No. 680,098. Patented Aug. 6, 1901.

W. C. WHITTAKER & W. V. TURNER.

PUMP.

(Application filed May 16, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

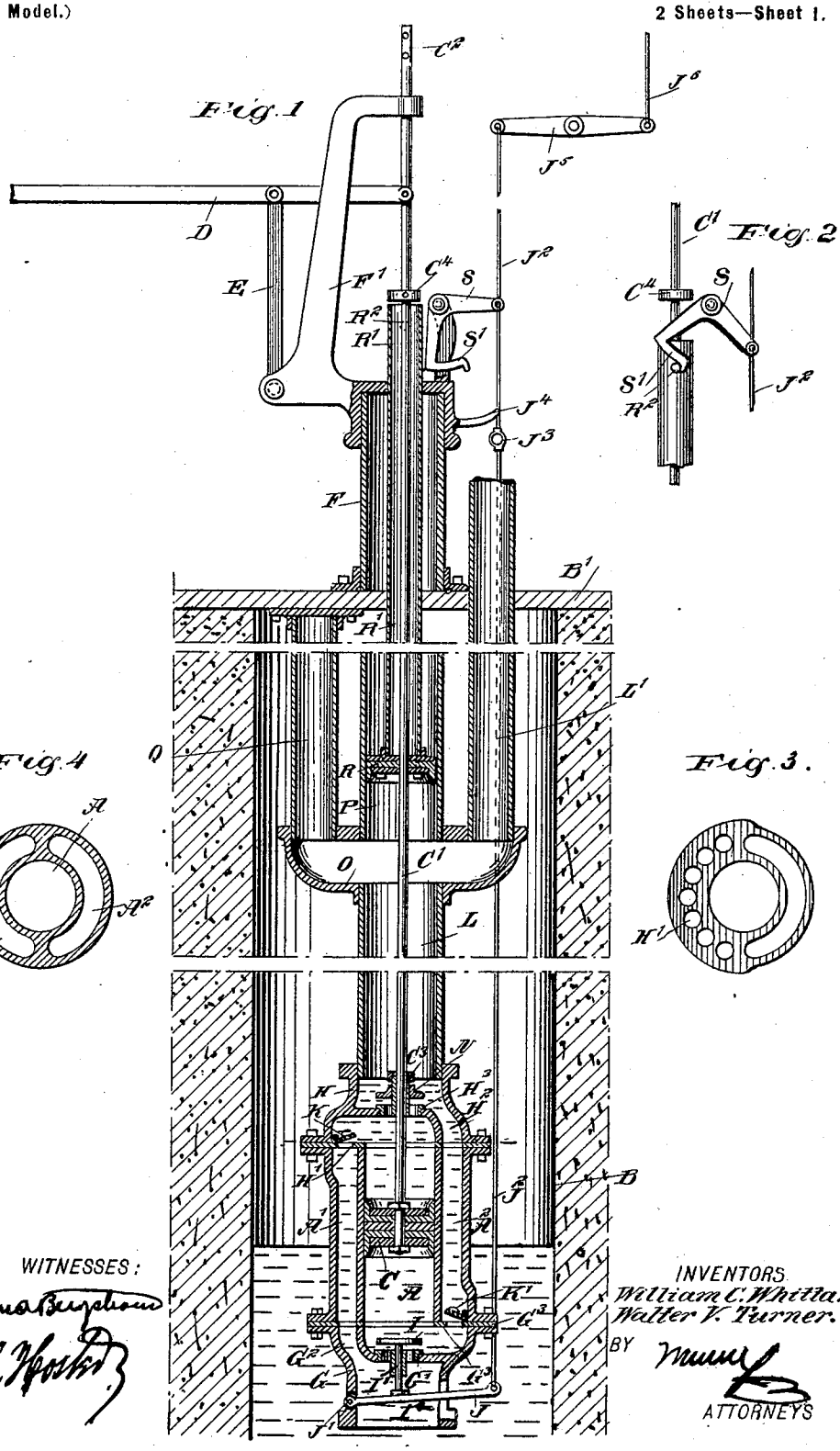

Fig. 2

Fig. 4

Fig. 3.

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Fig. 5

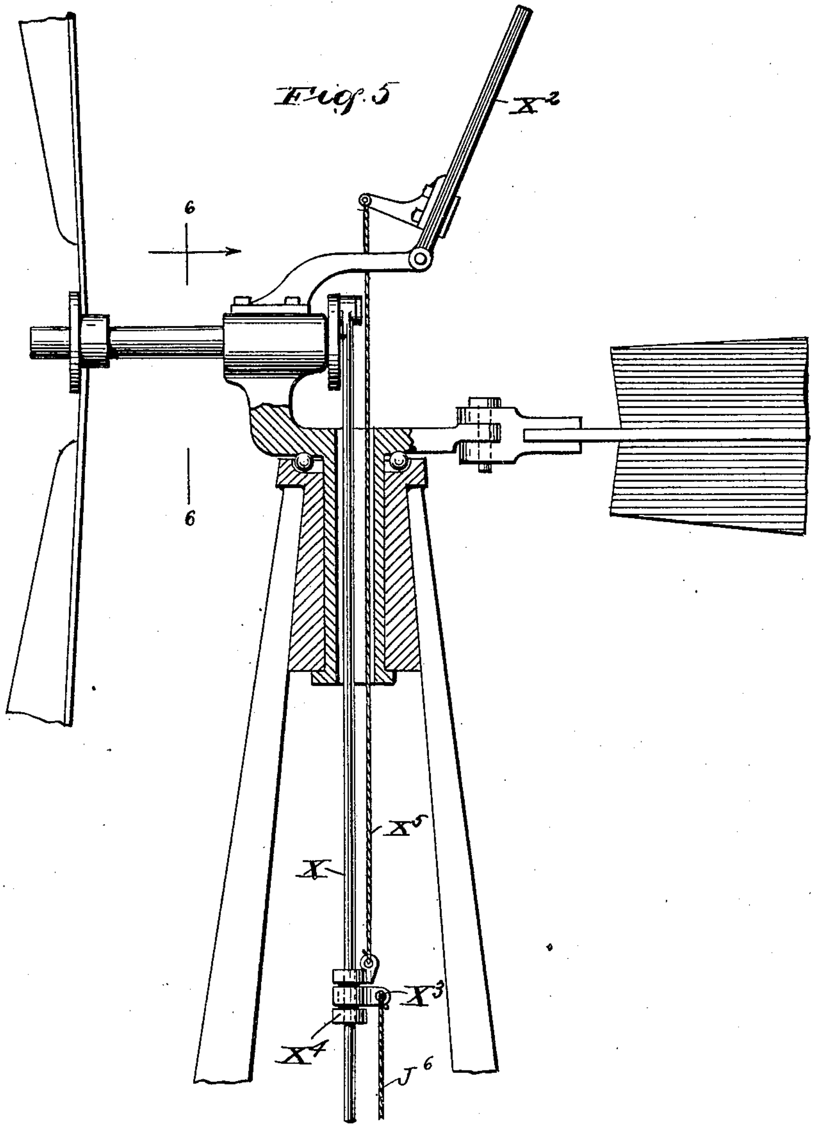
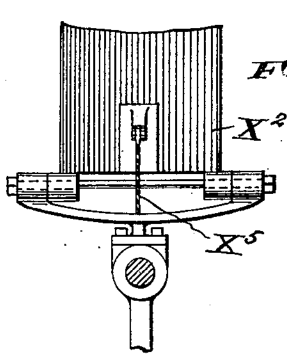


Fig. 6



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UNITED STATES PATENT OFFICE.

WILLIAM C. WHITTAKER AND WALTER V. TURNER, OF RATON, TERRITORY OF NEW MEXICO, ASSIGNORS TO WILLIAM C. WHITTAKER, WALTER V. TURNER, ALFRED PETERSON, AND EDGAR W. FULGHUM, OF SAME PLACE.

PUMP.

SPECIFICATION forming part of Letters Patent No. 680,098, dated August 6, 1901.

Application filed May 16, 1900. Serial No. 16,865. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM C. WHITTAKER and WALTER V. TURNER, citizens of the United States, residing at Raton, in the county of Colfax and Territory of New Mexico, have invented a new and Improved Pump, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved pump which is simple and durable in construction, very effective in operation, and arranged to work uniformly and either as a single or double acting pump, the operating power in either case being equally divided between the up and down strokes of the piston.

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 with parts in position for single action. Fig. 2 is a side elevation of the locking device for the auxiliary piston. Fig. 3 is a plan view of the valve-seat for one of the suction-valves. Fig. 4 is a sectional plan view of the main cylinder. Fig. 5 is a side elevation, partly in section, of a windmill; and Fig. 6 is a section on line 6 6 of Fig. 5.

The improved pump is provided with a cylinder A, extending into the water contained in a well B, and in said cylinder reciprocates a piston C, held on an upwardly-extending piston-rod C′, adapted to be connected at its upper end C^2 to the pump-rod X of a windmill or other motor, a windmill being shown in the drawings for imparting a reciprocating motion to the piston C. The piston-rod C′ may also be actuated by hand, and for this purpose said piston-rod is pivotally connected near its upper end with a hand-lever D, fulcrumed on a link E, pivoted to an arm F′, attached to a stand F, secured to the cover B′ of the well B. The upper end of the arm F′ also serves as a guide or bearing for the piston-rod C′.

On the lower end of the cylinder A is secured a suction-cap G, and on the top thereof is secured a cap H. The lower cap G contains a valve-seat G′ for a suction-valve I, used only when the pump is to be double-acting, as hereinafter more fully described, the lower end of the stem I′ of said valve being provided with a collar I^2, resting on an arm J, pivoted at J′ to the cap G, and connected at its free end with a rod J^2, extending upward through the well and the cover B′ thereof, as is plainly shown in Fig. 1, said rod J^2 being provided near its upper end with a ring J^3, adapted to hook upon a hook J^4, carried by the stand F. The extreme upper end of the rod J^2 is connected with one end of a lever J^5, fulcrumed on a suitable support, and connected at its other end by cord or rod J^6 with the governor X^2 on the windmill. The cord or rod J^6 is secured to a collar X^3 on a sleeve X^4 on the pump-rod X and connected with the governor by the cord X^5, as shown in Fig. 5. The governor, however, forms no part of the present invention. The ring J^3 and hook J^4 are only used when the rod J^2 is to be controlled by the operator—that is, locked in an uppermost position—the valve I being off its seat at the time the pump is to be used as a single-acting pump; but when the rod J^2 is connected with the governor then the position of the valve I is controlled by said governor according to the force of the wind. Thus in a light wind the valve I will be lifted off its seat by the governor, so that the pump is single-acting; but in a heavy wind the governor will pull on the rod J^6 and swing the lever J^5, so that the rod J^2 moves downward, and the pivot-arm J swings in a like direction to allow the valve I to seat on its seat G′, and thereby render the pump double-acting, as hereinafter more fully described. The collar I^2 on the lower end of the stem I′ limits the upward or opening movement of the valve I.

The cap G is provided with a passage G^2, leading to a suction-passage A′, arranged at one side of the cylinder, a valve-seat H′ be-

ing on the top of said passage A', a valve K being on the top of said seat and opening into the lower portion of the upper cap H. This lower portion of the cap H connects with the upper end of the cylinder A, so that when the piston C moves downward water is drawn into the upper end of the cylinder by way of the cap G, the passages G^2, A', the valve K, and the lower portion of the cap H. The lower end of the cylinder A is connected by the top part of the lower cap G, and the valve-seat G^3 for the valve K' is connected with a passage A^2, located on the side of the cylinder A opposite the passage A', as is plainly shown in Figs. 1 and 4, and the upper end of said passage A^2 connects by a passage H^2 in the cap H with a discharge-pipe L, extending upward in the well B from the top of the cap H. The upper and lower portions of the cap H are separated by a valve-seat H^3, on which is adapted to be seated a discharge-valve N, mounted to slide loosely in the stuffing-box C^3 for the piston-rod C' and limited in its upward movement by a collar or nut on the said stuffing-box.

The upper end of the discharge-pipe L terminates in a cap O, from the middle of which leads an auxiliary cylinder P, and from one side thereof extends an air-chamber Q, and from the opposite side extends upwardly the outlet-pipe L' for carrying the water to a suitable place of discharge. In the outlet-cylinder P is mounted to travel a piston R, having a hollow piston-rod R' and through which extends loosely the piston-rod C', the upper end of said hollow piston-rod R' being adapted to be engaged by a collar C^4, carried on the piston-rod C', so that when the latter moves downward said collar C^4 engages the piston-rod R' and pushes the latter and its piston R in a downward direction. When the piston C moves upward and the discharge-pipe L and cap O are filled with water, then the water lifted in said pipe and cap exerts a pressure on the under side of the piston R, so as to move the same upward in the cylinder P. Thus the downward stroke of the piston R is by the force of the piston-rod C', and the upward movement of said piston is by the pressure of the water lifted during the upstroke of the piston C.

Near the upper end of the hollow piston-rod R' is a pin R^2, adapted to be engaged by the arm S' of a bell-crank lever S, connected with the rod J^2, so that when said rod J^2 is moved downward by the action of the governor or by the operator then a swinging motion is given to the bell-crank lever F to move the same into the position shown in Fig. 2 to cause the arm S' to move over the pin R^2, so as to lock the piston-rod R' and the piston R in a lowermost position. When this takes place, the piston R remains stationary in its cylinder, and the pump is now a double-acting pump, as above mentioned.

The operation is as follows: When a reciprocating movement is given to the piston C at the time the valve I is lifted off its seat and the piston R is in an unlocked position, then during the downstroke of the said piston water is drawn into the upper end of the cylinder A by way of the cap G, the passages G^2 A', the valve K, and the lower portion of the cap H, and during the upstroke of said piston the previously-drawn-in water in the upper end of the cylinder is forced out through the valve-seat H^3 past the valve N, so that the water passes through the upper portion of the cap H into the discharge-pipe L. During a repetition of this described reciprocating movement of the piston C the water rises in the cap O and the outlet-pipe L' and finally passes from the latter to a suitable place of discharge. When the water is lifted in the pipe L and cap O during the upstroke of the piston C, then the water presses on the piston R, and thus causes an upward movement of the same in the cylinder P. The cylinder P is located approximately an equal distance from the water-level in the well and the discharge-water from the pipe L', so that upon the next downstroke of the piston C the piston R is moved with it by the action of the collar C^4 on the upper end of the piston-rod R', so that the said piston R now forces the water up in the pipe L' to a place of discharge. From this it is evident that the water is lifted halfway by the piston C on its upstroke and forced the other half of the way by the piston R during the down or suction stroke of the piston C. Thus only approximately one-half of the power is required for lifting water a certain distance on the upstroke and the other half of the power is required on the downstroke. From this it is evident that if the device is connected to a windmill the latter is free to run very uniformly, owing to the equal power required for working the pump on both the up and down strokes. When the operator removes the ring J^3 from the hook J^4 and pushes the rod J^2 downward, or the said rod is pushed downward by the action of the governor, as above explained, then the valve I moves to its seat, and at the same time the bell-crank lever S is swung over to lock the piston-rod R' and the piston R in a lowermost position in the auxiliary cylinder P. The reciprocating movement of the piston C and the cylinder A causes a drawing of the water into the upper end of the cylinder by way of the passages G^2 A' and the valve K during the downstroke of said piston, as previously explained, and during the upstroke water is drawn in through the cap G, valve-seat G', and the valve I into the lower end of the cylinder. During the downstroke of the piston C the previously-drawn-in water at the lower end of the cylinder is forced through the valve-seat G^3, past the valve K', into and through the passages A^2 H^2 to finally pass into the pipe L, cap O, and outlet L'. During the upstroke of the piston C, the water previously drawn into the upper end of the cylinder is discharged into the pipe L by way of

the seat H^3 and the valve N, as previously explained. From the foregoing it is evident that a continuous flow of water is obtained as the pump is now double-acting and approximately the same power is required on the downstroke as well as on the upstroke of the piston C.

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

1. The combination with a double-acting and single-acting pump, of means controlled by a governor on a motor, to automatically change the pump from a single action to a double action, and vice versa, according to the force of the wind, as set forth.

2. In a pump, the combination with a motor, and a governor thereon, of a cylinder having a suction-valve in its lower portion, a piston in the cylinder and operatively connected with the motor, an auxiliary cylinder above the first cylinder, a piston in the auxiliary cylinder, means whereby the suction-valve is controlled from the governor, and means for locking the piston of the auxiliary cylinder stationary, said means being controlled by the means controlling the suction-valve, substantially as described.

3. In a pump, the combination with a motor and a governor thereon, of a cylinder having a suction-valve in its lower portion, a piston in the cylinder and operatively connected with the motor, an auxiliary cylinder above the first cylinder, a piston in the auxiliary cylinder and having a hollow piston-rod through which the piston-rod of the first-named piston passes, a collar on the first-named piston-rod and adapted to engage the upper end of the hollow piston-rod, means whereby the suction-valve is controlled from the governor, and a locking device for the piston of the auxiliary cylinder, substantially as described.

4. A pump, comprising a main cylinder having a valve in its bottom and adapted to be arranged in a well, an auxiliary cylinder adapted to be arranged approximately midway between the water-level in the well and the discharge of the pump, pistons in the cylinders and each arranged to move the water about one-half the distance of its travel from the well to the discharge, the piston in the auxiliary cylinder moving downward with the piston of the main cylinder, and said auxiliary-cylinder piston moving upward by the force of the water lifted by the main-cylinder piston during the upstroke of the latter, means for holding the valve of the main cylinder off its seat, and means, whereby when the valve is allowed to be seated, the auxiliary-cylinder piston will be held stationary, substantially as described.

5. A pump, comprising a main cylinder in a well, an auxiliary cylinder approximately midway between the water-level in the well and the discharge of the pump, pistons in said cylinders, and each arranged to move the water about one-half the distance of its travel from the well to the discharge, the piston in the auxiliary cylinder moving downward with the piston of the main cylinder, and said auxiliary-cylinder piston moving upward by the force of the water lifted by the main-cylinder piston during the upstroke of the latter, suction and discharge valves for said main cylinder, to control the flow of water to and from the said cylinder, and means for holding the suction-valve off its seat, substantially as shown and described.

6. A pump, comprising a main cylinder in a well, an auxiliary cylinder located approximately midway between the water-level of the well and the discharge of the water, the auxiliary cylinder being located in the discharge-pipe of the main cylinder, pistons reciprocating in said cylinders, the main-cylinder piston being hand or power actuated, and the auxiliary-cylinder piston receiving its downstroke from the piston-rod of the main-cylinder piston and its upstroke by the water lifted by the main-cylinder piston during the upstroke of the latter, a suction-valve for the cylinder, and means for controlling the movement of said valve from the governor on a motor, substantially as shown and described.

7. A pump, comprising a main cylinder in a well, an auxiliary cylinder located approximately midway between the water-level of the well and the discharge of the water, the auxiliary cylinder being located in the discharge-pipe of the main cylinder, pistons reciprocating in said cylinders, the main-cylinder piston being hand or power actuated, and the auxiliary-cylinder piston receiving its downstroke from the piston-rod of the main-cylinder piston during the downstroke of the latter, a suction-valve for controlling the inlet of the water to the lower end of the main cylinder, means for controlling the movement of said valve and holding the auxiliary-cylinder piston stationary from the governor on a motor, and a discharge-valve for controlling the outlet of the water from the cylinder to the discharge-pipe, substantially as shown and described.

8. A pump, comprising a main cylinder in a well, an auxiliary cylinder located approximately midway between the water-level of the well and the discharge of the water, the auxiliary cylinder being located in the discharge-pipe of the main cylinder, pistons reciprocating in said cylinders, the main-cylinder piston being hand or power actuated, and the auxiliary-cylinder piston receiving its downstroke from the piston-rod of the main-cylinder piston during the downstroke of the latter, a suction-valve for controlling the inlet of the water to the upper end of the main cylinder, a discharge-valve for controlling the outlet of the water from the cylinder to the discharge-pipe, a suction-valve for the lower end of the main cylinder, a discharge for the lower end of said cylinder, means for lifting said suction-valve for the

lower end of the cylinder off its seat, and [illegible] locking the piston for the auxiliary cylinder in position, as set forth.

9. In a pump, the combination with a cylinder, a piston therein, a motor with which the piston is connected, and a governor on the motor, of a suction-valve in the lower part of the cylinder, a pivoted lever upon which the stem of the valve rests, and a connection between the lever and governor, substantially as described.

10. In a pump, the combination with a main cylinder, a piston therein, a motor with which the piston is connected, and a governor on the motor, of an auxiliary cylinder above the main cylinder, a piston in the auxiliary cylinder and having a hollow piston-rod through which the main piston-rod extends, a collar on the main piston-rod and adapted to engage the upper end of the hollow piston-rod, a suction-valve in the lower part of the main cylinder, a lever upon which rests the stem of said valve, a rod connected with said lever and operatively connected with the governor, and a bell-crank lever connected with the said rod and adapted to engage the hollow piston-stem to hold the same stationary, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM C. WHITTAKER.
WALTER V. TURNER.

Witnesses:
THOS. BURNS,
E. J. SMITH.