J. GLEASON.

DEEP WELL PUMP.

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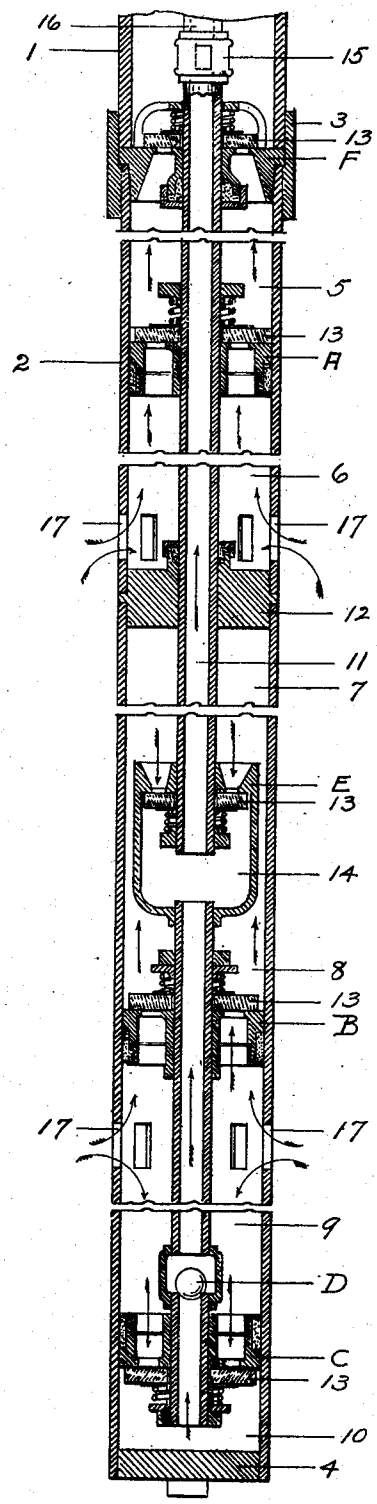
994,310. Patented June 6, 1911.



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DEEP-WELL PUMP.

994,310. Specification of Letters Patent. **Patented June 6, 1911.**

Application filed August 13, 1910. Serial No. 577,122.

To all whom it may concern:

Be it known that I, JAMES GLEASON, a citizen of the United States, residing at Green Bay, in the county of Brown, State of Wisconsin, have invented a new and useful Improvement in Deep-Well Pumps, of which the following is a specification.

My invention relates to an improvement in deep well pumps with a reciprocating motion.

I have taken as a basis for my improvement my double acting deep well pump, Gleason Pat. No. 913123, Feb. 23, 1909, which has been retained almost in its entirety, but have added one bucket, a diaphragm and a cage valve which makes the pump virtually a triple acting pump.

My invention is particularly applicable to deep wells with a metal casing, and where the water must be lifted from considerable depths, and the object of my invention is to provide a pump which will lift the largest possible amount of water from a comparatively small well giving a double flow on the upward stroke, and a single flow on the downward stroke, meaning that the pump will deliver double the capacity of a single pump barrel on the upward stroke, and the full capacity of the cylinder on the downward stroke. I obtain these objects by means of the mechanism illustrated in the accompanying drawing which is made a part of this application.

In the drawing 1 represents a suspension pipe or casing to which is attached the pump barrel or cylinder 2 by means of a threaded coupling 3. This pump barrel is closed at the lower end by means of a plug 4. This pump cylinder is divided into chambers 5, 6, 7, 8, 9, and 10 by the buckets A, B, and C, and diaphragm 12, and upper valve 13, 16 is what is termed a sucker rod attached to a pump rod 11 by means of a coupling 15 which has openings or ports on its sides admitting water from the bore of pump rod 11 to the bore of suspension pipe. The suspension pipe with cylinder attached is calcuated to operate some distance below the surface of the water in the well, and inside of a well casing not shown on this drawing.

To understand the operation of this pump a detail description of its construction and action will be necessary.

On the sides of the pump cylinder 2 are two sets of openings marked 17. One set opening from the well into chamber 9, the other into chamber 6. The latter chamber being above a solid diaphragm 12 which divides the working parts of the pump into practically two separate divisions each being independent of the other excepting a common connection through the bore of pump rod 11. Water is admitted to chamber 9 through bore 17, and on the upward stroke is passed through bucket C of which 13 is the valve, into chamber 10. At the turn of the stroke downward, valve 13 closes, the water is forced through the bore of pump rod 11 past the ball valve D then on upward through said pump rod and through ports in coupling 15 to the suspension pipe. On the downward stroke water is passed from chamber 9 through bucket B to chamber 8, and thence alongside cage valve E to chamber 7. At the turn of the stroke valve 13 of bucket B closes and on the upward stroke the water is passed through cage valve E into the space 14 of cage valve, and from thence upward through the pump rod, and through coupling 15 to the suspension pipe. On the downward stroke water is passed from chamber 6 through valve A to chamber 5. On the upward stroke valve 13 of bucket A closes, and water is forced through the stationary valve F to the suspension pipe 1.

Stationary valve F and diaphragm 12 are provided with packing boxes and close the space around the pump rod 11. Buckets A, B, and C are provided with packing rings on the outside next to the inner surface of pump cylinder. Buckets A, B, and C, stationary valve F, and cage valve E are all provided with springs to close the valve 13, this being of a soft material preferably of rubber. Buckets A, B, and C, ball valve D, and cage valve E are all rigidly attached to the pump rod. Stationary valve F, is held between the suspension pipe and pump cylinder by means of the coupling 3.

It will be seen that by means of this pump I secure two impulses or water discharges from the pump cylinder into the suspension pipe on the upward stroke, one being through the hollow pump rod 11, the other through the top valve F, and one impulse or discharge of water on the downward stroke to the suspension pipe through the hollow pump rod 11. By this means I am enabled to deliver double the full capacity of the cylinder bore less the volume of the pump rod

on the upward stroke, and the full capacity of the cylinder on the downward stroke.

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

1. In a deep well pump a suspension pipe, a pump cylinder attached thereto, said cylinder closed at the lower end, a diaphragm in said cylinder dividing the working space into two approximately equal parts, a diaphragm valve between the cylinder and the suspension pipe, two rows of ports in the sides of said cylinder opening into the two working spaces, a sucker rod, a hollow pump rod open at its lower end, and connected to the pump rod with a coupling having open port holes, a downwardly opening bucket at the lower end of the pump rod, a ball valve in said pump rod above the lower bucket, an upwardly opening bucket attached to the pump rod in the lower working section of the cylinder, a cage valve on said pump rod above the upwardly opening bucket, an upwardly opening bucket attached to said pump rod above said diaphragm in the upper working space of said cylinder, as set forth.

2. In a deep well pump a working cylinder divided into two working sections by a diaphragm, said cylinder closed at lower end, ports in the sides of said cylinder approximately midway of the lower section, ports opening into the upper section of said cylinder immediately above said diaphragm, a hollow pump rod working inside said cylinder, and open at its lower end, means for forcing water from the lower chamber of the cylinder into the hollow pump rod on the downward stroke, means for forcing water from the lower chamber of the cylinder into the hollow pump rod on the upward stroke, and means for forcing water from the upper chamber into the suspension pipe on the upward stroke as set forth.

3. In a deep well pump a suspension pipe, a pump cylinder attached thereto, a hollow pump rod working therein, said cylinder divided into two working sections by a diaphragm, ports in the sides of the cylinder in the lower section, ports in the sides of the cylinder in the upper section, each set of ports admitting water from the well to the respective sections of the cylinder, means for forcing water from the lower section of said cylinder through the hollow pump rod on the downward stroke, means for forcing water from the lower section of said cylinder through the hollow pump rod on the upward stroke, means for forcing water from the upper section of cylinder into the suspension pipe on the upward stroke as set forth.

4. In a deep well pump the combination of a suspension pipe, a pump cylinder divided into two chambers by a diaphragm, ports opening into both upper and lower chambers, the cylinder being closed at its lower end, a hollow pump rod open at its lower end, a cage valve on said pump rod, means for forcing water through the hollow pump rod on both upward and downward strokes, means for forcing water from the upper chamber into the suspension pipe as set forth.

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