No. 676,714. Patented June 18, 1901.

W. G. FETROW.

PUMP.

(Application filed Sept. 10, 1900.)

(No Model.)

Fig. 1

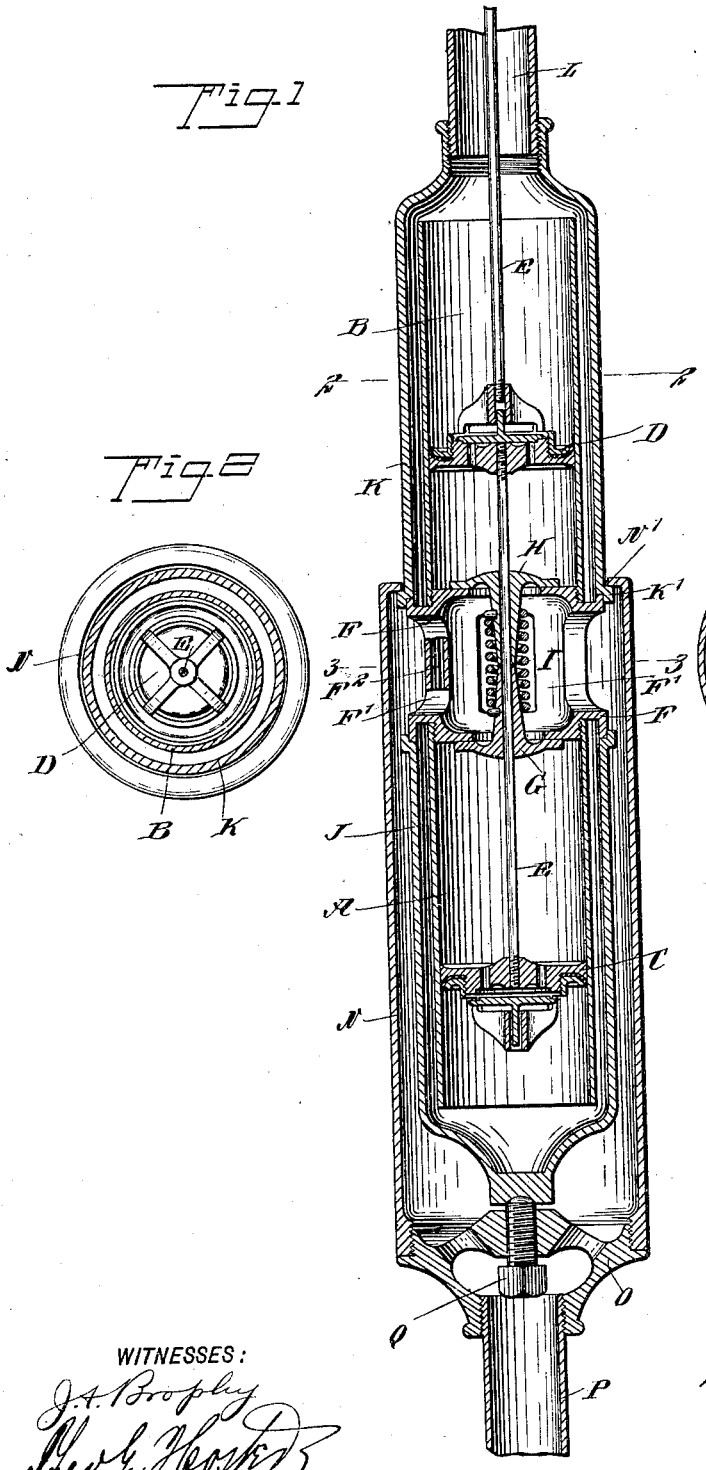
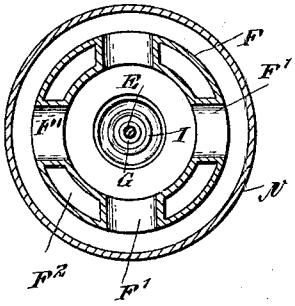


Fig. 2

Fig. 3



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PUMP.

SPECIFICATION forming part of Letters Patent No. 676,714, dated June 18, 1901.

Application filed September 10, 1900. Serial No. 29,532. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. FETROW, a citizen of the United States, and a resident of Mechanicsburg, in the county of Cumberland and State of Pennsylvania, have invented a new and Improved Pump, of which the following is a full, clear, and exact description.

The invention relates to double-cylinder force-pumps; and its object is to provide a new and improved pump which is simple and durable in construction, very effective in operation, and arranged to work both in shallow and deep wells, including Artesian wells.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a sectional plan view of the same on the line 2 2 in Fig. 1, and Fig. 3 is a like view of the same on the line 3 3 in Fig. 1.

The improved pump has two alined cylinders A and B, located one above the other, and has valved plungers C and D operating in unison with each other in said cylinders, the plungers being secured for the purpose on a single plunger-rod E, receiving an up-and-down movement by suitable mechanism at the top of the well. The adjacent ends of the cylinders A and B are secured to the bottom and top of a valve-holder F, having seats and formed in its side wall with openings F′ and also formed with vertical passages F^2, as is plainly shown in Figs. 1 and 3. On the seat at the bottom of the valve-holder F is normally seated a valve G, and a valve H engages the seat at the top of the valve-holder, as is plainly shown in Fig. 1, and the stems of the two valves G and H are connected with each other by a coil-spring I, normally holding the valves to their seats, but allowing either of the valves to open into the corresponding cylinder A or B.

The lower cylinder A is surrounded by a casing part J, closed at the bottom and into which opens the lower end of the cylinder A, said casing part J forming with the cylinder A an annular space opening at its upper end to the vertical passages F^2 in the valve-holder F. A casing part K surrounds the upper cylinder B and forms with the latter a space opening at the lower end to the top of the passages F^2 and opening at its upper end at the discharge-pipe L, secured to the top of the casing part K. The upper open end of the cylinder B opens into the upper end of the casing K, as will be readily understood by reference to Fig. 1.

The annular spaces above mentioned and the passages F^2 in the valve-holder form a continuous discharge-chamber for the lower end of the cylinder A, so that the water in the said cylinder on the downstroke of the plunger C passes up the said discharge-chamber to the discharge-pipe L, and water lifted by the plunger D on the upstroke thereof is caused to pass from the upper end of the cylinder B to the discharge-pipe L.

The casing parts J and K are secured to the top and bottom of the valve-holder F, and the latter, as well as the casing part J, is surrounded by a shell N, carrying at its lower end a head O, to which is connected an apertured suction-pipe P. A screw Q screws in the head O against the lower closed end of the casing part J to fasten the several parts together and in position, as shown in Fig. 1, it being understood that the upper end of the shell N is formed with an inwardly-extending flange N′, resting on an outwardly-extending flange K′, formed on the lower end of the casing part K.

The operation is as follows: On the downstroke of the plungers D and C the water contained in the lower end of the cylinder A is forced out through the discharge-chamber to the discharge-pipe L, as previously mentioned, and at the same time water is drawn into the upper part of this cylinder A by means of the valve-holder F and the suction-chamber formed between the valve-holder, the casing part J, and the shell N. During the downstroke of the plunger D the water previously drawn into the lower end of the cylinder B passes through the valve in said plunger to the upper part of the cylinder, and on the upstroke of this plunger the water in the upper part of the cylinder B is

forced up through the discharge-pipe L. During the upstroke of the plunger C the water previously drawn into the upper end of the cylinder A passes through the plunger-valve to the lower part of the cylinder A to be forced out therefrom on the next downward stroke of the plunger C.

Thus from the foregoing it will be seen that a very effective double-cylinder force-pump is provided which works equally well in shallow or deep wells, including Artesian wells. As the pump is composed of but few parts it is evident that it is not liable to get out of order, but can be readily repaired whenever necessary.

Various changes may be made in my invention without departing from the principle thereof. Hence I consider myself entitled to all such variations as come within the scope of the claims.

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

1. A pump, comprising alined upper and lower cylinders, valved plungers operating in unison in said cylinders, a valve-holder arranged between the cylinders and provided with valve-seats, valves on said seats and opening into the respective cylinders, a discharge-chamber for the lower cylinder and opening into the discharge of the upper cylinder, and a suction-chamber for the water, the said suction-chamber comprising a shell surrounding the discharge-chamber of the lower cylinder, and the valve-holder, and discharging into the valve-holder between the upper and lower valve-seats to supply both cylinders with water, as set forth.

2. A pump, comprising alined upper and lower cylinders, valved plungers operating in unison in said cylinders, a valve-holder between said cylinders and having an upper and a lower valve-seat, valves on the said seats and opening into said cylinders, a discharge-chamber for the lower cylinder comprising a lower portion surrounding the lower cylinder and an upper portion connected by passages with the lower portion, the said upper portion of the discharge-chamber surrounding the upper cylinder and opening into the discharge of said upper chamber, a suction-chamber for the water, said suction-chamber surrounding the discharge-chamber of the lower cylinder and the valve-holder and opening into the valve-holder between the upper and lower valves to supply both cylinders with water, and a spring connecting the said upper and lower valves with each other to normally hold the same to their seats, as set forth.

3. A pump, comprising alined upper and lower cylinders, valved plungers operating in unison in said cylinders, a valve-holder arranged between said cylinders, and having an upper and a lower valve-seat, the said holder being provided with vertical passages, valves on said seats and opening into the respective cylinders, a discharge-chamber for the lower cylinder and opening into the discharge of the upper cylinder, the said discharge-chamber comprising a lower portion, closed at the bottom and extending around the lower cylinder, and an upper portion extending around the upper cylinder, the said upper and lower portions of the discharge-chamber being connected by the vertical passages extending through the valve-holder, and a suction-chamber for the water, the said suction-chamber surrounding the discharge-chamber of the lower cylinder and the said valve-holder, and opening into the valve-holder between the upper and lower valve-seats to supply both cylinders with water, as set forth.

4. A pump, comprising alined upper and lower cylinders, valved plungers operating in unison therein, a valve-holder provided with valve-seats, and having side openings and vertical passages forming part of a discharge-chamber, valves on said valve-seats and opening into said cylinders, a lower casing part surrounding the lower cylinder and forming with the latter an annular space in communication with the lower end of the lower cylinder and in communication with the passages in the valve-holder, an upper casing part surrounding the upper cylinder and forming with the latter an annular space opening to the said valve-holder passages, the latter and said annular spaces forming a continuous discharge-chamber for the lower cylinder and the upper end of the chamber leading to the pump-discharge pipe, and a shell surrounding the valve-holder and said lower casing part to form a suction-chamber discharging into the side openings of the said valve-holder, as set forth.

5. A pump, comprising alined upper and lower cylinders, valved plungers operating in unison therein, a valve-holder provided with valve-seats, and having side openings and vertical passages forming part of a discharge-chamber, valves on said valve-seats and opening into said cylinders, a lower casing part surrounding the lower cylinder and forming with the latter an annular space in communication with the lower end of the lower cylinder and in communication with the passages in the valve-holder, an upper casing part surrounding the upper cylinder and forming with the latter an annular space opening to the said valve-holder passages, the latter and said annular space forming a continuous discharge-chamber for the lower cylinder and the upper end of the chamber leading to the pump-discharge pipe, a shell surrounding the valve-holder and said lower casing part to form a suction-chamber discharging into the side openings of the said valve-holder, and a discharge-pipe on the upper end of the upper casing part and into which opens the upper end of the upper cylinder and the upper end of the said discharge-chamber, as set forth.

6. A pump, comprising alined upper and

lower cylinders, valved plungers operating in unison therein, a valve-holder provided with valve-seats, and having side openings and vertical passages forming part of a discharge-chamber, valves on said valve-seats and opening into said cylinders, a lower casing part surrounding the lower cylinder and forming with the latter an annular space in communication with the lower end of the lower cylinder and in communication with the passages in the valve-holder, an upper casing part surrounding the upper cylinder and forming with the latter an annular space opening to said valve-holder passages, the latter and said annular spaces forming a continuous discharge-chamber for the lower cylinder and the upper end of the chamber leading to the pump-discharge pipe, a shell surrounding the valve-holder and said lower casing part, to form a suction-chamber discharging into the side openings of the said valve-holder, a discharge-pipe on the upper end of the upper casing part and into which opens the upper end of the upper cylinder and the upper end of the said discharge-chamber, and a suction-head on the lower end of the said shell, to connect with the suction-pipe, as set forth.

7. A pump having an upper and a lower cylinder, casings surrounding the cylinders and forming therewith annular spaces, a valve-holder arranged between the cylinders and having top and bottom valve-seats, the said valve-holder being provided with side openings leading to the interior of the valve-holder between the seats and upward passages in the side walls of the holder and connecting the annular spaces surrounding the cylinders, as set forth.

8. A pump having upper and lower cylinders, a casing surrounding the lower cylinder and closed at the bottom, the casing forming with the said cylinder an annular space communicating with the lower end of the cylinder, a casing surrounding the upper cylinder and forming with the latter an annular space communicating with the discharge of the upper cylinder, a valve-holder arranged between the cylinders and connected therewith and with the said casings, the said valve-holder having top and bottom seats, side openings leading to the said seats, and upward passages in the side walls connecting the annular spaces surrounding the cylinders, valves seated on the said seats, and a spring connecting the valves with each other to hold the valves to their seats and to allow the same to open outwardly, as set forth.

9. A pump having a valve-holder provided with top and bottom seats, and side openings leading to the said seats, valves seated on the said seats and having stems extending inwardly within the valve-holder, and a coil-spring surrounding the stems of said valves and connecting them with each other, as set forth.

10. A pump, comprising alined upper and lower cylinders, valved plungers operating in unison in said cylinders, a valve-holder between said cylinders and provided with valve-seats, the said holder having side openings and vertical passages, valves on said seats and opening into the respective cylinders, a casing surrounding the lower cylinder and spaced therefrom, the said casing being closed at its lower end, a casing surrounding the upper cylinder and spaced therefrom, the space between the lower cylinder and its casing communicating with the open lower end of said cylinder, and the space between the upper cylinder and its casing communicating with the pump-discharge pipe, the said cylinders and casings being secured to the said valve-holder and the said spaces formed by the cylinders and casings being connected with each other by the passages through the said valve-holder, a shell surrounding the lower casing and the valve-holder to form a suction-chamber discharging into the side openings of the valve-holder, the said shell being formed at its upper end with a flange resting on a corresponding flange on the lower end of the upper casing, a suction-head on the lower end of the shell and connected with a suction-pipe, and a screw carried by the said suction-head and engaging the lower closed end of the lower casing, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM G. FETROW.

Witnesses:
BAILEY MERCER,
H. H. MERCER.