

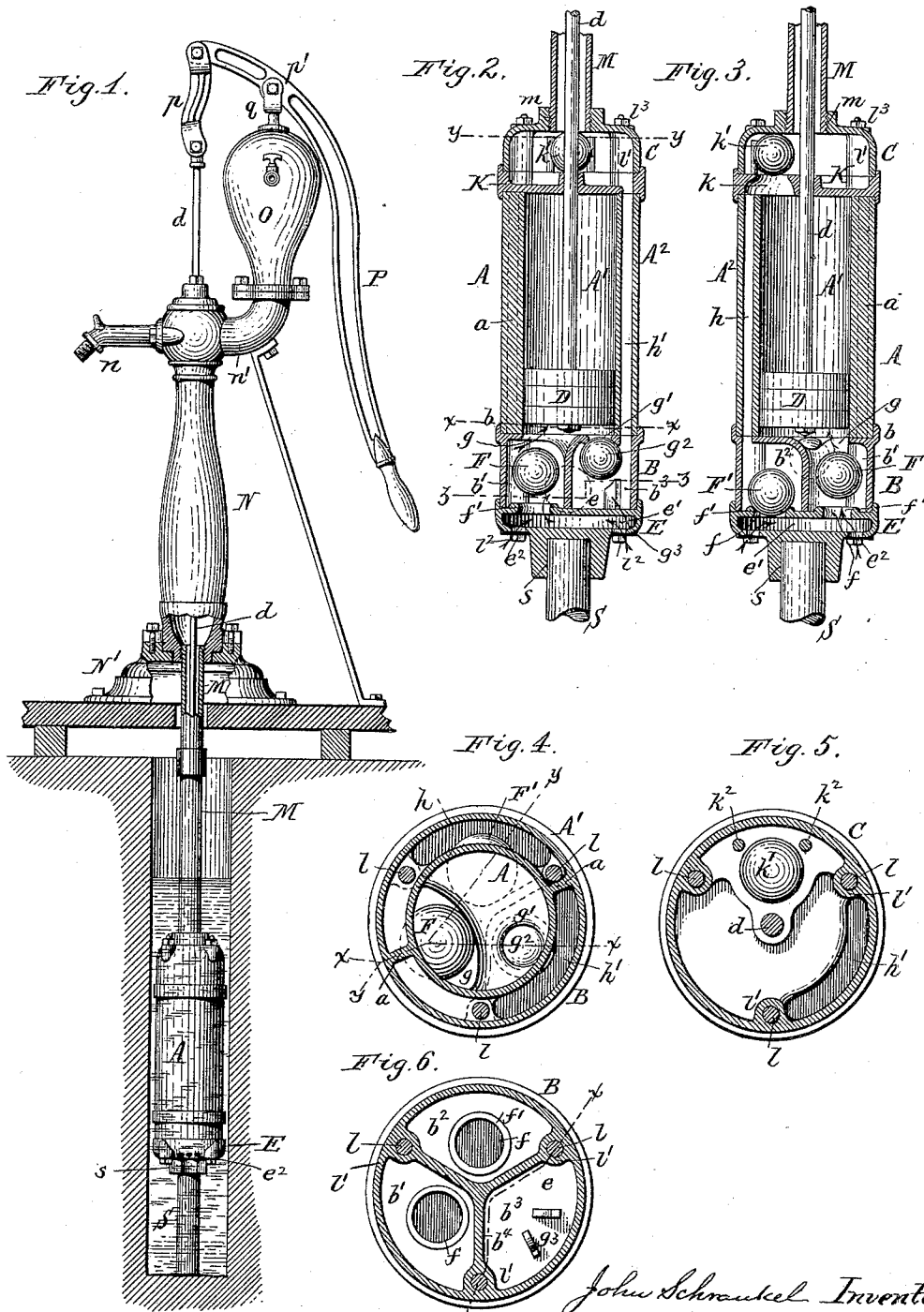
(No Model.)

2 Sheets—Sheet 1.

J. SCRANKEL.
DOUBLE ACTING FORCE PUMP.

No. 411,261.

Patented Sept. 17, 1889.



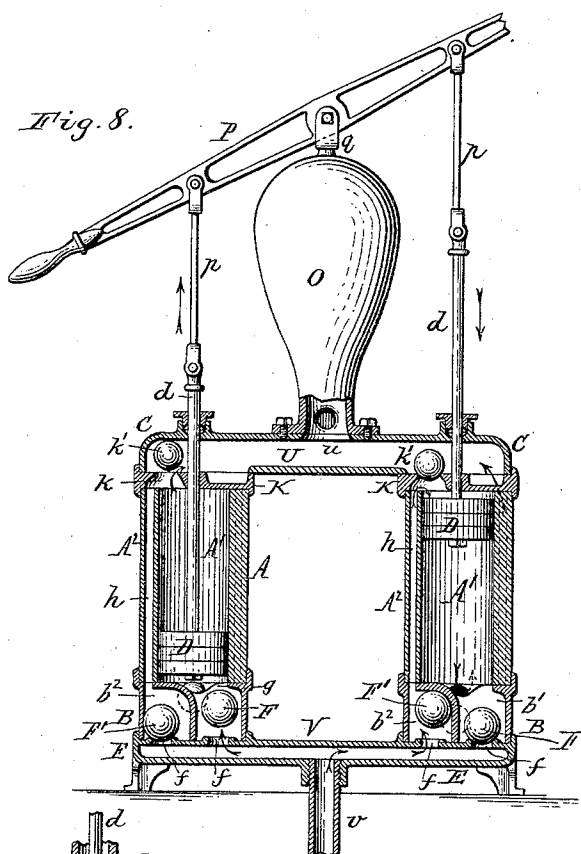
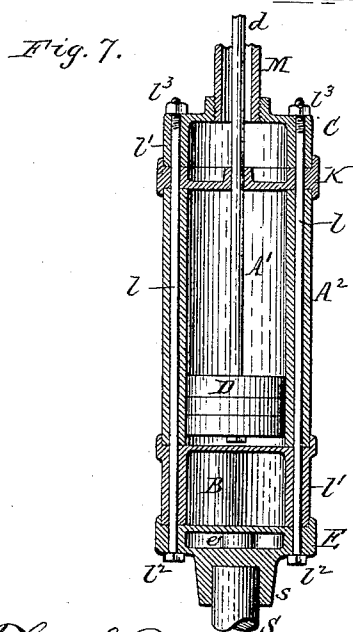
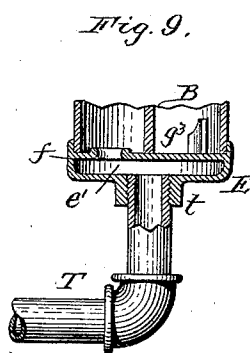
Theodor L. Popp. Witnesses.
Chas. J. Buchheit.

John Schrankel Inventor
By Wilhelm Rönner.
Attorneys.

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Attorneys.

UNITED STATES PATENT OFFICE.

JOHN SCHRANKEL, OF LANCASTER, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO LOUISA SCHRANKEL, OF SAME PLACE.

DOUBLE-ACTING FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 411,261, dated September 17, 1889.

Application filed January 11, 1886. Serial No. 188,166. (No model.)

To all whom it may concern:

Be it known that I, JOHN SCHRANKEL, of Lancaster, in the county of Erie and State of New York, have invented new and useful Improvements in Double-Acting Force-Pumps, of which the following is a specification.

This invention relates more particularly to improvements in that class of pumps which are employed for forcing water from deep wells, and has for its object to improve the construction of this class of pumps in such manner as to render the pump very compact and adapt it to be submerged in wells of small diameter.

The invention consists of the improvements which will be hereinafter fully set forth, and pointed out in the claim.

In the accompanying drawings, consisting of two sheets, Figure 1 represents a sectional elevation of my improved pump, showing the pump-cylinder submerged in a well. Fig. 2 is a vertical longitudinal section of the pump-cylinder on an enlarged scale, taken in line *x x*, Fig. 4. Fig. 3 is a similar view in line *y y*, Fig. 4. Figs. 4, 5, and 6 are horizontal cross-sections in lines *x x*, *y y*, and *z z*, Fig. 2, respectively. Fig. 7 is a vertical longitudinal section in line *x x*, Fig. 6. Fig. 8 is a sectional elevation of a pump provided with two cylinders. Fig. 9 is a vertical cross-section of the lower end of the cylinder.

Like letters of reference refer to like parts in the several figures.

A represents the pump cylinder or barrel, which consists of an inner cylinder A', an outer cylinder A², and end chambers B C, in which the valves are arranged and which form the heads of the pump-cylinder.

D is the piston arranged in the inner cylinder A' and provided with a piston-rod *d*.

The cylinders A' A² are arranged concentric with each other and cast in one piece, being connected together by longitudinal ribs *a*.

The cylinders A' A² rest upon an annular shoulder or offset *b*, formed around the upper edge of the valve-chamber B. The latter is divided into three separate compartments *b'* *b*² *b*³ by a partition or wall *b*⁴, which diverges in opposite directions from the center of the chamber toward its circumference or outer

wall. The bottom of the chamber B is closed by a plate *e*, which is cast with the head E, a suction-chamber *e'* being formed between the head E and plate *e*.

*e*² are openings formed in the bottom of the plate E and communicating with the suction-chamber *e'*.

f f are openings formed in the plate *e* and forming communication between the suction-chamber *e'* and the chambers *b'* *b*². The openings *f f* are provided with valve-seats *f'* *f'*, in which are seated the suction-valves F F'.

The top of the chamber B is closed and provided with two openings *g g'*, which form communications between the cylinder A' and the chambers *b'* and *b*². The opening *g'* is closed by a valve *g*², arranged in the chambers *b*².

h is a passage formed by the open space between the cylinders A' A², and leading from the chamber *b*² to the top of the cylinder A', and *h'* is a similar passage formed between the two cylinders and leading from the chamber *b*³ to the upper valve-chamber C.

K is a plate arranged between the valve-chamber C and the top of the cylinder A', and *k* is an opening formed in the plate K and forming a communication between the chamber C and the top of the cylinder A'. The opening *k* is closed by a valve *k'*, arranged in the chamber C.

The chambers B and C are secured to the cylinders A' A² by tie-rods *l*, which extend through the space formed between the inner and outer cylinders and through lugs *l'*, formed on the inner walls of the chambers B and C. The lower ends of the rods *l* pass through openings formed in the head E and are provided below the head E with heads *l*². The upper ends of the rods *l* project above the top of the chamber C and are screw-threaded to receive the screw-nuts *l*³. By tightening the nuts *l*³ the several parts forming the pump-cylinder are firmly secured together.

M represents the discharge-pipe, which is secured in an opening *m*, formed in the top of the chamber C. The pipe M is connected at its upper end to the bottom of a hollow standard or column N, which is supported

above the surface of the ground upon a suitable base N' . The standard N is provided with the usual discharge-spout n .

n' is an elbow or branch pipe formed on the standard N opposite the discharge-pipe n and in line therewith, and O is the air-chamber, which is secured to the branch pipe n , whereby the latter forms the mouth of the air-chamber O . The piston-rod d extends from the pump-cylinder centrally through the discharge-pipe M and standard N and is pivoted at its upper end to the short arm of a lever P by a link p . The lever P is pivoted at p' to a stud or bracket q , formed on or secured to the top of the air-chamber O .

As the piston ascends in the cylinder A' , by operating the lever P a suction is created in the valve-chambers b' b^3 through the openings g g' , causing the suction-valve F to be lifted from its seat and the water or other liquid to flow from the bottom suction-chamber e' into the chamber b' and through the opening g into the cylinder below the piston. When the piston has reached the end of its upward stroke, the cylinder A is filled, and as the piston starts to descend the valve F is forced against its seat, closing the communication between the suction-chamber e' and the cylinder. The pressure of the water in the cylinder also forces the valve g^2 from its seat and opens the communication between the passage h' and the cylinder, and as the piston continues to descend the water in the cylinder below the piston is forced up through the passage h' , leading to the upper valve-chamber C and out through the discharge-pipe M . In the descending movement of the piston a suction is also created in the passage h , leading from the top of the cylinder to the suction-chamber b^2 , causing the valve F' to be lifted from its seat and the water or other liquid to flow through the chamber b^2 and up through the passage h and filling the cylinder above the piston. As the piston again ascends, the valve F' will close and the water above the piston will force the valve k' from its seat and permit the water to escape through the chamber C into the discharge-pipe M . The valve F will be again lifted from its seat during the ascent of the piston, causing the water to flow into the cylinder below the piston, as before. In this manner a continuous suction and discharge of the water or other liquid through the cylinder is obtained during both movements of the piston.

The valves are of spherical form, and are preferably constructed of vulcanized rubber. The valve g^2 , when not in contact with its seat, rests upon supports g^3 , formed on the bottom of the chamber b^3 . The valve k' is confined between rods or projections k^2 and the piston-rod d .

A pump-cylinder constructed as described occupies very little space and can be readily submerged in deep wells having but a small

area. When the cylinder is submerged in a well, as shown in Fig. 1, I prefer to construct the bottom head E with a socket s , in which is inserted a bar or rod S , which extends to the bottom of the well and forms a support or prop for the cylinder.

The platform or base which supports the standard or column N is relieved from the weight of the cylinder and prevented from sagging by the prop S . If desired, the head E of the cylinder may be provided with a screw-threaded socket t , in which is inserted an elbow or bent pipe T , as shown in Fig. 9.

When a larger stream of water is required than can be pumped with one cylinder, the pump may be constructed with two cylinders, as shown in Fig. 8, in which the valve-chambers C of the two cylinders are made in one piece and connected together by a horizontal chamber U , which supports the air-chamber O and which communicates with the chamber U through an opening u . The heads E of both cylinders are also made in one piece, like the chambers C , and connected by a horizontal chamber V , which is provided with a suction-pipe v . The piston-rods d extend through stuffing-boxes formed in the top of the chambers C , and are pivoted to the lever P on opposite sides of the air-chamber, the lever P being pivoted at its center to the top of the air-chamber, whereby the pistons in both cylinders are operated by oscillating the lever P .

I do not wish to claim anything in this application which is claimed in another pending application filed by me July 19, 1886, Serial No. 208,398.

I claim as my invention—

In a double-acting force-pump, the combination, with the inner cylinder A' , provided with a piston, of a cylinder A^2 , surrounding the cylinder A' , passages h h' , formed between said cylinders, a divided valve-chamber B , applied to the lower ends of both cylinders and composed of a suction-valve chamber b' , connecting with the lower end of the inner cylinder and containing a suction-valve F , a suction-valve chamber b^2 , connecting with the passage h and containing a suction-valve F' , and a check-valve chamber b^3 , interposed between the lower end of the inner cylinder and the passage h' and containing a check-valve g^2 , a head E , applied to the lower end of the chamber B and connecting with both chambers b b' , and a check-valve chamber C , resting on the upper ends of both cylinders, communicating directly with the passage h' and communicating with the upper end of the cylinder by an opening k , provided with a check-valve k' , substantially as set forth.

Witness my hand this 22d day of December, 1885.

JOHN SCHRANKEL.

Witnesses:

JNO. J. BONNER,
THEO. L. POPP.