C. A. WAITZ.

PUMP.

APPLICATION FILED JAN. 15, 1909.

961,820. Patented June 21, 1910.

Fig. 1.

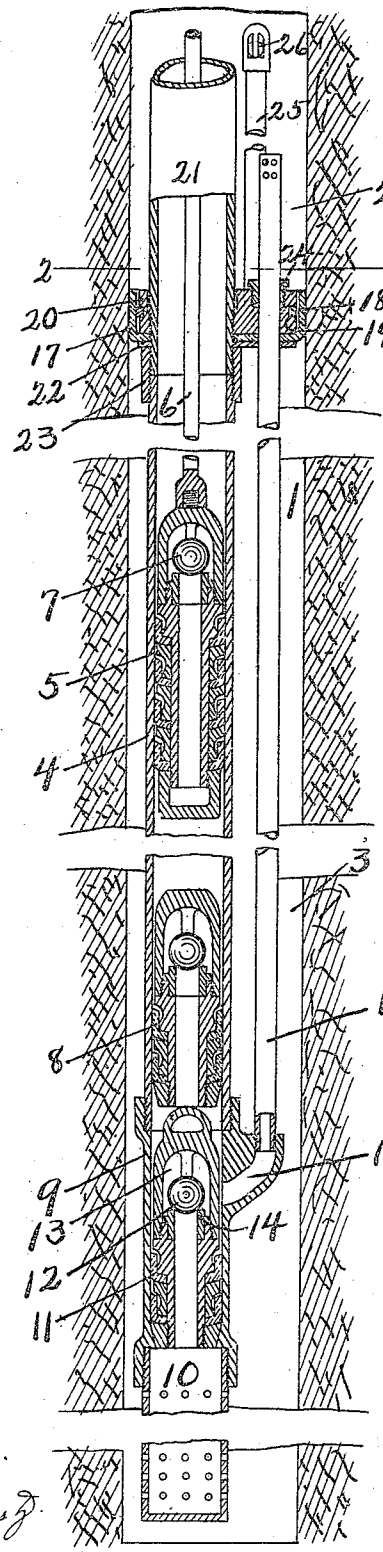


Fig. 2.

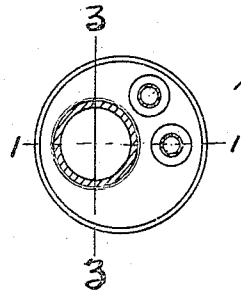
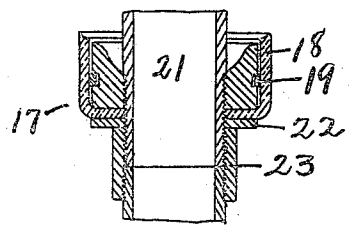


Fig. 3.



Witnesses
K. R. Kane.
J. J. Schmaltz.

Inventor
Charles A. Waitz
by W. L. Lord.
Attorney

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES A. WAITZ, OF ROUSEVILLE, PENNSYLVANIA.

PUMP.

961,820. Specification of Letters Patent. Patented June 21, 1910.

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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 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.

The object of the invention is to provide a pump which will pump liquids from different levels separately. As illustrated it is shown in an oil well. It often occurs in such wells that oil is pumped from different levels or different sands. In some instances the water or other ingredients from one sand is very detrimental when brought into contact with other sands or mixed with the liquid therefrom. This mixture has often become so objectionable that one of the sands would be entirely abandoned and separated out by a closure in the well. By using the improvement embodied in my invention the different sands may be separated by closures in the well, and the liquid from each sand pumped separately, so that the objectionable features with relation to the mixture of the liquid and otherwise is obviated.

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

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a central section through a pump arranged in a well, the section being along the line 1—1 in Fig. 2. Fig. 2 is a section on the line 2—2 in Fig. 1. Fig. 3 is a section on the line 3—3 in Fig. 2.

1 marks the well; 2 the upper level and 3 the lower level, each of which has a separate sand.

The pump is of the ordinary plunger type having the working barrel 4 and plunger 5. The plunger is operated by the usual sucker rod 6, and is provided with the plunger valve 7. The standing valve 8 is of the usual design and is arranged in the bottom of the working barrel.

A fitting 9 is connected to the lower end of the barrel, and the strainer 10 is connected to this fitting. A check valve 11 comprising the ball 12, crown 13, seat 14 are arranged in the fitting 11. The fitting has a side passage 15 from which extends a pipe 16 upwardly through a closure 17. The closure is formed with what is ordinarily termed a cup packer. It is provided with the cup 18 having the expanding ring 19. It has the central cup block 20. The cup block is screwed onto the tubing, and a washer 22 is arranged below the cup and secured by the couplings 23. The tubing is eccentric to the cup or closure as clearly shown in Fig. 3, so as to give room for the pipe connection 16. A gland 24 is arranged in the block 20 around the pipe. The pipe 16 extends upwardly above the closure, so as to maintain a liquid on the upper side to a desired depth to flood the upper sand if desired.

A gas pipe 25 extends through the closure and upwardly to a height above the highest point reached by the liquid in the well. It is preferably provided with a check valve 26 at its upper end to prevent any back flow of liquid through the pipe by an accidental rise in the level of the liquid above the top of the pipe.

The operation of the pump is as follows: When the pump is started, the upper level having the greater pressure of liquid, the liquid filling the barrel on the up stroke of the plunger comes entirely through the pipe 16, passing through the passage 15, crown 13 and standing valve 8. This operation continues until the level of the liquid above the closure is reduced to a point below the top of the pipe 16. In the further operation of the pump, the level of liquid in the pipe 16 is brought to a point below the level of the liquid in the well below the closure. When this point is reached the preponderance of the pressure of the liquid below the closure will assure the filling of the pump barrel by a movement of liquid from below the closure past the check valve 11 and standing valve 8 to the working barrel. In this way the liquid from the different levels is worked separately and successively and from the upper level first and then automatically from the lower level.

In pumping most oil wells, especially those for which this invention is particularly designed, the pumping is only for a short period. In other words, the well is pumped out at intervals, and then the oil is allowed to accumulate for a succeeding pumping. The pumping period is ordinarily so small compared to the time allowed for accumulating, that the accumulation in

the upper chamber does not interfere with the practical operation of the pump.

I prefer to have the passage 15 directly opposite the valve seat 14, so that as the liquid is pumped from the upper level any deposit of sand on the valve 11 is prevented.

It will be noted that the cup packer is expanded so as to make a complete closure by the split ring spring 19. This spring 19 is not of sufficient strength to expand the cup when dry. The packing can therefore be readily put in place in the well, and then as the cup softens under the influence of the liquid, the spring will expand to the walls of the well, so as to assure a complete closure.

What I claim as new is:

1. In a pump, the combination of a closure for separating the liquids to be pumped into different levels in a well; and pumping mechanism for pumping said levels separately.

2. In a pump, the combination of a closure for separating the liquids to be pumped into different levels in a well; and pumping mechanism for pumping said levels separately and successively.

3. In a pump, the combination of a closure for separating the liquids to be pumped into different levels in a well; and pumping mechanism for pumping said levels separately, the upper level first and then automatically changing to the lower level.

4. In a pump, the combination of a closure for separating the liquids to be pumped into different levels in a well; and a pumping mechanism for pumping said levels separately, the upper level first and then the lower level.

5. In a pump, the combination of a closure separating the liquid to be pumped into different levels; a pumping mechanism; and a connection between the upper level and the intake of the pumping mechanism, said pump being arranged to pump the liquids from the different levels separately.

6. In a pump, the combination of a closure for separating the liquids to be pumped into different levels; a pumping mechanism; and a pipe connecting the upper level with the intake of the pump, said pump being arranged to pump the liquids from the different levels separately, and automatically changing from one to the other.

7. In a pump, the combination of a closure for separating the liquid to be pumped into different levels in a well; a pumping mechanism; and a pipe connecting the upper level with the intake of the pump, said pump being arranged to pump the liquids from the different levels separately, first the upper level and then automatically changing to the lower level.

8. In a pump, the combination of a closure for separating the liquids to be pumped into different levels in a well; a pumping mechanism; and a pipe connecting the intake of the pump and extending through the closure and above the closure, said pump being arranged to pump both of said levels.

9. In a pump, the combination of a closure for separating the liquids in a well into different levels; a pipe extending through the closure and above the same for carrying liquid from the upper level to the pump, said pump being arranged to pump said levels separately; and a gas escape pipe extending above the connecting pipe.

10. In a pump, the combination of a working barrel; a plunger in the working barrel; two check valves for preventing a back flow of liquid; a closure for separating liquid into different levels; a pipe connected with the pump between the check valves and connecting the level above the closure with the pump.

11. In a pump, the combination of a working barrel; the fitting 11 secured to the working barrel and having a side passage 15 therein; a closure above the side passage; and a pipe 16 connecting the side passage with the space above the closure.

12. In a pump, the combination of a pumping mechanism, comprising a working barrel; a tubing above the working barrel and connected therewith; a closure comprising a cup; a cup block screwed onto the tubing; a washer below the cup; a tubing coupling arranged against the washer; and a pipe connecting the lower end of the working barrel with the level above the closure.

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

CHARLES A. WAITZ.

Witnesses:
K. R. KANE,
C. D. HIGBY.