C. A. WAITZ.

DEEP WELL PUMP.

APPLICATION FILED JULY 5, 1910.

1,014,271.

Patented Jan. 9, 1912.

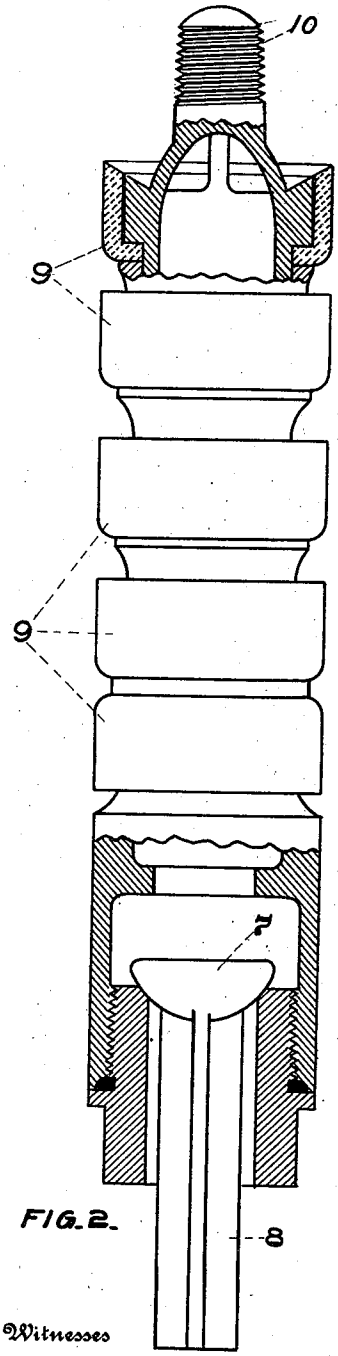

FIG. 2.

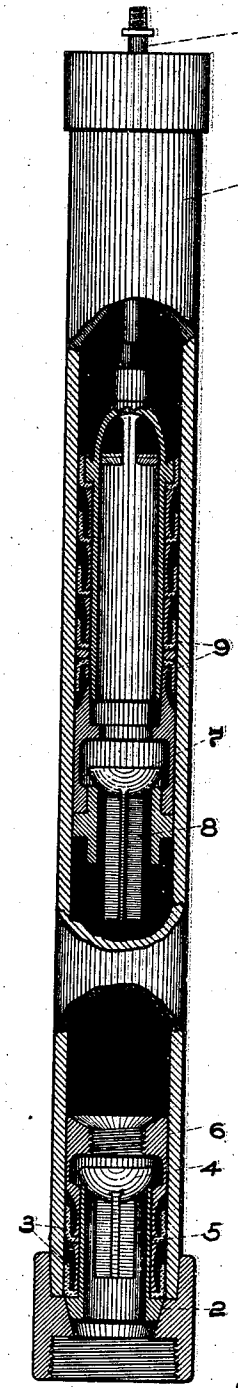

FIG. 1.

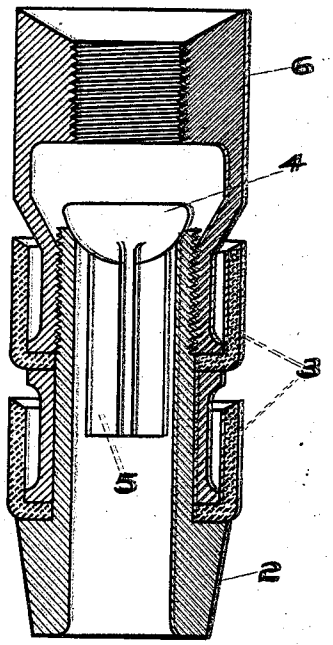

FIG. 3.

Witnesses

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CHARLES A. WAITZ, OF ROUSEVILLE, PENNSYLVANIA.

DEEP-WELL PUMP.

1,014,271. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed July 5, 1910. Serial No. 570,272.

To all whom it may concern:

Be it known that I, CHARLES A. WAITZ, a citizen of the United States, residing at Rouseville, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Deep-Well Pumps, of which the following is a specification.

The construction of my deep-well pump is herein set forth with sufficient clearness to enable those skilled in the use and construction of deep well pumps, to make and use the same.

The object of my invention is to provide a deep well pump, and more especially a working-barrel and valve mechanism for pumping oil wells in which the difficulty of valves becoming stuck and otherwise inoperative from sand settling around them, will be largely eliminated.

In the drawings: Figure 1 shows my improved working barrel complete with valves. Fig. 2 is an elevation, partly in central vertical section, of my improved piston valve. Fig. 3 is a central vertical section through my improved check valve.

In constructing my improved pump I employ a barrel 1 of substantially the usual form: I place in the bottom thereof a check-valve, commonly termed in the oil-fields a "standing valve", which consists of a tubular cage or body provided at its lower end with a plug 2 having the usual taper to fit the seat of an ordinary working barrel. Packing cups 3, or any other suitable packing material may be employed to prevent leakage between the wall of the barrel and the valve cage. The drop of the valve consists of a hemispherical head 4 and a pendant stem 5. The crown 6 of the cage is provided with a tapped hole into which the sucker-rod may be screwed to pull the valve from the barrel and remove same from the well for repairs.

My piston-valve, as shown in Fig. 2, is of a novel construction, especially as to the shape and location of the drop 7, which is usually at the top, whereas, I place it at the bottom; the construction of the upper portion of the piston also differs from those in common use by having a packing cup 9 directly at the top of the piston, which prevents silt from getting between the piston and the wall of the barrel, whereas all other pistons,—so far as I am aware—have a metallic section directly at the top that is somewhat smaller in diameter than the bore of the barrel, and this permits silt to settle around said section, and inasmuch as the action of the fluid cannot remove said silt, it greatly hastens the wear of the piston and barrel. The top or upper surface of my piston slopes downwardly and inwardly so that all solid material and silt settling upon the same is directed to the inner chamber of the piston, which chamber has imperforate walls that prevent the lateral escape of said silt and from whence the action of the fluid will carry it out when the pump is in operation.

Another novel feature of my piston is the projection of the stem 8 below the bottom of the piston body, the object of which will be presently set forth.

The outside of the piston is provided with a plurality of packing cups 9, one of which is located directly at the top of the piston, as aforesaid to exclude all sand and silt and prevent its finding its way and lodging between the working surfaces. The other cups may be located as shown, or in any other way best adapted to efficient service. The upper end of the valve is provided with a threaded nipple 10, to which the sucker-rod is attached to operate the piston.

While some oil wells are pumped continuously, nearly all of them are pumped intermittently, and when they are not being pumped, if there is any sand or silt in the fluid,—as there nearly always is—it will settle to the bottom of the column of fluid contained in the tubing, and lodge upon and around the valves and this often causes the valves to either stick, by settling around them, or to leak by getting between the drop and its seat, and the actual condition appears to be that the silt nearly always settles around the piston or its drop and causes them to stick, and gets beneath the check-valve drop and causes it to leak and the reasons for these conditions probably are, that the weight of the column of oil above the piston holds the drop so securely to its seat that sand cannot get beneath it and thus settles around it, while with the check-valve, there being only a small amount of oil above it, it is not so firmly held to its seat, thus permitting the sand to get between the drop and its seat, and this causes it to leak.

With my improved construction, when the valves become inoperative, or partially so

from the presence of silt about them, the piston is adjusted to a low position, until the stem 8 enters the tap-hole in the top of the check-valve and touches the head 4 of the drop in said check-valve; a few strokes of the pumping mechanism will then cause the stem 8 to strike against the head 4 at each downward stroke of the piston and this will free the valves from any obstruction, the piston is then re-adjusted to the higher, original position in the barrel and the pump is ready for operation.

When the valves are "bumped", as above explained, the drop in the piston is caused to rise, and the fluid may flow downward or regurgitate through it, and if there is any sand upon the seat of the standing valve, or between said seat and the drop, the downward rush of the oil will quickly remove same and place the valve in good operative condition. It will readily be understood that the force of the downward flow of a column of fluid several hundred feet in height will be considerable, and will quickly remove particles of sand from the valve seats.

I claim:

In a deep well pump the combination with a barrel provided with a check-valve seat at its lower end, of a check-valve arranged to seat in said seat and a piston adapted to operate in said barrel; said check-valve consisting of a tubular cage having an opening at the top thereof, a seat within said cage, a hemispherical drop with its spherical face seating upon said seat, a pendant stem upon said drop, packing members between the outer wall of said cage and the inner wall of said barrel; said piston consisting of a tubular body open at the top and having imperforate side walls, the upper edge of the walls of said body sloping inwardly for the purpose set forth, packing members carried by said body, a seat in the lower portion of the chamber of said body and a valve-drop seating upon said seat, said drop having a pendant stem projecting below said piston, arranged to bump the drop of said check-valve, as and for the purpose set forth.

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

CHARLES A. WAITZ.

Witnesses:
J. D. TRAX,
PEARL PROPER.