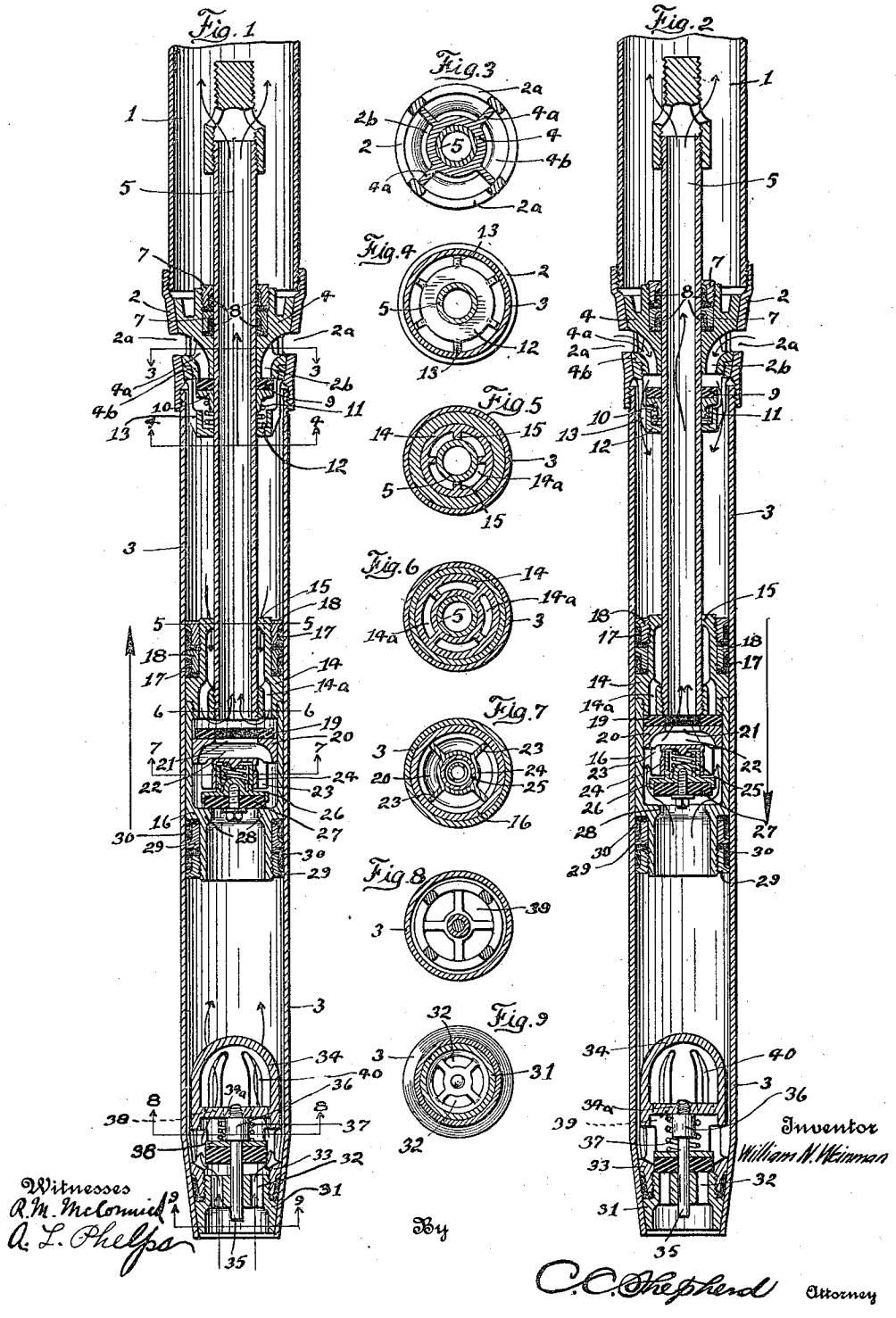
W. N. WEINMAN.

DOUBLE ACTING PUMP.

APPLICATION FILED DEC. 27, 1915.

1,278,264. Patented Sept. 10, 1918.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM N. WEINMAN, OF COLUMBUS, OHIO.

DOUBLE-ACTING PUMP.

1,278,264. Specification of Letters Patent. Patented Sept. 10, 1918.

Application filed December 27, 1915. Serial No. 68,793.

To all whom it may concern:

Be it known that I, WILLIAM N. WEINMAN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Double-Acting Pumps, of which the following is a specification.

My invention relates to the improvement of double acting pumps of that class which are commonly called deep well pumps and the objects of my invention are to provide an improved construction and arrangement of parts whereby an unrestricted flow of water may be attained; to so construct my improved pump as to insure a low cost of maintenance and operation; to provide improved spring actuated valve constructions which will contribute to smoothness of operation and obviate undesirable vibration and shocks, thus preventing parts of the mechanism from becoming loosened or broken; to so construct my improved pump as to facilitate the ready removal and substitution of parts thereof and to produce other improvements, the details of which will be more fully pointed out hereinafter.

These objects I accomplish in the manner illustrated in the accompanying sheet of drawings, in which similar characters of reference designate corresponding parts, and in which:

Figure 1 is a central vertical section of that portion of my improved pump which extends below the sucker rod and showing the position of the parts on the up-stroke of the piston,

Fig. 2 is a similar view showing the position of the movable parts on the down stroke of the piston,

Fig. 3 is a transverse section on line 3—3 of Fig. 1,

Fig. 4 is a transverse section on line 4—4 of Fig. 1,

Fig. 5 is a transverse section on line 5—5 of Fig. 1,

Fig. 6 is a transverse section on line 6—6 of Fig. 1,

Fig. 7 is a transverse section on line 7—7 of Fig. 1,

Fig. 8 is a transverse section on line 8—8 of Fig. 1, and,

Fig. 9 is a transverse section on line 9—9 of Fig. 1.

1 represents the lower portion of the drop pipe, which through a coupling sleeve 2 is connected with the upper portion of the barrel 3. The upper portion of this coupling member 2 below the lower end of the drop pipe is tapered as shown, and within this tapered portion is secured the upper tapering head portion of a plug 4, the lower portion of the body of which is reduced in circumference, said reduced portion being formed with radial lips 4^a which carry on their outer sides a ring 4^b, the latter having an outwardly flanged upper portion, as shown. The coupling 2 opposite the reduced portion of the plug is formed with comparatively large openings 2^a which communicate with the spaces 2^b between the ring member 4^b and the lower portion of the plug 4. 5 represents a tubular rod or tubular sucker rod extension, which extends from a point in the lower portion of the drop pipe 1 downward into and through the central portion of the barrel 3. This tubular rod 5 is movable through a central opening of the plug, the head of the latter being recessed about its central opening to accommodate suitable packing rings and cup leathers 7 and 8. The lower side of the rear portion 4^b of the plug 4 and the underside of the body of the plug forms a seat for the upper face of the rubber or leather top ring 9 of a valve 10, this valve movably surrounding the hollow tube 5 and having its underside pressed by a coil spring 11 which also surrounds the tube 5 and which bears in the lower end portion of a valve cage 12, the separated upwardly extending side members 13 of which have their upper end portions screwed into engagement with the plug ring 4^b. The spring 11 normally retains the valve top ring in its uppermost position and said valve is thus adapted to close communication between the spaces 2^b and the interior of the barrel 3. At a suitable distance below the valve 10, the tubular rod 5 carries a piston or plunger, of which 14 represents the upper section or shell, the body of which surrounds the tube 5 at a distance therefrom and the upper end of which is formed with inwardly projecting lugs 15 which contact with the periphery of the tubular member 5. The shell or plunger section 14 has its lower portion enlarged and connected by screw threads with the lower end portion of the tubular rod 5. The interior of the upper portion of the shell 14 is made to communicate with the interior of the upper portion of the lower

section or shell 16, with which it is detachably connected, through the medium of passages 14a. While the body of the section 14 is designed to fit movably within the barrel 3, the upper portion thereof has its periphery cut away to form a space for the reception of cup leathers 17 and packing rings 18. Below the otherwise open lower end of the tubular rod 5 is a yielding valve ring 19 which is carried on the upper side of a valve 20 which slidably fits within the plunger section or valve casing 16. The valve body 20 is formed with a central opening in its upper side as indicated at 21 and the underside of said valve body is recessed or hollowed as indicated at 22. Depending from the valve body and formed therewith are vertical ribs 23, the latter being connected with the periphery of a spring container member 24 which is of inverted cup form and which surrounds an internal spring container member 25 which rises from a valve 26, the latter carrying on its underside a yielding valve disk 27. This valve disk seats upon an internal shoulder 28 of the section or casing 16. Below this valve seat, the section 16 is reduced to permit of the application of packing rings 29 and cup leathers 30 between said reduced portion and the barrel.

The lower end of the barrel 3 is tapered, as shown, and into this tapered lower end fits a plug 31 which is formed with a tapered lower portion and the underside seat of which is hollowed or recessed. The plug 31 is formed with a central vertical opening and about the latter with openings 32. The upper portion of the plug has a threaded connection with the lower end of a cage 33 which is formed with a dome-shaped top 34. Into the central portion of the dome bottom 34a screws the upper portion of a vertical valve rod 35. On the upper portion of this valve rod is carried a sleeve or enlargement 36 which is surrounded by a coil spring 37, the latter bearing between the dome bottom and the upper side of a valve 38 which is mounted on the rod 35. In the dome bottom 34a are formed openings 39 and the wall of the dome has formed therein elongated openings or slots 40 which form a communication between the interior of the dome and the barrel 3. The spring 37 normally presses the valve 38 downward over the upper ends of the openings or passages 32 of the plug 31.

As stated, the position of the parts on the up-stroke of the piston is illustrated in Fig. 1 of the drawing, and assuming that the piston is moving upward, it will be understood that the suction caused by the movement of the piston will result in raising the valve 38 and pumping water from the well through the passages 32 about the valve 38, thence through the dome slots 40 into the barrel above said dome. In this upward movement, it is obvious that the water which has previously been drawn into the barrel above the plunger member 14, will be forced downward through the openings 14a operating to open the valve 20 and to close the valve 26. The water thus pumped through the passages 14a following the direction of the arrows shown, rises in the tubular rod 5 from which it is conducted into the drop pipe 1 from which latter it flows through a suitable discharge outlet. During this operation, it is obvious that the spring pressed valve 10 will be seated in its uppermost position, thus cutting off the passage of water through the openings 4a. However, on the down stroke of the plunger, this valve 10, as indicated in Fig. 2 of the drawing, will by downward suction be opened and water from the well be permitted to enter through the openings 2a and passages 2b and thence about the valve 10 and into the barrel below said valve. The downward movement of the plunger also results through pressure of the water in the lower portion of the barrel below the plunger, in closing the valve 38, opening the valve 26 and closing the ring valve 20, thus causing the water which was contained in the lower portion of the cylinder to pass upward about the valve 26 through the central opening of the valve 20 and thence through the pipe or tubular rod 3. It will be understood that the reciprocating motion of the plunger may be imparted by suitable operating means applied to the sucker rod which is connected with the tubular rod in any suitable or desirable manner.

From the operation described, it will be understood that a desirable and substantially continuous flow of water may be obtained by imparting to the pump plunger the usual vertical reciprocating motion. In addition to the utility of the valve springs shown and described in assisting in the closing of the valves to which they are applied, it is obvious that these springs will serve to cushion the valves against undesirable shock and contribute to the ease of operation of the parts. It will also be observed that my improved pump construction is such as to admit of the various elements thereof being readily disconnected one from the other in case of the necessity of repair or of substituting new parts.

What I claim, is:

1. In a double acting pump, a barrel, a plunger slidably mounted within said barrel, said plunger comprising upper and lower sections, a hollow plunger operating rod having the lower extremity thereof situated within and secured to said upper section, said lower section being internally enlarged to provide a valve receiving chamber, ribs internally formed with said upper

section and adapted to space the body thereof from said rod to provide ports, the latter establish communication between that portion of the barrel above said plunger and the valve chamber thereof, said lower section being formed with a port for establishing communication between the portion of a barrel below said plunger and said valve chamber, and a plurality of vertically opposed and alined valves having an expansive spring situated there-between and normally tending to obstruct the flow of fluid through the ports formed in said sections.

2. In a reciprocatory plunger for well pumps comprising a plurality of upper and lower ported sections forming therein a valve chamber, a valve structure situated within said chamber, said structure comprising an upper valve body having a seating washer disposed on its upper surface and its under surface formed to provide a webbed spring engaging portion, a lower valve body formed to include a seating washer and an opposed spring engaging surface, an expansive spring situated between said valve bodies and tending to force the washers thereof into seating engagement with ports formed in said plunger, a telescopic means carried by said valve bodies for giving their relative movements and to maintain the same in vertical alinement.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM N. WEINMAN.

Witnesses:
WALTER E. L. BOCK,
A. L. PHELPS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."