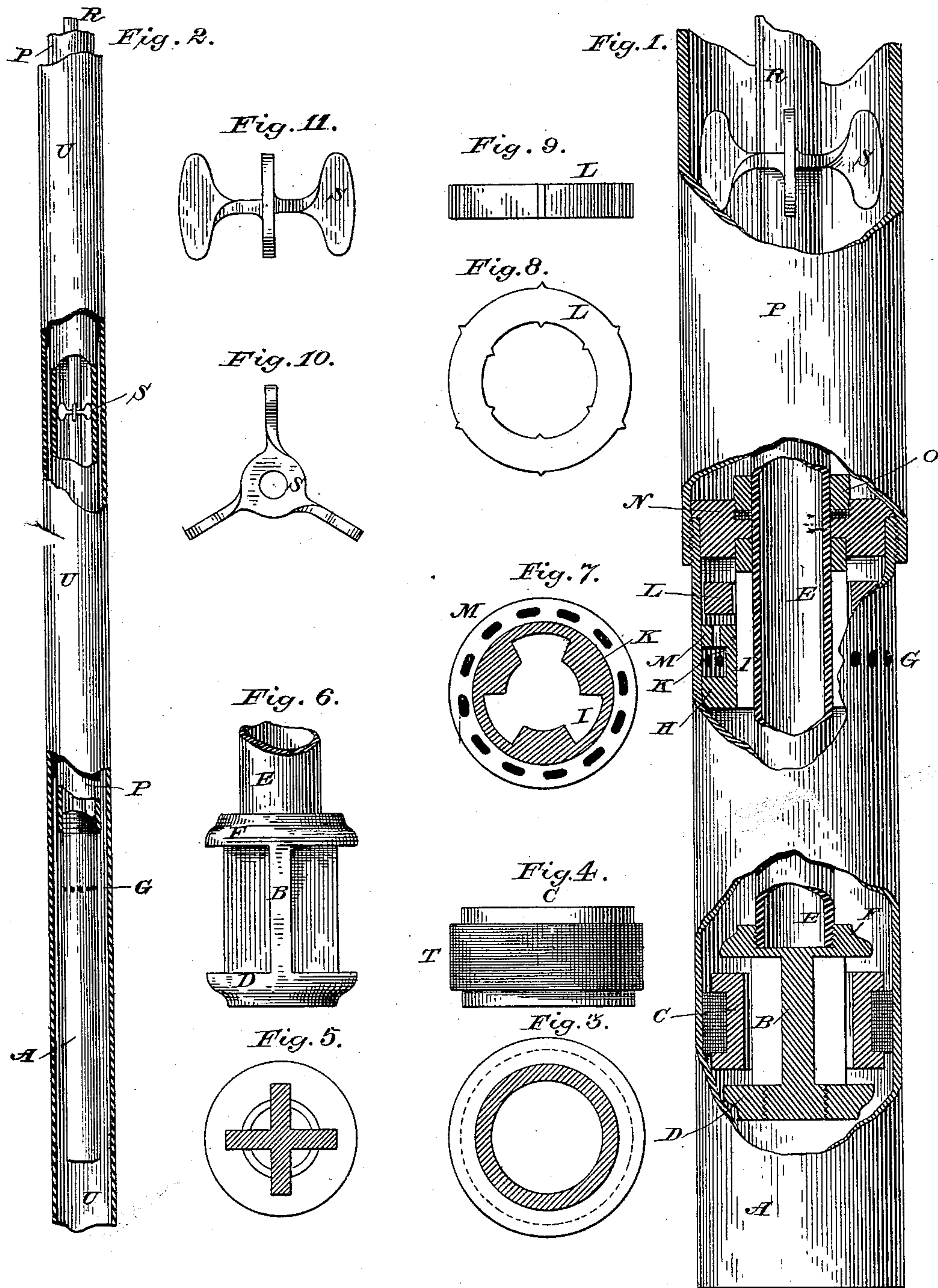


P. M. BARKER.
Double Acting Pump.

No. 230,731.

Patented Aug. 3, 1880.



Witnesses:

R. H. Barnes.
Warren Leely

Inventor:

Philander M. Barker
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Atty

UNITED STATES PATENT OFFICE.

PHILANDER M. BARKER, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF
OF HIS RIGHT TO D. FARRAND HENRY AND RALZEMOND A. PARKER,
OF SAME PLACE.

DOUBLE-ACTING PUMP.

SPECIFICATION forming part of Letters Patent No. 230,731, dated August 3, 1880.

Application filed December 6, 1879.

To all whom it may concern:

Be it known that I, PHILANDER M. BARKER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful
5 Improvement in Double-Acting Pumps, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to certain new and useful improvements in the construction of double-acting deep-well pumps, and is more especially designed to be an improvement upon a device for a similar purpose as patented to me June 10, 1873, Patent No. 139,650.

15 The principal features which constitute my invention are hereinafter fully described, in connection with parts deemed to be old, and are specifically indicated in the claims.

In the drawings, Figure 1 is an elevation of the pump, a part of the barrel being broken away so as to show sections of the piston and lower valves, and of the plug, upper water-way, and ring-valve, and also of the lifting-rods and wing-guards. Fig. 2 shows the pump and
25 tubing in place inside of the well-pipe. Fig. 3 gives a section, and Fig. 4 an elevation, of the hollow sleeve and packing. Fig. 5 is a central section, and Fig. 6 an elevation, of the spider and hollow piston-rod, showing the spider inside of the piston and the valve-seats which receive the top and bottom of the hollow sleeve. Fig. 7 is a section through the upper water-way, showing the water-passages through the ring-valve seat and also around
35 the hollow rod to the body of the pump. Fig. 8 is a plan, and Fig. 9 is an elevation, of the ring-valve. Figs. 10 and 11 give the plan and elevation of the wing-guards on the pump-rods.

40 An ordinary suction-valve is used at the bottom of the pump, also a common check-valve at the upper end of the hollow piston-rod E, with openings therefrom into the well-tubing; but not being deemed essential to a full understanding of my improvement, and
45 being old devices, they are omitted from the drawings.

Like letters refer to like parts of the various drawings.

My inventions and improvements are more particularly described as follows:

In the drawings, A refers to the pump-barrel. B represents a spider attached to the lower end of the hollow piston-rod E, having rings F and D, which are somewhat less in
55 diameter than the pump-barrel A. Of these rings, the upper one is firmly fixed to the hollow piston-rod E, and the lower one, D, screwed onto the bottom of the spider B, to permit the hollow sleeve C to be put on over the spider
60 B, on which it slides. These rings form valve-seats for the top and bottom of the hollow sleeve C. The spaces left between the said sleeve C and the spider B form water-ways, which permit free communication between the
65 interior of the hollow piston-rod E and the pump-barrel above or below said hollow sleeve C, as its upper or lower end is pressed against the valve-seats D or F respectively. This sleeve C is surrounded by suitable packing T, fitting
70 water-tight in the pump-barrel A, and which is put on or removed by having one of the ends of the hollow sleeve C removable, the whole forming a peculiarly-constructed piston.

In the upper end of the pump-barrel A is a tight-fitting plug, in two sections, N H, through the center of which passes the hollow piston-rod E, packed water-tight by the stuffing-box O. Around and in the inner face of the lower
75 section of said plug H are cored water-ways I I, communicating between the pump-barrel A, below said plug N H and an upper recess formed in and around the outer circumference of said plug N H. A second recess, K, is formed around the said plug, separated from
80 the first-named recess by the septum M, and opposite to a series of openings through the pump-barrel A a series of openings is also made through the septum M.

The upper surface of said septum M forms a valve-seat for a ring-valve, L, playing in the upper recess. This valve is constructed with projections on its inner and outer circumference, as detailed in Figs. 8 and 9, for the purpose of preventing its sticking or clogging with sand. The hollow piston-rod E is attached at its upper end to the pump-rods R by a coupling, and through this coupling are

openings which communicate with the interior of the pump-tubing P above the stuffing-box O. Below these openings, over the hollow piston-rod, may be placed a check-valve (not shown in the drawings,) as heretofore mentioned. As in this pump the work is on both the up and down stroke, the effect of the vibration of the rods will therefore, in deep wells, be more marked than in an ordinary lifting-pump, both in frictional resistance and in the derangement of the pump and connections.

To prevent this vibration I have invented the segmental curved wing-guides S. These are most easily made from a circular piece of sheet metal, so cut as to form a hub, three arms, and a rim broken in three parts, each part being fixed to an arm. The arms being twisted ninety degrees, the segmental rims will assume a position at right angles to the axis of the hub, the outer portion being curved in the same direction. These guides can be placed at each joint of the pump-rods, or more or less frequently, as desired, and being a little less in diameter than the tubing, and the bearing-edges curved in the direction of motion, they will prevent a vibration of the rods, and at the same time, but very slightly, resist their action, and will not be liable to be caught at any of the joints of the tubing.

Starting with the hollow piston-rod E at the upper end of its stroke, as the piston-rod descends it slides through the hollow sleeve C, which is held in the barrel by the packing T until its upper end comes in contact with the upper valve-seat, F, thus closing the upper and opening the lower water-way between the pump-barrel and the interior of the hollow piston-rod E. The piston continuing its descent, it carries with it the said hollow sleeve C and packing T, forming a partial vacuum above it. Thus the water is drawn into the pump-barrel through the opening G, thence through the opening in the valve-seat M, lifting the ring-valve L; thence passing through the water-ways I I into the body of the pump-barrel A. The water underneath the piston, being confined by the closing of the suction-valve at the bottom of the pump-barrel, is forced past the lower valve-seat, D, through the water-ways, into and up the interior of the hollow piston-rod E, past the check-valve at its upper end, into the pump-tubing P. As the piston-rod E reaches the lower end of the stroke and commences its return the upper ring-valve, L, falls upon its seat M, closing the ports therein. The sleeve C is held by the packing T in the barrel A until it comes in contact with the lower valve-seat, D, thus closing the lower water-way and opening the upper one between the hollow piston-rod E and the pump-barrel A above the piston.

The water contained in the pump-barrel above the piston, as it continues to rise, passes through the water-ways I into the space above the ring-valve L, thus holding it firmly upon its seat, and the water being thus confined in the pump-barrel is forced through the upper

water-way in the piston below the valve-seat F into and up the hollow piston-rod E; from thence it is discharged, through the opening in its upper end, heretofore mentioned, into the pump-tubing, as before described.

The continuing of the upward motion of the piston-rod E carries up the hollow sleeve C and its surrounding packing T, forming a partial vacuum in the pump-barrel A below it, and causes the water to flow through the suction-valve at the lower end of the pump-barrel and to follow the piston in its ascent. Thus at every stroke in either direction the full capacity of the pump-barrel is discharged, making a double-acting pump and causing a constant flow of water from the outlet.

I am aware that a movable sleeve carrying packing is not new, the same being shown in patents heretofore granted.

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. In a double-acting pump, the peculiar formation of the hollow plug through which passes a piston-rod, and fitting tightly in the pump-barrel, it being constructed with two circumferential recesses, one opposite exterior water-ways through the pump-barrel and separated from the other recess above it by a septum, M, which is perforated and forms a seat for a valve-ring, L, placed in the upper recess, and also having water-ways I I formed in the face of the interior passage for the piston-rod, and allowing a free communication between the pump-barrel A and the upper recess, and when the ring-valve L is lifted through the perforations in its seat and the exterior water-ways, G, with the space outside of the pump-barrel A, which interior water-ways extend above the ring-valve to produce a back pressure thereon, constructed substantially as described, and for the purpose set forth.

2. In a double-acting pump, a peculiar-formed ring-valve, L, having suitable projections on its exterior and interior circumference to guard against sand-clogging, substantially as described, and for the purpose set forth.

3. The combination of a pump-barrel, A, having a stuffing-box, O, at the upper and a suction-valve at the lower end, a hollow piston-rod, E, a valved piston consisting of spider B, sleeve C, and packing T, together with the recessed plug N H, placed in the pump-barrel opposite exterior water-ways, G, and having interior water-ways, I I, perforated valve-seat M, and a ring-valve, L, the whole being constructed and operating substantially as described, and for the purpose set forth.

4. A deep-well double-acting pump consisting of a pump-barrel, A, with a stuffing-box at the top and a suction-valve at the bottom end, a hollow piston-rod, E, with suitable openings at the top, with check-valve therein, a valved piston, consisting of a spider, B, having valve-seats D and F, a hollow loose sleeve-valve, C, carrying a surrounding packing, T, hollow plug N H, properly recessed, and having a perforated valve-seat, M, and interior

water-ways, I I, a ring-valve, L, with exterior and interior projections, exterior water-ways, G, through the pump-barrel A, and ring-guides S on the pump-rods R, constructed, arranged, and operating substantially as described, and for the purpose set forth.

5 5. In combination with the pump-rod R, the wing-guides S, constructed from a single piece of metal having a central orifice to re-

ceive such pump-rod and twisted at right angles to the plane of the central portion, as described, to form curved bearing-surfaces, substantially as and for the purposes set forth.

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Witnesses:

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