R. Cornelius

Oil Pump

No. 53,117. Patented Mar. 13, 1866.

Fig. 1.

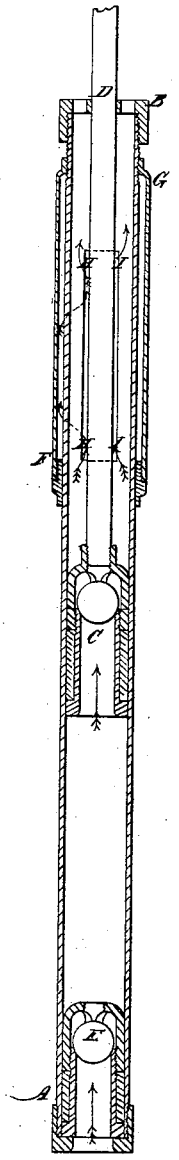


Fig. 2.

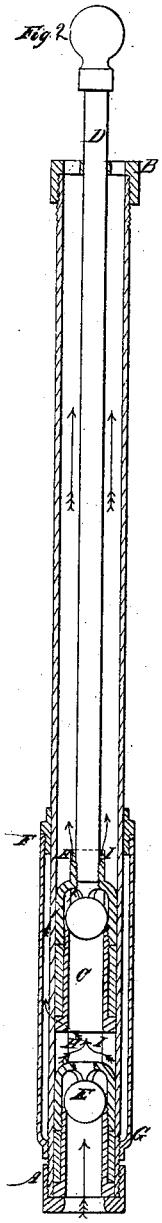


Fig. 3.

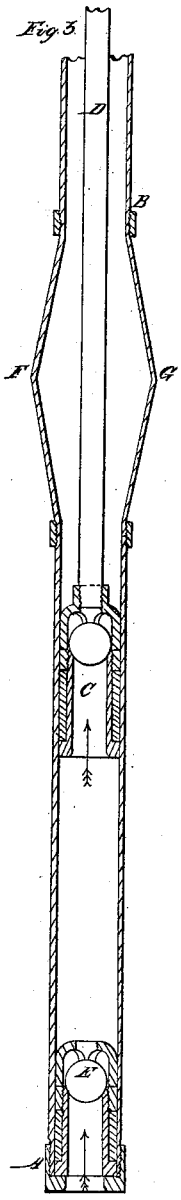
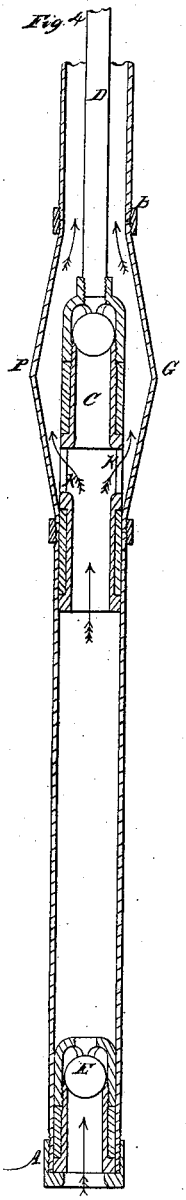


Fig. 4.



Witnesses

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ROBERT CORNELIUS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PUMPS FOR DEEP WELLS.

Specification forming part of Letters Patent No. **53,117**, dated March 13, 1866.

To all whom it may concern:

Be it known that I, ROBERT CORNELIUS, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Pumps for Oil-Wells; and I do hereby declare the following to be a full and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and in which—

Figure 1 is a vertical section of my improved pump; Fig. 2, a modification of my improved pump; Figs. 3 and 4, are vertical sections, showing alternative forms of my improved pump.

Numerous attempts have been made to overcome the difficulty in the use of the ordinary oil-pump arising from the fact that the heavy column of fluid in the tube above the pump, pressing upon the upper puppet-valve, keeps it in its seat while the piston is descending. Consequently the descent of the piston merely condenses the gas in the pump-chamber, and when the piston ascends this condensed gas only expands. Consequently no vacuum is produced below the piston. Therefore the entrance of oil into the pump at its lower extremity does not take place. In such pumps, where there is much gas in the well the piston continues to operate for a length of time without producing any apparent defect in raising gas or oil from the well.

The nature of my improvement consists in enlarging the pump-chamber, either at one or both ends of the stroke of the piston, so as to form a circumferential passage for the escape of the gas between the exterior of the piston and the wall of the enlarged chamber, for the purpose of enabling the gas to escape by the piston.

In Fig. 1, A B represent the ordinary pump-chamber, usually about five feet long and one and three-fourth inch in diameter. C is an ordinary piston with its ball-valve. D is the ordinary piston-rod, and E is the ordinary ball-valve at the lower part of the pump-chamber. In these respects the figure represents a common pump. At F G, I surround the exterior of the pump-tube by another tube, F G, two and one-half inches in diameter and twelve inches long, forming an annular passage or chamber one-fourth of an inch wide all around the walls of the pump-chamber. This exterior tube is screwed to the pump-tube at both extremities, as shown at F and G. One or more vertical slots or apertures, H I, are made communicating between the interior of the pump-chamber and the exterior chamber, F G.

The operation of the exterior chamber, F G, in connection with its passages is as follows: As the the piston ascends it draws the gas, or oil containing a great quantity of gas, into the chamber, and when the piston has passed the point F the gas from below escapes laterally, by reason of its levity and the pressure of liquid above, through the passages H and I, as shown by the arrow. The place occupied by the gas is replaced by liquid from above coming down through the exterior chamber and the slotted passages. The pump-chamber below the piston is thus filled with fluid instead of gas, and as the piston descends the upper valve freely opens as the piston slides down. If there be a supply of fluid, either oil or water, below, the pump will raise this up as an ordinary pump; but if gas enters the pump-chamber it will be forced up, as stated. Thus the piston can never be occupied in merely condensing gas, as in the ordinary pump, but must either raise a column of fluid or compel a column of gas to ascend.

Instead of placing the enlarged chamber F G at the upper end of the pump-chamber, as in Fig. 1, it may be placed at the lower extremity of the pump-chamber, as in Fig. 2. In that case, when the piston descends, if there be a supply of gas below, it condenses the gas until the piston has passed the point G, when the gas escapes upward through the lateral openings H I from below, around the top of the piston, and escapes through the tube. When there is fluid (oil or water) below it operates as an ordinary pump.

Instead of a separate annular chamber, as in Figs. 1 and 2, with slotted passages of communication, an enlargement of the cylinder, as shown at F G, Figs. 3 and 4, will answer the same purpose, and to prevent the piston in such cases from wabbling in the enlarged passage a guide tube or socket covered with leather, with side openings, K K, may be used to guide the piston.

My improvement may be applied at either end or at both ends of the piston-chamber.

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

The supplemental annular chamber at one or both ends of the stroke, so as to form a circumferential passage for the escape of the gas between the circumference of the pump-cylinder and the enlarged chamber, substantially as described.

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Witnesses:
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