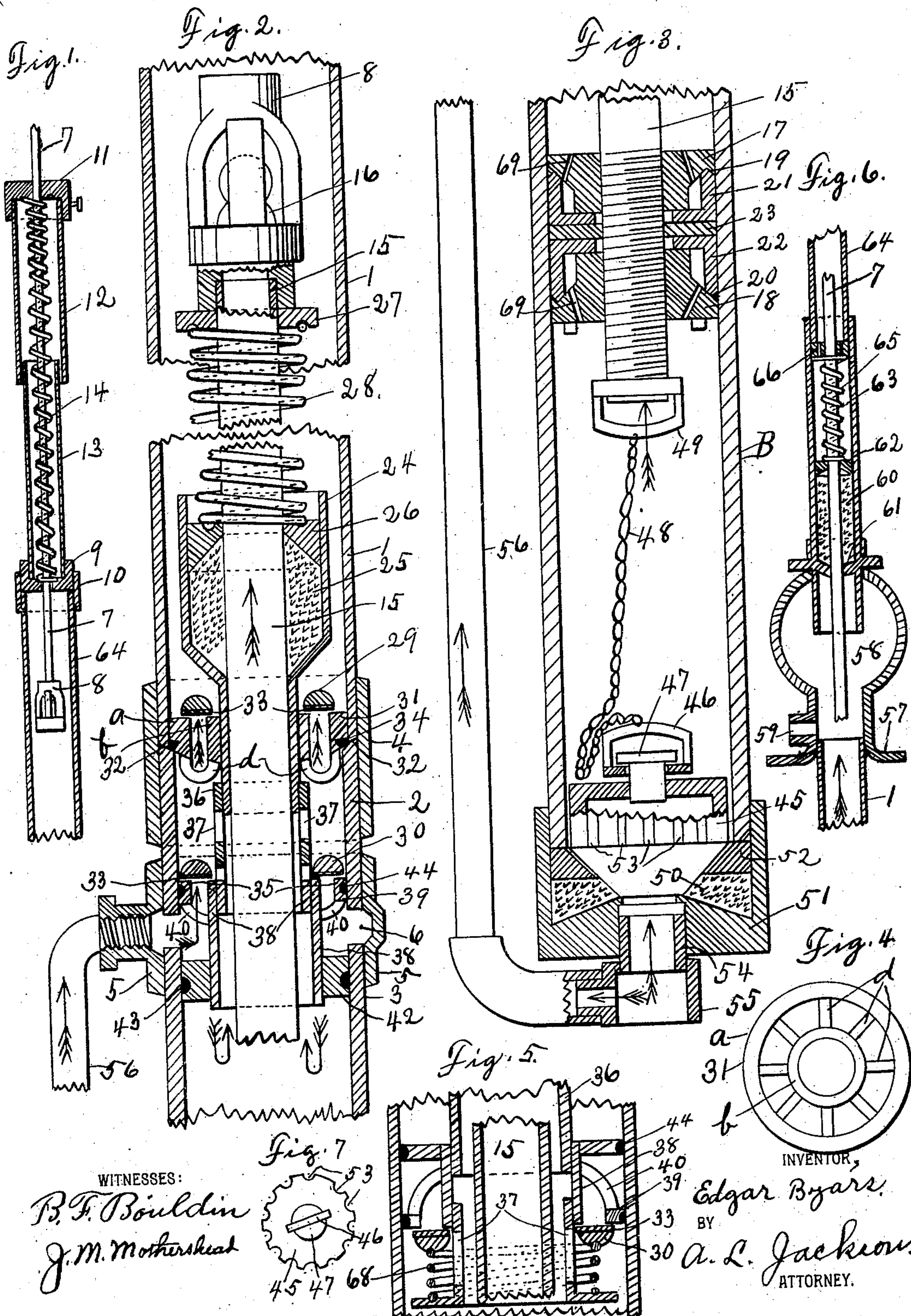


No. 711,654.

Patented Oct. 21, 1902.

**E. BYARS.**  
**DOUBLE ACTION PUMP.**  
(Application filed Aug. 10, 1899.)

(No Model.)





# UNITED STATES PATENT OFFICE.

EDGAR BYARS, OF RHOME, TEXAS.

## DOUBLE-ACTION PUMP.

SPECIFICATION forming part of Letters Patent No. 711,654, dated October 21, 1902.

Application filed August 10, 1899. Serial No. 726,796. (No model.)

*To all whom it may concern:*

Be it known that I, EDGAR BYARS, a citizen of the United States, residing at Rhome, Texas, have invented certain new and useful Improvements in Double-Action Pumps, of which the following is a specification.

My invention relates to double-action submerged force-pumps which can be operated by any suitable power, but particularly adapted for operation by windmills provided with variable gearing; and the object is to construct a pump which is simple in construction and strong and durable and in which there are no parts which can be disarranged during operation and from which all the valves may be removed without disturbing the pipe and which will maintain a continuous flow of water during operation.

Other objects and advantages will be better understood from the following description when read in connection with the accompanying drawings, which form a part of this application.

Figure 1 is a vertical section of the equalizer for the pump, a broken section of a pipe being shown to illustrate the connection of the equalizer with the working head. Fig. 2 is a broken vertical section of the pump on an enlarged scale. Fig. 3 is a continuation of the view shown in Fig. 2. Fig. 4 is a plan view of a valve-seat. Fig. 5 is a broken sectional view of a pump, illustrating a variation in the arrangement of one of the valves and means for holding valve in place. Fig. 6 is a vertical section of the working head. Fig. 7 is a plan view of the bottom valve.

Similar characters of reference are used to indicate corresponding parts throughout the several views.

The pump-barrel consists of three sections 1, 2, and 3, sections 1 and 2 being connected by means of the union 4 and sections 2 and 3 being connected by the casting 5, which has an annular waterway 6. The equalizer of the pump consists of the rod 7, connected to valve-basket 8, the spring-seat 9, resting on top of the pipe 64 and held thereon by cuff 10, the spring-seat 11, attached to the pump-rod by a set-screw, the pipe 12, with one end screwed in the seat 11, the pipe 13, screwed into spring-seat 9 and telescoping into the pipe 12, and the spiral spring 14. A

pipe 15 serves as a piston-rod for the pump, the valves 29 and 30 being outside of and intermediate the ends of the piston-rod. This pipe is provided with a piston-head, as shown in section in Fig. 3, and is connected with a valve 16, of usual construction, having a seat and basket 8 to prevent the displacement of the valve, the pipe being screwed into the lower end of the valve-seat. The piston-head is composed of the brass rings 17 and 18, having annular seats 19 and 20 for the leather packing-rings 21 and 22. When the rings 17 and 18 are screwed on the pipe 15, they force the leather rings toward each other and clamp the same on the disk 23. The sides or ends of the brass rings next to the leather rings are reduced, so that there will be annular waterways between the brass rings and the leather rings. Ducts 69 are made through the brass rings, so that water may enter the waterways and expand the leather rings and press the same against the inner side of the pump-barrel 1. The annular seats 19 and 20 will prevent the leather rings from turning inside out when the piston is being drawn through the pipe. An improved packing is provided for the piston-pipe 15. This packing consists of the cup 24, the stuffing 25, and the spring-seat 26, which also serves as a wedge for confining and compressing the stuffing. The spring-seat 26 is funnel-shaped on the under side in order to attain the requisite compression of the stuffing material, and this seat may be placed in the cup 24 as low down as may be practical. A spring-seat 27 is mounted on pipe 15 and a spiral spring 28 is mounted on the pipe 15. This spring will aid in the operation of the pump and may be used to hold the packing in place by pressing on the seat 26.

The pump is provided with the valves 29 and 30. Valve 29 has a seat 31 screwed on the packing-cup 24. The section 2 of the pump has a wall thick enough to form a rest for the valve-seat 31 at 32. The valves 29 and 30 are rings semicircular in cross-section and having leather or rubber disks 33 on their faces. The seat 31 is composed of two rings *a* and *b*, which are connected by ribs *d*, which are integral with the rings, and a rubber or leather packing 34 is placed in an annular groove in this seat. The valve 30 is provided



with a seat 35. This seat is connected to the packing-cup 24 by a coupling 36, which has slots 37 for water to come through from the bottom of the pump-barrel. The seat 35 is composed of an inner ring 38 and an outer ring 39, connected by ribs 40, integral with said rings. The inner ring 38 is screwed on the coupling 36 and is extended down and screwed in the ring 42, which is secured in the barrel-section 3 by means of a rubber or other suitable ring 43. A similar ring 44 holds valve-seat 35 securely against the barrel-section 2. All the valves are supported on the barrel-section 2, and the spring 28 and rings 43 and 44 prevent upward motion of the valves.

The pump is provided with a bottom valve 45, which is tubular and cone-shaped at the bottom. A swivel 46 is attached to the valve by means of a bolt 47, which is screwed into the valve. A chain 48 or other suitable means is used to connect the swivel 46 with the pipe-piston 15, a yoke 49 being screwed on the pipe 15 for this purpose. When the valve 45 goes down, it comes in contact with a rubber seat 50. The valve-seat 50 is inclosed in a casing 51 and is held in place by a brass ring 52. The valve 45 has grooves 53. It is necessary to make the valve large enough to prevent the links of the chain from going down between the valve and the pump-barrel section 1 and being wedged therein. It is preferable to cut off the water by means of the rubber seat 50, and the valve is so constructed that water will go down as far as the rubber seat, the valve 45 resting on the rubber seat and not touching the ring 52, except when the valve is slightly displaced. Consequently water passes between the valve and the ring 52. A short pipe 54 is screwed into the casing 51 to make connection with the coupling 55. A pipe 56 connects with the coupling 55 and with the groove 6 in the casing 5. This pipe might be dispensed with when the pump is submerged. With this pipe water may be pumped without putting the pump in the water or even in the well. If the pump is not put in the water, a pipe would have to be connected with the coupling 55 and extended down in the water.

The working head is shown in Fig. 6. The base 57 of the working head is screwed on the pump-barrel section 1. This head is provided with an air-chamber 58, a water-discharge 59, and a packing 60. The packing rests on a partition 61, which has a hole for the pump-rod 7. The packing is held in place by the spring-seat 62. The packing-cup 63 extends up and connects with a pipe 64, which is used to compress the spring 65. The pipe 64 presses on the spring-seat 66. The spring 65 maintains a constant pressure on the packing. The pipe 64 is screwed in the packing-cup 63 and is connected to the equalizer, as above described.

Fig. 5 illustrates a variation in means for controlling the valve 30. The valve-seat 35

is inverted and a spring 67 is used to hold the valve closed. A spring-support 68 is screwed in the valve-seat 35. On the downstroke the valve 30 will be opened by suction and the space in the pump below the valve will be filled with water. On the upstroke the valve is closed and the water goes out, as in the above-described construction of the valve.

In the piston-head ducts 69 are made, so that water may enter and expand the leather rings 21 and 22. The annular seats 19 and 20 will prevent the leather rings 21 and 22 from turning inside out when the piston is being drawn through the pipe. It will be observed that all the valves can be taken out with the pump-pipe without turning the pipe.

The operation of the pump may be described as follows: Water may be drawn on both the up and the down stroke. On the downstroke valve 16 is opened and valve 29 is closed and water passes out through pipe 15, and at the same time valve 30 is opened and water comes in, as indicated by arrows. The valve 45 at the bottom is also closed on the downstroke. On the upstroke valve 45 is opened and water comes in. Valve 30 is closed and valve 29 is opened and valve 16 is closed. Spring 14 is compressed on the downstroke and expands and aids in raising the piston on the upstroke.

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

1. A double-action pump comprising a barrel consisting of an upper, a lower, and a middle section, a pipe having a discharge-valve at the upper end and a piston-head on the lower end, a valve in the lower end of said barrel for supplying said pipe, a discharge and a receiving valve outside of and intermediate the ends of said pipe, a packing-cup and packing for said pipe, a seat for said discharge-valve supported on the middle section of said barrel, said packing-cup being extended below said seat and said seat being screwed on said packing-cup, a coupling screwed on the extension of said cup, a seat for said receiving-valve screwed on said coupling and supported against the middle section of said barrel, and a pipe for supplying said receiving-valve from the lower part of the well.

2. A double-action pump comprising a pump-barrel, a rod and a pipe constituting the pump-rod, a discharge-valve for the upper end of said pipe, a receiving and a discharge valve outside of and intermediate the ends of said pipe, seats for said valves, a valve in the lower end of said barrel for supplying said pipe, and a piston-head on the lower end of said pipe, said piston-head consisting of a disk mounted on said pipe, a leather or rubber ring, L-shaped in cross-section, on each side of said disk, brass rings for clamping said leather rings on said disk, the sides of said brass rings next to said leather rings being reduced whereby annular waterways are



formed between each brass ring and the leather ring adjacent thereto, said brass rings having ducts therethrough leading to said waterways and annular seats for said leather rings for the purpose set forth.

5 3. A double-action pump comprising a pump-barrel, a rod and a pipe constituting the pump-rod, a discharge-pipe for the upper end of said pipe and a piston-head on the lower  
10 part thereof, a discharge and a receiving valve surrounding said pipe, seats for said valves supported on and against the interior wall of said barrel, an auxiliary pipe outside  
15 of and connected to said barrel for supplying water to said receiving-valve from the bottom

part of the well, and a seat for said valve consisting of a casing screwed on the bottom of said pump-barrel, a rubber ring or disk supported on said casing, and a brass ring screwed in said casing on said rubber ring, said valve  
20 having grooves in the side so that the rubber forms a waterproof valve-seat.

In testimony whereof I set my hand, in the presence of two witnesses, this 15th day of May, 1899.

EDGAR BYARS.

Witnesses:

JAMES GILFORD BROWNING,  
A. L. JACKSON.