(No Model.)

A. MUNDEN.

FORCE PUMP.

No. 590,161. Patented Sept. 14, 1897.

Fig. 1.

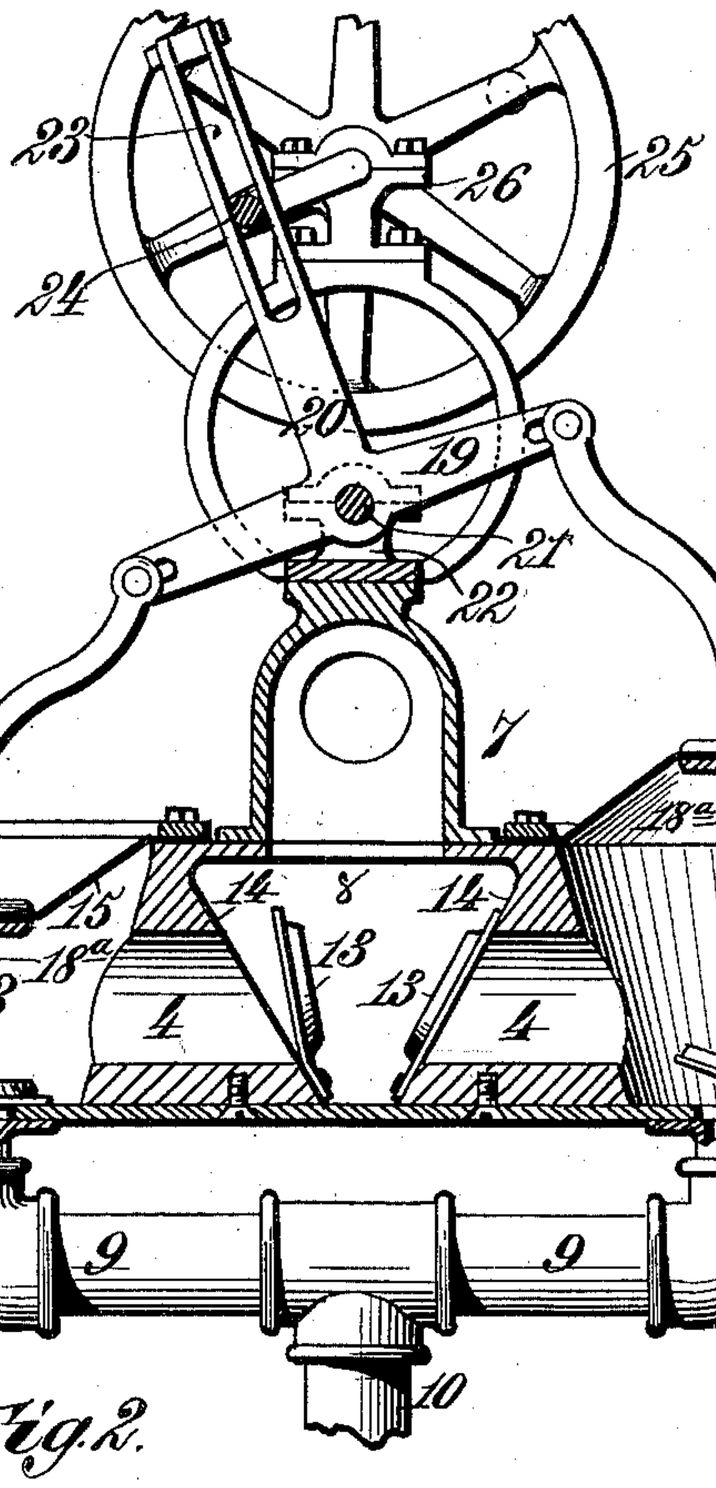


Fig. 2.

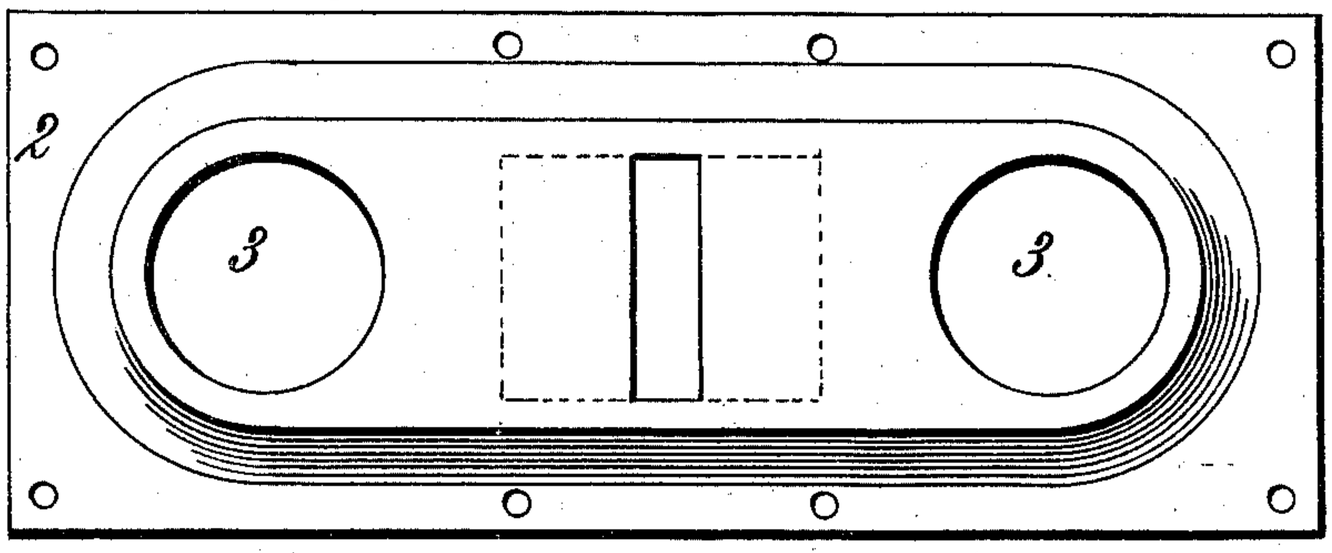
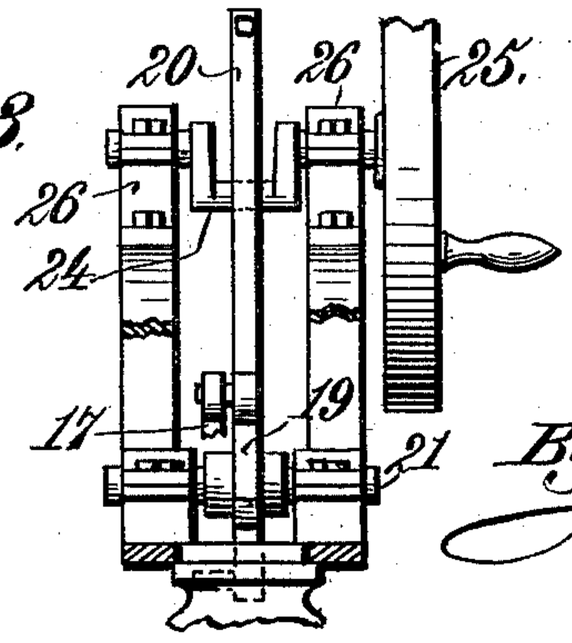


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

ALBERT MUNDEN, OF BERKLEY, VIRGINIA.

FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 590,161, dated September 14, 1897.

Application filed December 23, 1896. Serial No. 616,755. (No model.)

To all whom it may concern:

Be it known that I, ALBERT MUNDEN, a citizen of the United States, residing at Berkley, in the county of Norfolk and State of Virginia, have invented new and useful Improvements in Force-Pumps, of which the following is a specification.

My invention relates to that type of pumps known as "diaphragm force-pumps;" and it is the object of the invention to improve and simplify the construction of pumps of this class.

To this end the invention consists in the novel construction, arrangement, and combination of parts hereinafter set forth and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of a pump constructed in accordance with my invention. Fig. 2 is a bottom plan view of the top plate of the pump-casing, and Fig. 3 is a detail view of one type of mechanism for operating the pump.

In the said drawings the reference-numeral 1 indicates the casing of the pump, which is composed of a base-plate having a vertical wall the configuration of which is optional, and it may be composed of any material suitable for the purpose, such as metal.

The reference-numeral 2 indicates what I designate as the "top plate" of the pump-casing. It conforms in exterior shape to the configuration of the base-plate and is cast with opposite suction and force cylinders 3, extending entirely therethrough, as shown in the drawings.

The base-plate of the casing 1 is provided with inlets 5, leading to the cylinders 3. The opposite ends of a pipe 9 communicate with the inlets 5 for conducting the water to be pumped from the suction-pipe 10. The top plate 2 is also cast with a water-receiving chamber 8, arranged between the cylinders 3 and with which the latter communicate by means of passages 4, cast in said top plate. The function of these passages is to conduct water from the cylinders 3 to the water-receiving chamber 8, as will be obvious. Flap-valves 12, which open upwardly, are arranged in relation to the inlets 5 in such manner that they lift and establish a communication between the suction-pipe 10 and the water-chamber 8 during the suction movement of the pump and close down upon said inlets to cut off such communication during the forcing movement of the pump.

The walls 14 of the lower portion of the water-receiving chamber 8 are inclined and diverge from each other upwardly, forming an inclined seat for flap-valves 13, which open during the forcing movement of the pump to permit the passage of water from the cylinders 3 to the water-receiving chamber 8, and which close against their seats to cover the passages 4 during the suction action of the pump.

The numerals 15 indicate diaphragms of suitable material, such as rubber or leather having the required flexibility, confined upon the top plate 2 by means of a ring 16, which is suitably riveted to said top plate. The top plate and the base-plate of the pump-casing are secured together in a removable manner by means of a bolt 6, so that in the event of clogging of the interior passages or the faulty operation of the valves the pump may be readily separated and the difficulty remedied.

The diaphragms 15 cover the cylinders 3 and are adapted to be alternately depressed into and elevated out of the cylinders 3 by suitable mechanism, as hereinafter described, to impart the suction and force movements of the pump.

The numerals 17 indicate pitmen suitably clamped at their lower extremities to the diaphragms 15, as by nuts 18, engaging the screw-threaded ends 18^a of said pitmen. The upper ends of the pitmen are pivotally connected to a cross-head 19, rocking upon the shaft 21, supported in a bearing 22, mounted upon the housing 7 of the water-receiving chamber 8 and provided with a lever-arm 20, slotted, as at 23, to receive the crank-arm 24 of a balance-wheel 25, which is mounted in bearings 26, extending from the housing 7 and located a suitable distance above the bearings 22 for the shaft upon which the cross-head 19 is supported.

The operation of my invention as thus described is as follows: The fly-wheel 25 is rotated in a suitable manner by power or manually and through the medium of its crank-pin, and the slotted lever carried by the cross-head imparts reciprocating motion alter-

nately to the pitmen 17, which in turn operate to depress the diaphragms 15 into and elevate them out of the cylinders 3, thus alternately imparting suction and force operation in the cylinders 3 and producing a continuous flow of water into the receiving-chamber 8 from the suction-pipe 10 through the pipe 9, inlets 5, and passages 4 past the flap-valves 12 and 13.

By my invention I have improved the construction of pumps of the class referred to, simplifying the same as compared with pumps of prior construction.

The body of my improved pump is composed of two main parts removably secured together by the bolts 6, so that the parts of the pump may readily be separated in case of injury to or imperfect operation of any of the parts.

By my invention I provide a pump composed of a minimum number of parts, the top plate of the casing containing cast within itself the suction and force cylinders, the water-receiving chamber and the passages connecting said cylinders and chamber.

Having thus described my invention, what I claim is—

In a diaphragm force-pump, the combination with a base-plate having a vertical wall and two valved inlets, a suction-pipe, a branch pipe leading from said suction-pipe and communicating with said inlets at its opposite ends, of a top plate cast with suction and force cylinders extending entirely therethrough and communicating with the inlets in the base-plate, and with a central receiving-chamber and passages connecting said chamber and cylinders, flexible diaphragms covering the suction and force cylinders, rings fitting over said diaphragms and secured to the top plate, bolts removably securing said base-plate and top plate together, valves arranged in the water-receiving chamber to alternately open and close the passages connecting said chamber with the suction and force cylinders, and means for operating the diaphragms, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALBERT MUNDEN.

Witnesses:
N. V. LANE,
C. W. PARKS.