Nov. 2, 1926.

G. C. JOHNSON

1,605,114

OIL WELL PUMP

Filed March 6, 1926

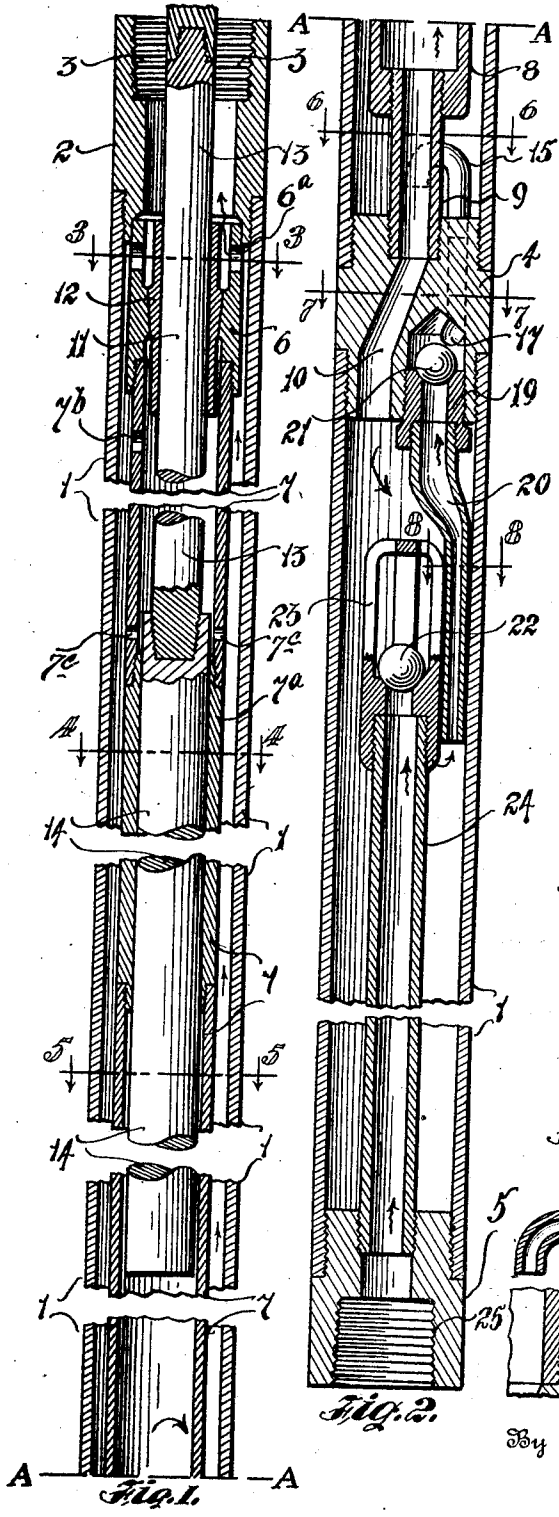

Fig. 1.

Fig. 2.

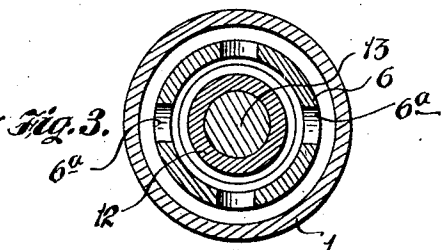

Fig. 3.

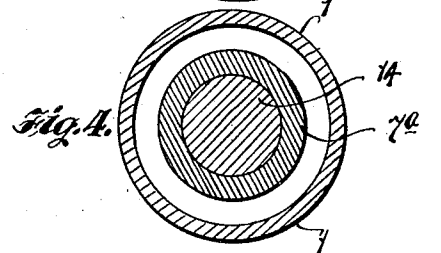

Fig. 4.

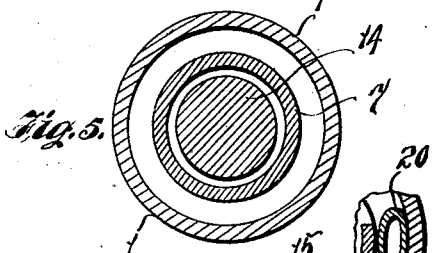

Fig. 5.

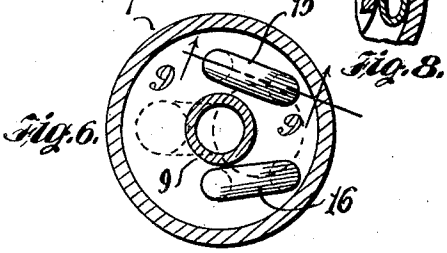

Fig. 6.

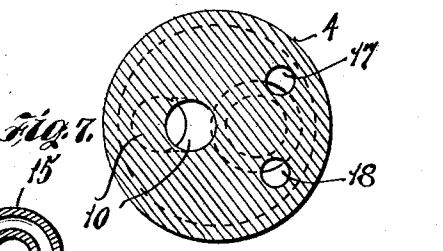

Fig. 7.

Fig. 8.

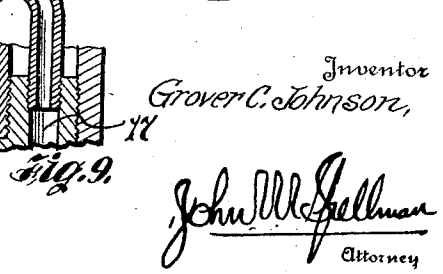

Fig. 9.

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UNITED STATES PATENT OFFICE.

GROVER C. JOHNSON, OF WICHITA FALLS, TEXAS.

OIL-WELL PUMP.

Application filed March 6, 1926. Serial No. 92,929.

This invention relates to new and useful improvements in pumps for oil wells and has for one of its objects to provide a practical and efficient oil well pump, novel in construction and adapted to prevent sand in the well from settling or interfering with the working parts. Particular provision is also made in the pump for removing and replacing of worn parts, such operation being possible of attainment by the novel assembling of the pump parts.

Another particular object of the invention is to provide a sand pocket for trapping of sand, such assembly and novel arrangement of the parts as indicated above lending particular advantage in this connection.

Other important objects, in addition to those hereinbefore mentioned, will be clearly understood by reference to the following detailed description, taken in connection with the accompanying drawings and wherein—

Figure 1 is a longitudinal sectional view of the upper part of the pump, and Figure 2 is a similar view of the lower portion thereof, the pump being divided along the line A—A for the sake of convenience of illustration.

Figures 3, 4 and 5 are cross-sectional views along the lines 3—3, 4—4 and 5—5, respectively, of Figure 1.

Figures 6, 7 and 8 are also cross-sectional views of the lower part of the pump below the line A—A in Figure 2, and

Figure 9 represents a detailed longitudinal sectional view of the goose-neck ports through which the oil passes in its travel.

Proceeding in accordance with the drawing, and wherein numerals are employed to designate the various parts throughout, 1 denotes the outer pump casing, having an upper connecting head 2, internally screw-threaded at 3 for connection to additional tubing lengths leading to the top of the well. A connecting head 4 joins the pump casing or tubing at the center and a third head 5 forms the end of the pump.

Slidably disposed in the head 2 inside the casing 1 is a cylindrical member 6 to which are suspended the several connected lengths 7—7 comprising the pump or plunger barrel. The lower end 8 of this barrel has a reduced end and forms a connection with a tubular member 9, the latter being joined to and having open communication with a port 10 in the central head 4.

The central portion of the member 6 forms a removable sleeve 12 through which the polish rod 13 reciprocates in the operation of the pump, and 14 is the piston working in its barrel 7 and connected to the polish rod 13. The piston 14 fits tightly in that portion 7^a of the barrel, as shown in Figure 1, while the adjacent lengths 7—7 afford a freer movement.

Reference being had to Figure 3, it will be seen that the oil is permitted to pass out from the pump through the spaced ports 6^a, these ports having communication with the annular space between the casing 1 and the barrel comprising the tubular lengths 7 and 7^a. The upper end of one of these tubular lengths has also a port 7^b, the object thereof being to provide lubrication for the piston 14 in its travel through the tubular length 7^a. The upper end of tubular length 7^a is perforated at 7^c for permitting any sand which may enter through the openings 6^a and 7^b to fall upon the head 4.

Referring to Figures 2, 6 and 7, wherein is illustrated the head 4, the tubular member 9 connecting the lower end of the lengths 7 and 7^a of the pump barrel to the head 4. The head 4 has the lower opening on the lower end of the head off the center thereof and directed diagonally upward, terminating in the upper central part of the head and thereby permitting the oil to pass through the tubular member 9. Disposed on opposite sides of the nipple are two goose-neck ports 15 and 16. The object of these ports 15 and 16 is to prevent sand from settling on the ball valve 21. Both of these ports are disposed in the head 4 and so arranged that they have communication with the openings 17 and 18 in the head. These openings are inwardly converged at the lower ends and communicate with a bushing 19 connected to a nipple 20, the latter of which is bent and directed over toward the wall of the casing 1, well below ball valve 22, normally seated over the upper end of the nipple 19. Any sand is prevented from settling upon the ball valve 22.

A second ball valve 22 is seated in a cage 23 secured to a tubular member 24 which provides an entrance means for the oil passing upward through opening 25 in the end of head 5. The end of the head is interiorly screw-threaded for the purpose of connecting and further extending the tubing.

In the operation of the pump, on the upward stroke of the piston 14, oil is drawn in-

ward and upward through the opening 25, thence through the tubular member 24, unseating the ball valve 22. The oil or other liquid then passes through port 10, thence in the direction of the arrows into the pump barrel. The oil is drawn upward to approximately the position shown by the upper curved arrow just below the lower end of the piston. When the piston has reached this position it begins its downward stroke and the liquid is forced downwardly, closing the ball valve 22 and the pressure forces the oil upwardly through the nipple 20, thence into the goose-neck ports 15 and 16, the ball valve 21 being forced from its seat. The oil then enters the annular space between the pump barrel and casing and passes as indicated by the arrows upwardly, thence through the ports 6^a out of the well. The object of directing the nipple over towards the wall of the casing is to permit fluid to be drawn up below ball valve 22 and prevent sand from settling on the valve.

Any sand will be caught and trapped on the top of the head 5 and also be caught upon the head 4. The arrangement and provisions of the cylindrical member 6 and sleeve 12 effectually prevents sand from effecting the reciprocation of the piston, ample lubrication being supplied through the opening 7^b, and the arrangement of the slightly larger diameter of the tubular lengths 7—7.

It is obvious that modifications and alterations may be made in the construction of the pump in keeping with the appended claims.

What is claimed is:

1. An oil well pump comprising an outer cylinder of divisional lengths, a pump barrel, a piston rod, a piston of elongated formation reciprocable within the pump barrel; a centrally disposed head connecting the lengths of the cylinder, said head including an arrangement of ports to permit oil to pass in opposite directions in its passage from the well; said pump barrel provided with a lubricating arrangement comprising an opening for oil in said barrel.

2. An oil well pump as set out in claim 1 and wherein said centrally arranged head includes a diagonally disposed port for upward and downward passage of oil on the upward and downward stroke of the piston, and a lower port disposed to one side of the inflow of oil from the well and extending below a ball valve; and upper ports on the top of and communicating with said head to permit passage of oil upward again on the downward stroke of the pump.

3. An oil well pump as set out in claim 1 and wherein said pump barrel includes a slidable cylindrical member with a removable sleeve through which the piston reciprocates, and annularly-spaced outlet ports for oil from the pump, said ports having open communication with an annular space formed by the walls of the barrel and said casing.

4. An oil well pump comprising an outer cylinder of divisional lengths, a pump barrel, a portion of said pump barrel having a reduced inside diameter for tightly embracing the piston; said pump barrel attached to a centrally disposed head connecting said divisional lengths by means of a tubular member; and goose-neck ports on the head.

5. An oil well pump as set out in claim 4 and wherein an annular space is formed between said pump barrel and cylinder, said space providing in conjunction with said centrally disposed head, a sand pocket.

6. An oil well pump comprising an outer cylinder, a pump barrel, a centrally arranged connecting head, a lower cylinder connected thereto; said head including goose-neck members having communication with ports in said head and disposed at the top of the head: and a nipple with a ball valve forming the entrance of oil in the lower end of said head and communicating with said goose-neck ports.

7. An oil well pump as set out in claim 4 and wherein said head has a port opposite said goose-neck ports and communicating with said tubular member from the lower end of the barrel and providing a separate passage for liquid through the head.

In testimony whereof I affix my signature.

GROVER C. JOHNSON.