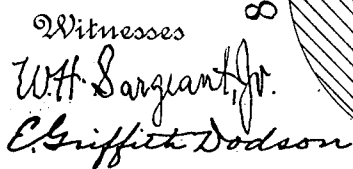


APPLICATION FILED AUG. 23, 1911.

Patented Mar. 12, 1912.



Inventor
Thomas B. Wilkinson,
by Thomas Ewing, Jr.,
Attorney

UNITED STATES PATENT OFFICE.

THOMAS B. WILKINSON, OF BAKERSFIELD, CALIFORNIA.

WELL-PUMP AND VALVE MECHANISM THEREFOR.

1,020,337.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed August 23, 1911. Serial No. 645,634.

To all whom it may concern:

Be it known that I, THOMAS B. WILKINSON, a citizen of the United States of America, and a resident of Bakersfield, Kern county, California, have invented certain new and useful Improvements in Well-Pumps and Valve Mechanism Therefor, of which the following is a specification.

In many oil wells great difficulty is experienced with the clogging of the pumps and valves by sand brought up with the oil in the agitation of the latter, and which settles in the valves, choking and cutting them out. When it is remembered that the average yield of pumped oil wells in the United States is less than a barrel a day per well it will be seen that the positive and rapid seating of the valves is of the utmost importance in preventing the escape of the oil past the valves, or slip as it is technically named. It is further to be remembered that these valves worked under heavy pressure due to the length of oil column above them and are located deep down within the well and that any removal of the valves for repairs or cleaning necessitates pulling of the well rods and valves and the consequent enforced idleness of the well for a considerable period.

My invention has for its object to provide such a construction in the pumps and valves for this class of wells (although not limited thereto in its application) as will render them self-clearing and non-choking and at the same time will prevent the scoring of the valve ball and valve seat, and thus prolong the life of these parts and for this purpose it further consists in the construction, arrangement and combination of the several parts of which it is composed which will be hereinafter more fully described and claimed.

Referring to the accompanying drawings in which corresponding parts are designated by corresponding marks of reference: Figure 1 is a central vertical section through a part of the well pump having my invention applied thereto. Fig. 2 is a corresponding section through another and lower part of the same pump showing other parts of my invention. These two figures to constitute

continuations of each other. Fig. 3 is a side elevation of the upper cage. Fig. 4 is a horizontal section on lines x^1-x^4 of Fig. 2. Fig. 5 is a section on lines x^5-x^5 of Fig. 2.

The pump barrel 1 has upon its lower end a restricted part 1^a for the standing valve. Within it is contained the hollow plunger 2 carrying on its upper end the upper valve, comprising the valve cage 3, seat 3^a and ball 3^b , the lower valve likewise comprises a cage 4, the valve seat 4^a , the ball 4^b and the base section 4^c fitting into the restricted part 1^a of the barrel. The parts so far described above are of the ordinary and general construction. The improvements made by me in this general structure comprises two general features, one being in means for causing the positive seating of the ball or balls by either or both valves, whereby the clogging by sand, gravel or other foreign substances is prevented, and the other being in means for permitting the pulling of the standing valve from the well for the purpose of repair and inspection.

In order to cause the positive seating of the valves I use a device which I will describe particularly in connection with the upper valve. As there shown the cap 5 of the cage 3 has an axial perforation therein, through which projects and in which moves freely a rod 5^a carrying on its lower end an anvil 5^b which by preference is recessed on its bottom as at 5^c and normally rests upon the ball 3^b . This rod 5 projects upwardly within the tubular plunger rod 6 which serves to actuate the plunger and by its weight serves to rapidly and forcibly throw the ball 3^b upon the seat 3^a , the rod being of sufficient length to give it weight for this purpose. I have found by practical use that a rod six feet long and one-half inch in diameter is suitable for this purpose. It will be noted that the ball is not connected to the rod in any way except by frictional contact so that the ball while forcibly projected to its seat is still free to rotate for the purpose of clearing itself from any obstruction. This prevents scoring which would follow with the ball always seating in one position.

The arrangement on the lower valve for

projecting the ball to its seat is the same as that before described and the parts thereof have been lettered 7 to 7^c respectively. The rod 7^a of the lower valve, however, does not project up within the tubular plunger rod but extends well up within the plunger 2 where it is provided with a three arm butterfly 8, the lower end of the plunger having therein a screw washer 8^a provided with a central recess 8^b through which the rod 7^a passes and which is of much greater diameter than that of the rod to permit the passage of oil therethrough. The aperture 8^b is however sufficiently smaller than the internal diameter of the plunger 2 to form a shoulder 8^c on the upper side of the washer, adapted to prevent the passage thereby of the butterfly 8. The length of the rod 7^a and the position of the lower valve in the assemblage of the parts is such that during the normal pumping stroke of the plunger the shoulder 8^c on the base of the plunger will not come in contact with the butterfly and at such times the rod 7 acts to throw down the ball 4^b in precisely the same manner that the rod 5^a acts upon the ball 3^b. However should it be desired to pull the lower valve it may be done by lifting up the plunger by means of the plunger rod 6 beyond its normal stroke the butterfly will be engaged by the shoulder 8^c and the rod lifted, whereupon the anvil 7^b on the rod will engage the lower face of the cap of the lower valve cage and lift that cage and the parts 4^a, 4^b and 4^c connected therewith out of the well. Furthermore the length of the rod 7^a is by preference such that upon lowering the plunger on to the bottom, or beyond its normal stroke the butterfly will engage an internal shoulder 9 in the upper part of the plunger and be driven down by the weight of the plunger and plunger rods. This will be useful in dislodging obstructions in the lower valve which the weight of the rod 7^a will be unable to accomplish.

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

1. In a device of the character described, the combination with a plunger and a valve cage, of a connecting rod having one end movably disposed in the valve cage and normally engaging the valve member, the upper end of said connecting rod being disposed within the plunger and movable with respect to the same, and means on the upper end of the connecting rod to be engaged by the plunger whereby the valve cage may be removed from its operative position.

2. The combination with a pump plunger and a valve cage having a valve ball seated therein, of a connecting rod between the plunger and the valve cage, the lower end of said rod being disposed within the valve cage and bearing on the ball to nor-

mally retain the same on its seat, and means on the upper end of the connecting rod to be engaged by the plunger whereby the valve cage may be removed from its operative position.

3. The combination with a pump plunger and a valve cage having a valve ball seated therein, of a rod connecting the plunger and cage, the lower end of said rod being enlarged and conically formed for engagement with the valve ball, said rod being movable in respect to the plunger and bearing upon the valve ball to normally retain the same in its seat and prevent said ball lodging between the walls of the cage, and means arranged on the upper end of said rod to be engaged by the plunger whereby the valve cage may be removed from its operative position.

4. The combination with a pump plunger and a valve cage having a valve ball seated therein, of a rod connecting the plunger and cage, the lower end of said rod being disposed within said cage and longitudinally movable therein, said lower end of the rod being enlarged and provided with a concave face for engagement upon the periphery of the ball, said rod being also movable with respect to the plunger, the weight of the connecting rod normally holding the ball upon its seat, a washer threaded in the lower end of the plunger and providing an annular shoulder therein, and a head rigidly fixed on the upper end of said rod having a plurality of arms for engagement upon said shoulder whereby the plunger, valve cage and its connecting rod may be removed from their operative positions.

5. In a device of the character described, the combination with a valve cage, of a valve therein, and a rod resting on the valve and capable of limited movement in respect to the valve cage, with means for lifting the said rod to withdraw the valve cage.

6. In a device of the character described, the combination with a pump plunger having a valve seat and cage upon the upper end thereof, a valve ball within the said cage and resting on the said seat, a tubular plunger rod engaging the cap of the valve cage, the said cap being axially perforated, and a rod projecting through the said perforation and within the tubular plunger rod and provided with an anvil resting upon the valve ball.

7. In a device of the character described, the combination with a standing valve comprising a valve cage, a seat and a ball, of a rod guided in said cage and projecting above the top thereof and provided with an anvil normally resting on the ball, and a pump plunger having upper and lower shoulders to engage the said rod whereby the valve may be lifted from its seat by an abnormal upward movement of the plunger or where-

by the ball may be forced to its seat by the weight of the plunger upon an abnormal downward movement thereof.

8. In a device of the character described, 5 the combination with a standing valve comprising a valve cage, a seat and a ball, of a rod resting on the ball, guided in the said cage and projecting above the top thereof and a pump plunger having a shoulder to

engage the said rod to force the ball to its 10 seat by the weight of the plunger upon an abnormal downward movement thereof.

Signed at New York, N. Y., this 22d day of August, 1911.

THOMAS B. WILKINSON.

Witnesses:

SAMUEL W. BALCH,
JAMES T. LAW.

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