E. A. WHEELER.

OIL WELL PUMP.

APPLICATION FILED OCT. 19, 1911.

1,013,246.

Patented Jan. 2, 1912.

FIG. 1.

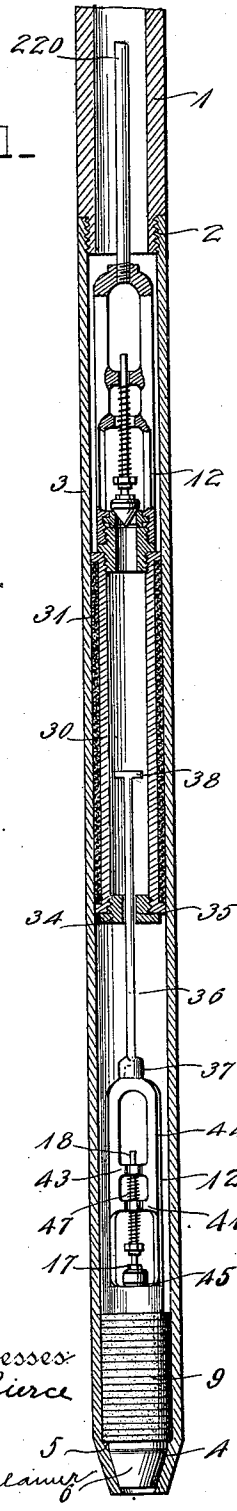


FIG. 2.

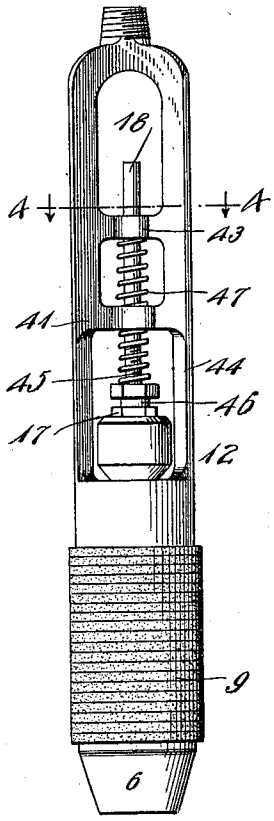


FIG. 3.

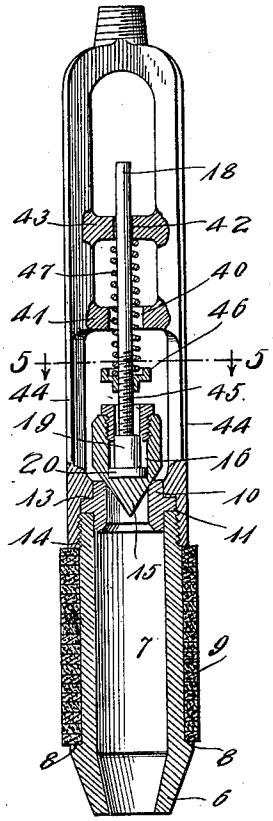


FIG. 4.

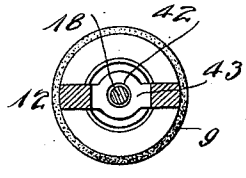
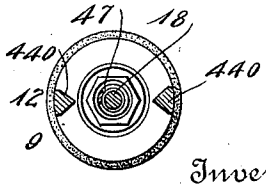


FIG. 5.



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UNITED STATES PATENT OFFICE.

EARL A. WHEELER, OF BAKERSFIELD, CALIFORNIA.

OIL-WELL PUMP.

1,013,246. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed October 19, 1911. Serial No. 655,534.

To all whom it may concern:

Be it known that I, EARL A. WHEELER, a citizen of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented certain new and useful Improvements in Oil-Well Pumps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to pumps, and more especially to those adapted for use in oil wells; and the object of the same is to effect certain improvements in the cage of the pump described in my companion application filed August 3, 1911, and bearing Serial No. 642,113.

To this end the invention consists in the details hereinafter more fully described and claimed and as shown in the drawings wherein—

Figure 1 is a vertical sectional view of the working cylinder at the lower end of a tubular oil well, showing my improved pump as located therein; Fig. 2 is a side elevation, and Fig. 3 a central vertical section of the improved cage forming the subject matter of the present invention; Fig. 4 is a cross section on the line 4—4 of Fig. 2, and Fig. 5 is a cross section on the line 5—5 of Fig. 3.

In the drawings the numeral 1 designates the usual well tubing, connected at its lower end as at 2 with the upper end of the working cylinder 3 in which operates my valve yet to be described, and the lower end of this cylinder is contracted internally as shown at 4 and shouldered as at 5 above its contracted or conical portion, and above the shoulder it is cylindrical throughout its length. Within the conical portion 4 of this cylinder is removably inserted the conical lower end 6 of a seat-supporting tube 7 which is externally shouldered as at 8 for the reception of the leathers 9 which fit closely within the bore of the cylinder 3 and rest upon its shoulder 5 when the conical lower end 6 fits closely within the tapered or conical lower portion 4 of said cylinder 3; and the upper end of said supporting tube 7 carries the standing valve.

The standing valve includes a reversible seat 10 having on its outer side between its ends a ridge 11 which rests upon the upper end of the tube 7 when the seat is in place as best seen in Fig. 3, a cage 12 having an internal shoulder 13 near its lower end which bears upon said ridge 11 and holds the latter against the upper end of the tube, and below the shoulder internal threads 14 by means of which the cage is detachably connected with the upper end of said tube, and a valve head. This head is conical on its exterior as seen at 15 so as to fit within either end of the seat 10, and internally it has a chamber 16 smooth at its lower end and threaded at its upper end for the reception of an annular plug or ring 17 whose length is less than the depth of said chamber. The valve rod 18 is enlarged as at 19 near its lower end, the enlargement moving freely through the bore of said ring 17, and at its lower extremity this enlargement has a head 20 of still larger circumference so that it may fit slidably within the chamber 16. The upper end of the cage 12 is detachably connected as at 37 with an upright rod 36 which passes upward and loosely through a rather large hole 35 forming the bore of a ring or nut 34 which constitutes the lower end of the cylindrical plunger 30. The latter is surrounded by packing 31 and is reciprocated within the working cylinder 3 by means of the sucker rod 220 which may be connected with the upper end of said plunger by a similar cage and valve whose details of construction will not be elaborated herein. The upper end of the rod 36 has a T-head 38 which is longer but narrower than the diameter of the bore 35 through the nut 34, and therefore when the plunger is reciprocated vertically this head is engaged by said nut and the standing valve lifted out of place if the sucker rod is raised sufficiently, but under ordinary conditions and with the reciprocations of usual length the sucker rod moves only the piston valve in a manner well understood.

Coming now more particularly to the details of the present invention in so far as it differs from my former case hereinbefore referred to, the valve rod or stem 18 passes loosely through a rather large hole 40 formed in a lower spider 41 and then upward and through a smaller hole 42 formed in an upper spider 43, both said spiders extending across between and connecting the side bars 44 of the cage 12. The lower portion of said rod 18 is threaded as seen at 45, and on the threads is disposed a cup nut 46 which supports the lower end of an ex-

pansive spring 47 coiled around the rod and leading from the nut upward to the upper spider 43 as best seen in Fig. 3. The size of the hole 40 in the lower spider permits this coiled spring to pass through it as shown in this view, and therefore the spring may have greater length and greater resiliency than if its upper end rested beneath the lower spider. If the nut 46 be adjusted down against the nut or plug 17 as seen in Fig. 2, it serves as a jam nut to hold the latter in place; or, as seen in Fig. 3, the nut 46 may be adjusted higher upon the stem 18 so as to increase the tension of the spring 47. The side bars 44 of the cage immediately around the head 15 and below the lower spider 41 are preferably reduced and made triangular as seen in cross section in Fig. 5 at 440, thus permitting the oil to freely escape when the head is lifted from its seat.

In operation, the parts being connected as best seen in Fig. 1 and the working cylinder 3 lowered into the well, when power is applied to reciprocate the sucker rod 220 so that the piston valve and plunger move up and down within the cylinder without withdrawing the standing valve from its place at the lower end thereof as shown, at each upward stroke, the oil above the head of the upper valve is lifted while the tendency is to produce a partial vacuum between the two valves as usual. The pressure of the oil or gas beneath the head of the lower valve unseats the latter with the assistance of said vacuum, and during the rise of the plunger some of the oil flows through the standing valve into the working cylinder. On the return or downward movement of the latter the upper valve opens and the lower valve closes, its closing being occasioned by the weight of the column of liquid dropped upon it, assisted by the expansive force of the spring. The latter it is my intention to set so as to just about to overcome the gas pressure or oil pressure beneath this valve head, after which the reciprocation of the sucker rod and the piston valve will cause the two valves to open and close alternately in a manner which is well understood in this art. If in the act of pumping some small particle such as a stone or even grains of sand should become lodged upon the seat and beneath the head of either valve, the lost motion between said head and its stem will permit the jarring action which takes place to dislodge the impediment so that the upward flow of the oil soon cleanses the parts automatically. The reducing of the size of the side bars 44 as seen at 440 facilitates the free passage of the oil flowing upward through the seat 10 and diverted radially outward by the conical shape of the head at 15, and of course the passage of the oil upward packs the two spiders, lubricates the rod 18 and permits it to reciprocate through the hole in the upper spider with very little friction. The parts may be of the desired sizes, shapes, proportions and materials, and changes in details may be made as consistent with the scope of this invention.

What is claimed as new is:

1. In an oil well pump, a cage comprising two side bars connected by upper and lower spiders pierced with holes whereof that in the lower spider is larger than the other, said side bars being reduced and made triangular beneath the lower spider, and a seat carried by the cage; in combination with a valve consisting of a conical head adapted to fit said seat, a stem rising therefrom having a threaded portion and above that a smooth portion passing through the hole in the upper spider, a cup nut mounted on said threads and larger than the hole through the lower spider, and an expansive spring surrounding the rod between said nut and the upper spider and passing through the hole in the lower spider.

2. In an oil well pump, the combination with a valve cage including a seat, two side bars rising therefrom, and two spiders connecting said side bars and pierced with holes whereof that in the lower spider is larger than that in the upper; of a valve stem sliding through the smaller hole and passing loosely through the larger and threaded near its lower end, its lower extremity having an enlargement, a valve head adapted externally to said seat and containing an internal chamber of a size to loosely receive said enlargement and threaded at its upper portion, a threaded plug engaging the threads in the head above the enlargement of the stem and loosely receiving the threaded portion of the stem, a nut adjustably engaging the threaded stem above said plug, and an expansive spring coiled around the stem between said nut and the upper spider and passing loosely through the hole in the lower spider.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EARL A. WHEELER.

Witnesses:
J. R. WILLIAMS,
F. A. NIGHBERT.