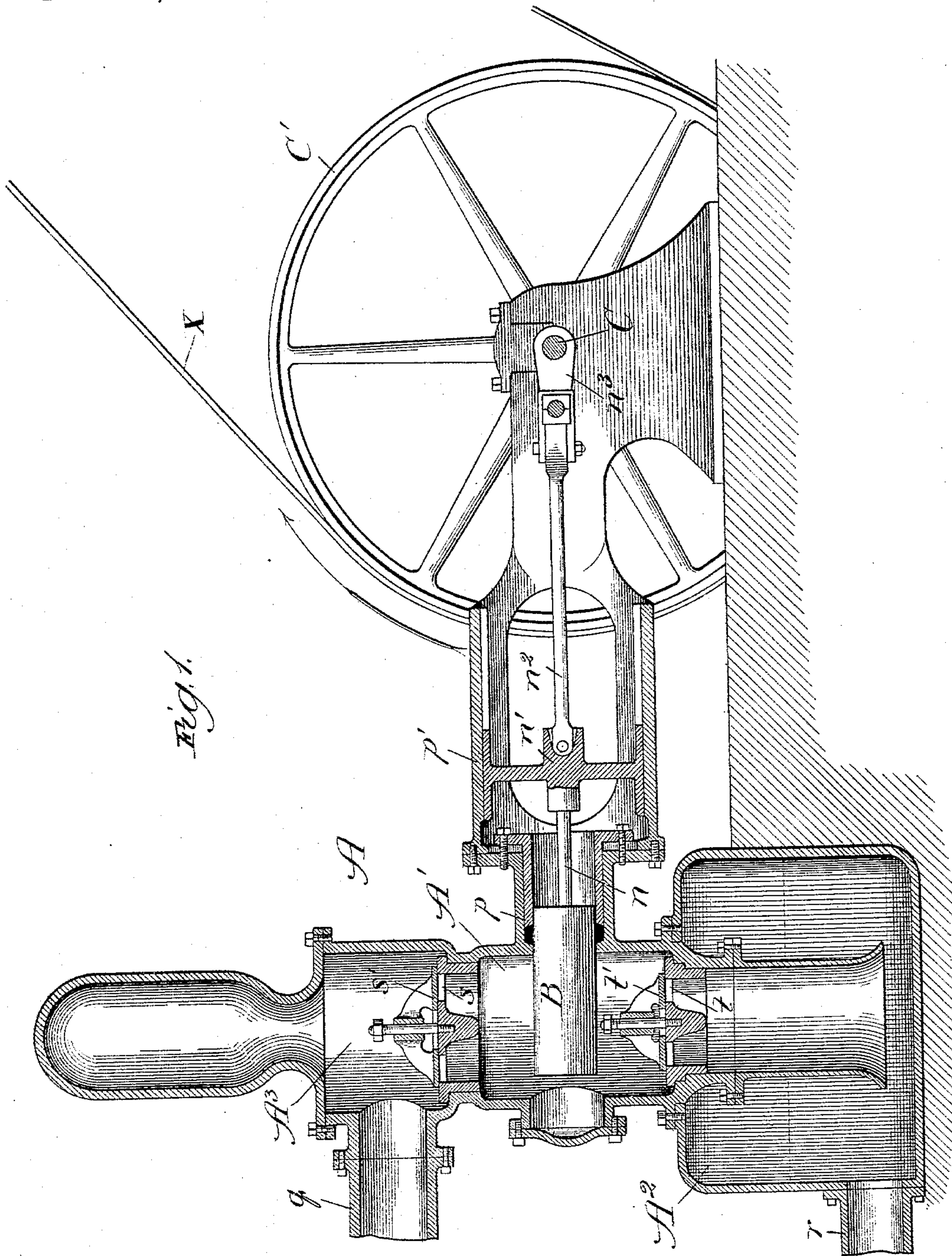
(No Model.)

2 Sheets—Sheet 1.

J. STUMPF.
PUMP.

No. 571,702.

Patented Nov. 17, 1896.



Witnesses
Chas. E. Gaylord,
Lute J. Miller.

Inventor:
John Stumpf,
By Dyrenforth & Dyrenforth,
Attys.

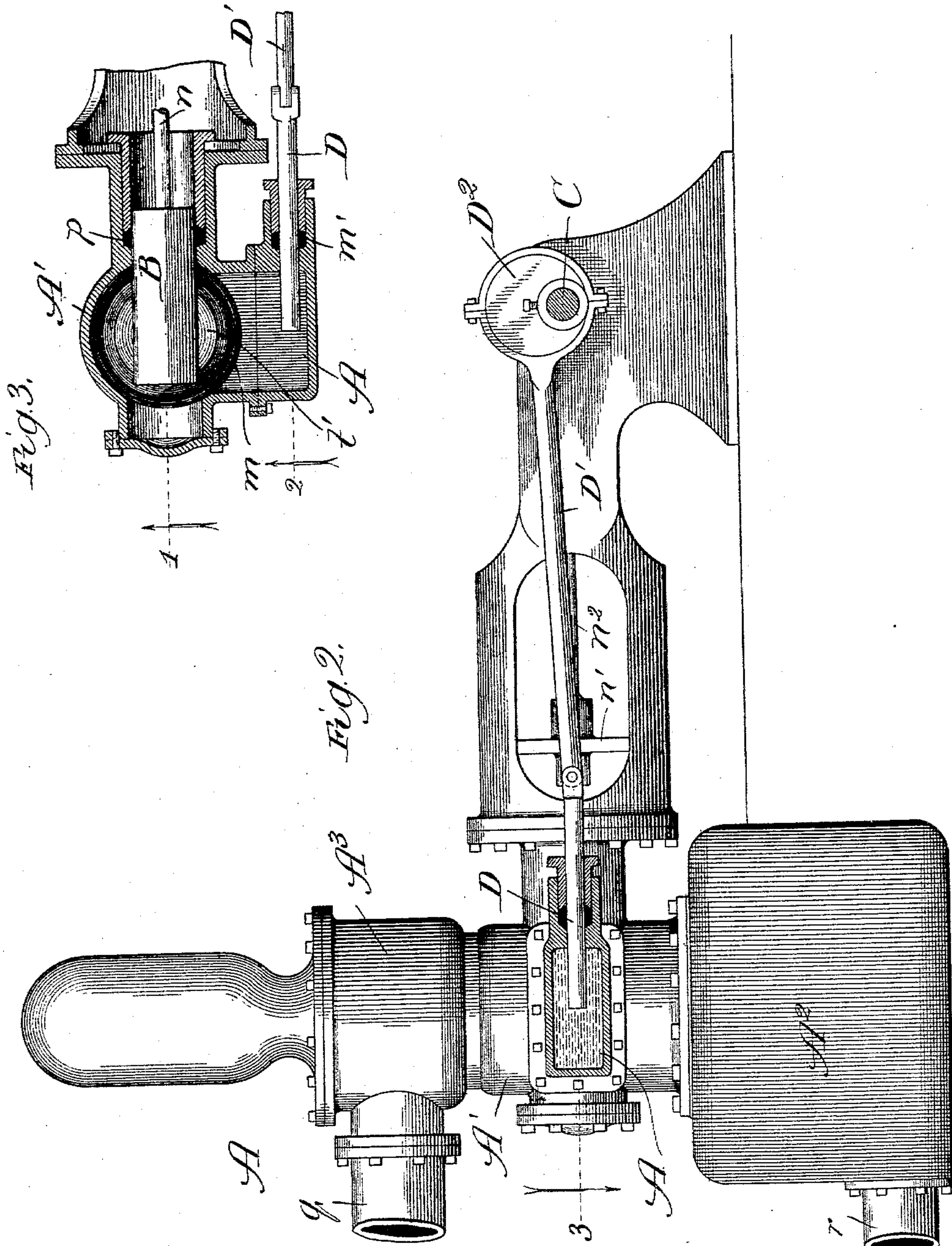
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2 Sheets—Sheet 2.

J. STUMPF.
PUMP.

No. 571,702.

Patented Nov. 17, 1896.



Witnesses:
Edw. Gaylord,
Lute J. Alt.

Inventor:
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UNITED STATES PATENT OFFICE.

JOHN STUMPF, OF CHICAGO, ILLINOIS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 571,702, dated November 17, 1896.

Application filed July 13, 1896. Serial No. 598,954. (No model.)

To all whom it may concern:

Be it known that I, JOHN STUMPF, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pumps, of which the following is a specification.

My invention relates to an improvement in fluid-pumps generally, and more especially to water-raising pumps employing a cylinder or piston-chamber having induction and eduction ports provided with valves and a piston working in the cylinder to suck the fluid through the induction-port and discharge it through the eduction-port. In pumps of this class the piston is usually connected, by means of a plunger, with a crank or eccentric on a rotary shaft and operates in its movement in the outward direction to first open the induction-valve and close the eduction-valve, and then draw the fluid into the cylinder, and in its movement in the inward direction to first close the induction-valve and open the eduction-valve and discharge the fluid from the cylinder. During the time of movement of the plunger across either dead-center the piston is practically inactive, and in the initial movement of the piston in either direction to produce opening and closing of the valves the pump is performing no useful work. Although the valves may be comparatively sensitive and open and close quickly under the action of the piston, a more or less extensive travel of the piston is required to effect this result before the useful work of sucking the fluid into or discharging it from the cylinder commences. The time required to open and close the valves by the movement of the piston from the dead-center reduces the working capacity of the pump and is therefore an objection. Furthermore, the sudden great pressure brought to bear against the valves when the movement of the piston is reversed tends to cause the valves to open and close with a shock which is not only more or less noisy, but destructive to the valves and valve-seats.

My object is to provide simple and effective means, in the form of an auxiliary plunger, at or effective in the cylinder for opening and closing the induction and eduction valves in a manner comparatively gentle and while

the piston-operating plunger is crossing the dead-center, whereby the piston will from the very commencement of its movement in either direction suck water into or discharge it from the cylinder, and the pump may be run at high speed without undue shock to the valves.

In the drawings, in which my improvements are shown as applied to a single-acting pump, Figure 1 is a central vertical section through the pump, the section being taken on line 1 of Fig. 3 and viewed in the direction of the arrow; Fig. 2, a side elevation of the pump, partly in section, the section being taken on line 2 of Fig. 3 and viewed as indicated; and Fig. 3, a broken plan section taken on line 3 of Fig. 2.

A is the pump, of which A' is the cylinder having the suction or induction port *t* and the discharge or eduction port *s*. Below the cylinder A' is an air-chamber A², provided with an inlet-pipe *r*, and above the cylinder is an air-chamber A³, having a discharge-pipe *q*. In the cylinder and normally seating upon the port *t* is an induction-valve *t'*, which in its opening movement rises from the said seat. In the chamber A³ and normally seating upon the port *s* is an eduction-valve *s'*, which opens upward.

B is the pump-piston, which reciprocates through a stuffing-box *p* on the side of the cylinder and is provided with a stem *n* and cross-head *n'*, which latter moves in the guide *p'*. The cross-head is connected by means of a plunger *n²* with a crank *n³* on the drive-shaft C. The shaft may carry a pulley C', driven by a belt *x* to rotate the shaft and crank and reciprocate the piston B into and out of the cylinder A'. At the side of the cylinder A', and communicating therewith through an open port *m*, is a chamber A², provided in its end with a stuffing-box *m'*, through which works an auxiliary piston or plunger D. The piston or plunger D is connected by means of a plunger-rod D' with an eccentric D² on the shaft C.

The piston or plunger D is small, as compared to the piston B, and the eccentric D² extends at an angle of about ninety degrees with relation to the crank *n³*, whereby the piston or plunger D is moved outward (to the right in Fig. 2) while the crank *n³* is crossing the

dead-center previous to drawing the piston B in the outward direction, and the piston or plunger D is plunged inward while the crank n^3 is crossing the dead-center previous to plunging the piston B in the inward direction.

In the operation of the piston or plunger D it tends to withdraw fluid from the cylinder A' into the chamber A^2 in its outward plunge and force the fluid back again into the chamber A' in its inward plunge, and its operation is such that in the movement of the crank n^3 across the dead-center previous to an outward plunge of the piston B the suction produced by the piston D will quickly but gently close the eduction-valve s' and open the induction-valve t' , while during the movement of the crank n^3 across the dead-center previous to its plunging the piston B inward the piston D will produce sufficient pressure in the cylinder to quickly but gently close the induction-valve and open the eduction-valve. Thus from the very commencement of the movement of the piston B in the outward direction it will draw fluid through the port t , and from the very commencement of its movement in the inward direction it will discharge fluid through the eduction-port without loss of time or energy in opening the valves.

My invention may be applied to duplex or double acting pumps by providing each cylinder with a chamber A^2 and plunger or piston D. The character or construction of the pump proper has nothing to do with my invention and may be of any suitable form, whether as shown in the drawings or otherwise; and while I show a drive-shaft as the driving mechanism for the piston and valve opening and closing plunger any other suitable driving mechanism may be employed with which the valve opening and closing means may be directly or indirectly connected. Thus I wish it understood as within my invention if the valve opening and closing means be actuated from any moving part of the pump itself or of the engine or motor which works the pump.

While I prefer to construct my improvements in every way as shown and described, they may be modified in the matter of details of construction without departing from the spirit of my invention, as defined by the claims.

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

1. In a pump, the combination with the cylinder provided with an inwardly-lifting induction-valve and an outwardly-lifting eduction-valve, the driving mechanism and piston, of an auxiliary plunger, effective in the same cylinder, actuated from the driving mechanism, while the piston is at the opposite limits of its traverse, to alternately increase and diminish the fluid-pressure in the cylinder and thereby effect opening-and-closing movement of said valves, substantially as and for the purpose set forth.

2. In a pump, the combination with the cylinder and its induction and eduction valves, the driving mechanism and piston, of an auxiliary plunger at the said cylinder actuated from the said driving mechanism, to discharge fluid into and withdraw fluid from the cylinder while the piston is at the opposite limits of its traverse, and thereby effect opening-and-closing movement of said valves, substantially as and for the purpose set forth.

3. In a pump, the combination with the cylinder and its induction and eduction valves, the driving mechanism and piston, of a chamber in open communication with the cylinder, an auxiliary plunger movable in and out of said chamber and actuated from the driving mechanism while the piston is at opposite limits of its traverse, to withdraw fluid from and discharge it back into the cylinder, and thereby effect opening-and-closing movement of said valves, substantially as and for the purpose set forth.

JOHN STUMPF.

In presence of—

ERNEST B. ELLSWORTH,
J. T. COOGAN.