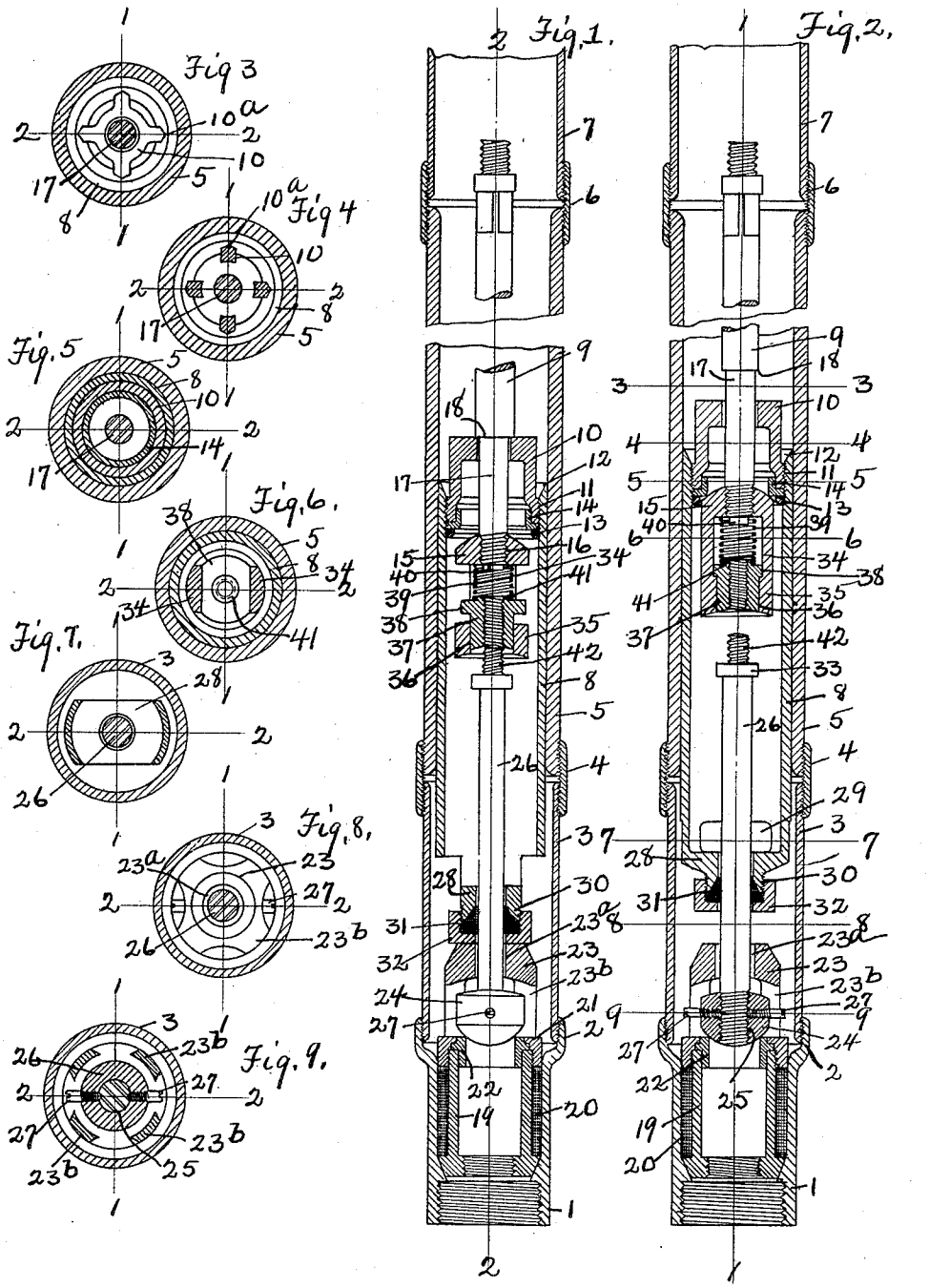
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PUMP.

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1,067,316. Patented July 15, 1913.



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UNITED STATES PATENT OFFICE.

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PUMP.

1,067,316. Specification of Letters Patent. Patented July 15, 1913.

Application filed August 1, 1911. Serial No. 641,787.

To all whom it may concern:

Be it known that I, RUDOLPH CONRADER, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Pumps, of which the following is a specification.

This invention relates to pumps and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

Among the objects of the invention is to provide the pump with means for mechanically actuating the valve of the pump. This has heretofore been accomplished, but is accomplished in accordance with this invention in an improved manner. Means are also provided in connection with the mechanically actuated valves for opening the valves of the pump so as to drain the pump for the various purposes for which it is desirable.

The invention also contemplates means whereby the sand settling in the pump may be prevented from packing on the top of the plunger so as to injure the working surfaces.

Other objects of the invention will appear from the specification and claims.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 is a central section of a pump on the line 1—1 in Figs. 2, 3, 4, 5, 6, 7, 8 and 9, the plunger being lowered preparatory to picking up the standing valve. Fig. 2 a section on the line 2—2 in Figs. 1, 3, 4, 5, 6, 7, 8, and 9, the plunger being in normal position. Fig. 3 a section on the line 3—3 in Fig. 2. Fig. 4 a section on the line 4—4 in Fig. 2. Fig 5 a section on the line 5—5 in Fig. 2. Fig. 6 a section on the line 6—6 in Fig. 2. Fig. 7 a section on the line 7—7 in Fig. 2. Fig. 8 a section on the line 8—8 in Fig. 2. Fig. 9 a section on the line 9—9 in Fig. 2.

1 marks the standing valve fitting. This is provided with the bell 2 at its upper end into which the working barrel extension 3 is screwed. The working barrel extension is connected by a coupling 4 with the working barrel 5. The working barrel 5 is connected by a coupling 6 with a tube 7.

The plunger 8 operates in the working barrel, and as shown is wholly metallic. It is operated by a sucker rod 9. A crown 10 is screwed into the upper end of the plunger, the plunger being internally screw threaded at 11 for this purpose. A collar 13 is also screwed into the upper end of the plunger and the removable plunger seat 14 is clamped between the collar 13 and the crown 10. The upper edge of the plunger is beveled, the edge in contact with the working barrel being higher than the inner surface. The crown 10 is screwed down into the plunger so that the edge 12 forms a complete annulus around the top of the plunger. The webs of the crown (see Fig. 3) are V shaped as indicated at 10^a so that any sand that may settle in the tubing will not lodge around the crown but will pass into the plunger and thus may be flushed out of the pump.

The plunger valve 15 has a screw threaded opening at its center into which the extension 17 of the sucker rod 9 is screwed. The extension 17 is of slightly smaller diameter than the sucker rod 9 forming a shoulder 18 which contacts the crown 10 so as to limit the relative movement between the sucker rod and the plunger. On the downward movement of the sucker rod, the valve 15 is opened through the movement of the sucker rod and the plunger is carried down when the shoulder 18 contacts the crown.

The standing valve has the usual sleeve 19 on which the packing 20 is arranged. The packing 20 is clamped by the base 21 of the crown 23. This base has a flange which clamps the removable seat 22 on the top of the sleeve 19. The standing valve check 24 is arranged in the cage and operates upon the seat 22. It has a screw threaded opening 25 into which the stem 26 is screwed, the stem extending upwardly through an opening 23^a in the top of the crown. The screw is locked in the valve by means of the set screws 27. The set screws extend outwardly from the check 24 into the space between the posts 23^b in the crown so that they not only lock the screw in the valve, but also lock the check and stem 26 against turning.

The lower end of the plunger has a strap 28 formed integrally with the plunger, leaving the openings 29 to the plunger. A screw threaded projection 30 extends from the lower end of the strap 28 and this is cupped in its lower face forming a gland in which the packing material 31 is placed. A flange nut is arranged on the extension 30 and screwed up, against the packing so as to

create frictional pressure on the stem. As the plunger is reciprocated, the friction on the stem 26 is sufficient to mechanically operate the check 24 so that it is opened and closed through the direct action of the plunger rather than by the pressure of the liquid as ordinarily.

The upper end of the stem 26 has a shoulder 33 which is of sufficient size to engage the strap 28 if the plunger is withdrawn. In this way, the standing valve may be withdrawn with the plunger, the shouldered extension is of sufficient length, and telescopes the plunger sufficiently so that in the normal operation of the pump, the shoulder does not contact the strap 28.

The check 15 is provided with the downwardly extending arms 34 with the cross piece 35 at the bottom. The cross piece has the perforation 36 in which is slidingly mounted the nut 37. The nut has the head 38 adapted to engage the arms 34 so as to prevent its turning in the cage thus formed. A spring 39 is tensioned between the top of the nut and the valve 15, the spring being held in place by a projection 40 on the end of the sucker rod at the top and a projection 41 on the top of the nut. The nut 37 is screw threaded so as to engage the screw threads 42 on the top of the stem 26. By lowering the plunger below the ordinary stroke of the plunger, the nut 37 can be brought into engagement with the screw threads 42 at the top of the stem 26 and by turning the sucker rod, the nut may be screwed on to the stem so that the stem is directly connected. In order to prevent the bruising of the threads 42 as the nut is lowered, the nut is yieldingly mounted, as shown, the spring yielding but still exerting sufficient pressure as to insure the entry of the screw. The standing valve, of course, could be lifted by the shoulder 33 but this in itself would not assure the opening of the pump valves so as to drain the pump and thus facilitate the lifting of the parts. The stem 26 and connected parts are so proportioned that when the nut 37 is fully screwed on to the screw 42, the shoulder 18 resting on the top of the crown and the flange nut on the top of the standing valve cage, the check 24 will be lifted from its seat. Observing Fig. 1, the parts are in position to start the engagement of the nut 37 with the screw 42. It will be noted, that the shoulder 18 is in engagement with the crown and the bottom of the plunger with the standing valve cage. It will also be noted that the nut 37 is lifted slightly but not equal to the length of the screw 42. By turning the sucker rod 9, the nut 37 is screwed down until the head 38 contacts the bottom cross piece 35. A further turning of the sucker rod and the screw lifts the stem 26 and consequently the check 24. Often all that is desired is to flush the well or flush the pump, and this opening of the two valves, especially in connection with the arrangement of the crown 10 and edge 12 of the plunger allows the flowing back of the sand and matter that may have accumulated in the tubing in the well. It will be understood that in the normal operation of the pump, most of the sand during the active movement of the liquid is carried with it but where the pumping ceases in deep wells the deposit of sand from several thousand feet in the tubing is what gives trouble.

It will be noted that the yielding screw connection is near the top of the plunger. Where the sand is allowed to pass back into the plunger, it is apt to accumulate on this connection if it is arranged lower in the plunger. Where this happens, the sand clogs the action of the spring and throws out the yielding feature of the connection and the advantages arising from it. In the present construction this is obviated.

I do not claim broadly in this application the strap 28 formed integral with the plunger leaving the openings 29, said strap forming a wrench hold for the plunger nor this structure in connection with a screw threaded valve seat in the plunger as these features broadly considered form the subject matter of application #582,610, filed Sept. 19th, 1910.

What I claim as new is:

1. In a pump, the combination of a plunger having an internal screw thread near its top; a removable seat; and a crown having an annular screw threaded base screwed into the top of the plunger on to the seat, the annular portion of the crown being below the edge of the plunger.

2. In a pump, the combination of a plunger having an internal screw thread near its top; a collar screwed into the screw thread; a removable seat arranged on the collar; and a crown screwed into the top of the plunger on to the seat.

3. In a pump, the combination of a plunger having an internal screw thread near its top; a collar screwed into the screw thread; a removable seat arranged on the collar; and a crown screwed into the top of the plunger on to the seat, said crown having an annular portion at its base for its screw thread, this annular portion being below the edge of the plunger.

4. In a pump, the combination of a plunger having an internal screw thread near its top; and a crown having an annular screw threaded base screwed into the top of the plunger, the annular portion of the crown being below the top of the plunger.

5. In a pump, the combination of a plunger having an internal screw thread near its top; a removable seat; a crown screwed into the top of the plunger for securing the seat;

a plunger valve operating on the seat; and a sucker rod extending through the crown and secured to the valve for mechanically actuating the valve.

6. In a pump, the combination of a plunger having an internal screw thread near its top; a removable seat; a crown screwed into the top of the plunger for securing the seat; a plunger valve operating on the seat; and a sucker rod having a reduced extension extending through the crown and connected with the valve, said extension forming a shoulder with the sucker rod and adapted to engage the crown to limit the downward movement of the sucker rod relatively to the crown.

7. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; and devices for opening said valves to drain the pump.

8. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; and devices controlled by the sucker rod for opening said valves to drain the pump.

9. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; and devices for opening the valve to drain the pump and for lifting the standing valve with the plunger.

10. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; a yielding screw threaded connection between the sucker rod and the standing valve; and means acting with said connection for opening the standing valve.

11. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; a yielding screw threaded connection between the sucker rod and the standing valve; and means acting with said connection for opening the standing valve and plunger valve.

12. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; and a screw threaded connection for lifting the standing valve with the plunger.

13. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve in the plunger; a standing valve; means for mechanically actuating said valves with the reciprocation of the plunger; and a screw threaded connection, one member of which is yielding for connecting the standing valve with the plunger for lifting the standing valve with the plunger.

14. In a pump, the combination of a working barrel; a hollow plunger in the working barrel; a plunger valve near the top of the plunger; a screw member arranged near the top of the plunger; a standing valve; and a stem extending from the standing valve having a screw at the top thereof for engaging the screw member carried by the plunger.

15. In a pump, the combination of a working barrel; a hollow plunger in the working barrel; a plunger valve near the top of the plunger; a yielding screw member arranged near the top of the plunger; a standing valve; and a stem extending from the standing valve having a screw at the top thereof for engaging the screw member carried by the plunger.

16. In a pump, the combination of a working barrel; a plunger in the working barrel; a sucker rod connected with the plunger below the top edge of the plunger; a plunger valve near the top of the plunger; a screw member near the top of the plunger; and a stem extending upwardly from the standing valve adapted to be engaged by the screw member of the plunger.

17. In a pump, the combination of a working barrel; a plunger in the working barrel; a plunger valve near the upper end of the plunger; a sucker rod mechanically actuating the plunger valve, the plunger valve closing in an upward direction; a connection between the plunger and the sucker rod below the upper edge of the plunger; a connecting member carried in the plunger near its upper end; a standing valve; a stem extending upwardly from the standing valve and adapted to be connected with said member for lifting the standing valve.

18. In a pump, the combination of a working barrel; a standing valve; a plunger in the working barrel; a shoulder arranged in the bottom of the plunger; a stem extending upwardly from the standing valve and telescoping the plunger above the shoulder; means for forming a frictional engagement between the shoulder and the stem; and a shoulder on the upper end of the stem adapted to engage the shoulder on the plunger for lifting the standing valve.

19. In a pump, the combination of a working barrel; a standing valve; a plunger in the working barrel; a shoulder arranged in the bottom of the plunger; a stem extending

upwardly from the standing valve and telescoping the plunger above the shoulder; means for forming a frictional engagement between the shoulder and the stem; a screw on the upper end of the stem; and a screw carried by the plunger for engaging the screw on the stem.

20. In a pump, the combination of a working barrel; a standing valve in the working barrel formed with posts forming lateral openings; a check in the cage; a stem secured to the check; a projection on the check engaging the post, for preventing the turning of the check; a screw on the stem; a plunger in the working barrel; and a screw on the plunger adapted to engage the screw on the stem.

21. In a pump, the combination of a working barrel; a standing valve in the working barrel, said valve comprising a cage having posts forming lateral openings; a check in the cage; a stem screwed into the check; pins extending into the check and locking the screw, extending outwardly from the check and locking the check against turning; a screw on the stem; a plunger in the working barrel; and a screw on the plunger adapted to engage the stem.

22. In a pump, the combination of a working barrel; a plunger in the working barrel; a standing valve; an upward extension on the standing valve; means forming a frictional engagement between the plunger and extension for mechanically actuating the standing valve; a sucker rod; a plunger valve secured to the sucker rod and mechanically actuated thereby; and a screw connection for the upward extension of the standing valve actuated by the sucker rod for connecting the standing valve to lift the standing valve with the plunger.

23. In a pump, the combination of a working barrel; a plunger in the working barrel; a sucker rod; a plunger valve connected with the sucker rod and actuated thereby; a yielding screw member carried by the plunger valve; a standing valve; a stem extending upwardly from the standing valve; a shoulder on the lower end of the plunger; means for forming a frictional engagement between the shoulder and the stem; and a screw on the upper end of the stem for engaging the yielding screw on the plunger valve.

24. In a pump, the combination of a plunger having an internal screw thread near its top; a removable crown screwed into the screw thread with a downwardly faced seat; and a valve arranged in the plunger and operating from below on said seat.

25. In a pump, the combination of a plunger having an internal screw thread near its top; a crown screwed into the said screw thread; a seat within the plunger beneath the crown; and a valve operating upon said seat.

26. In a pump, the combination of a plunger having an internal screw thread near its top; a crown having an annular screw threaded base screwed into the top of the plunger, the annular base of the crown being below the top of the plunger; a valve seat beneath the crown; and a valve operating on the seat.

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

RUDOLPH CONRADER.

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