(No Model.) 2 Sheets—Sheet 1.

W. H. CLOUD.

PUMP.

No. 345,116. Patented July 6, 1886.

Fig. 1.

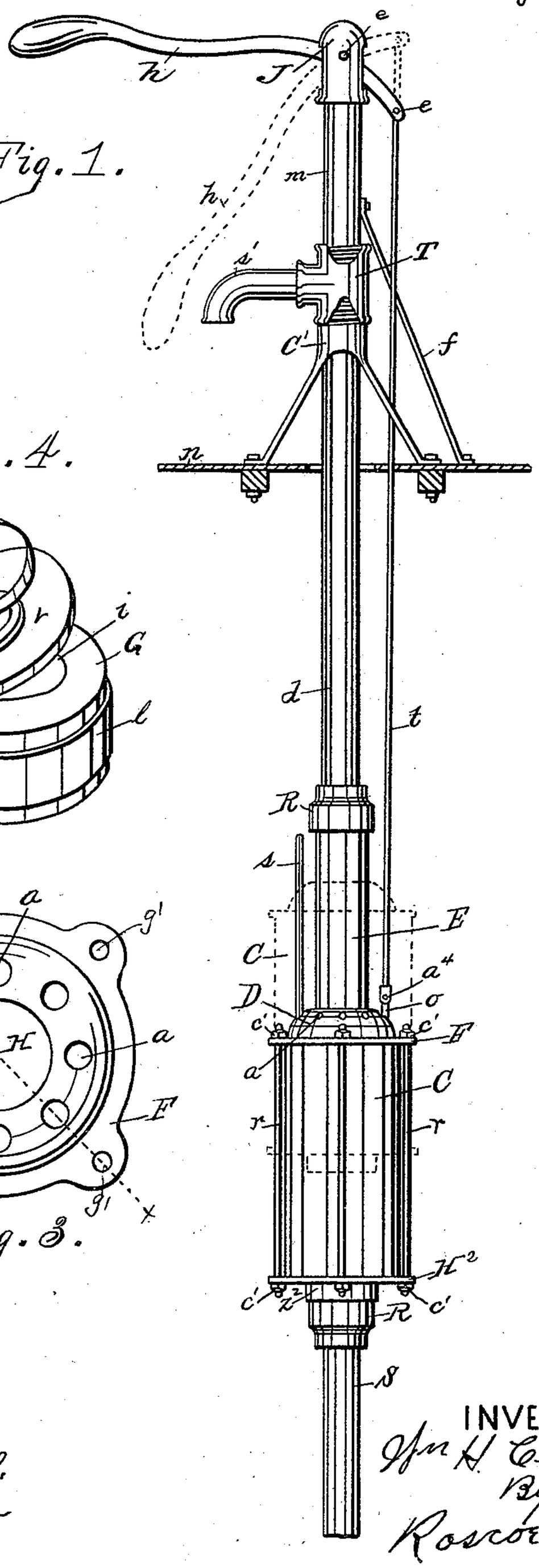

Fig. 4.

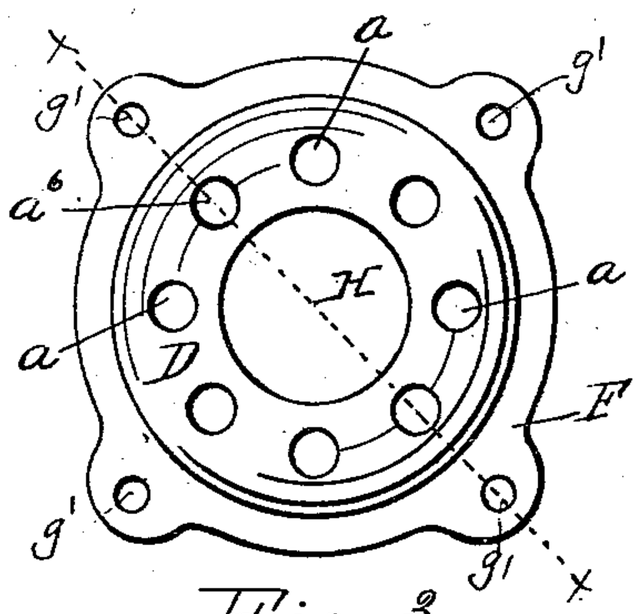

Fig. 3.

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(No Model.)

2 Sheets—Sheet 2.

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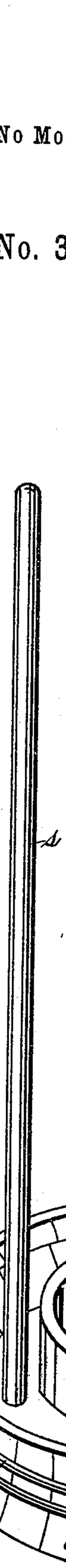


Fig. 2.

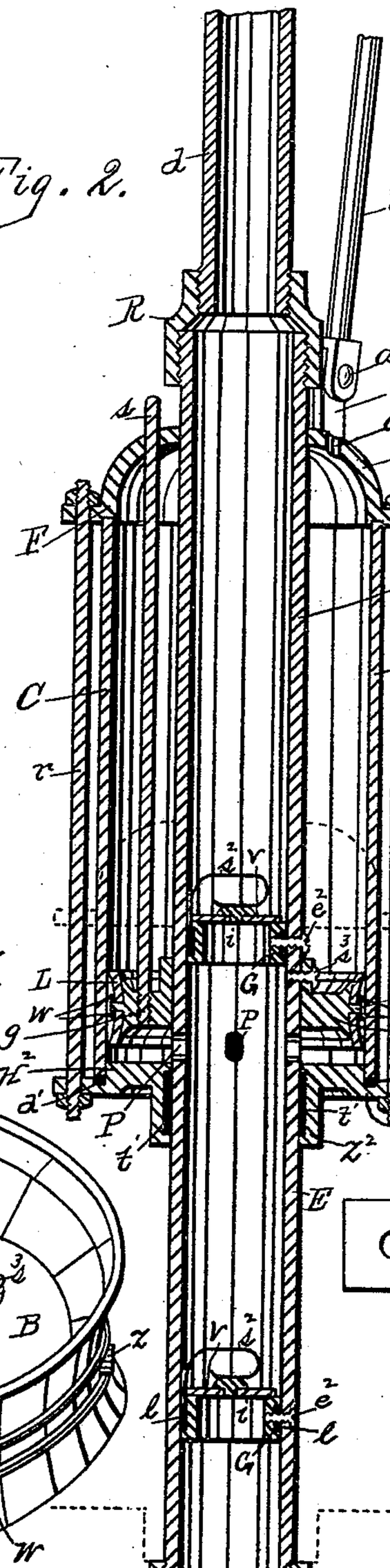


Fig. 6.

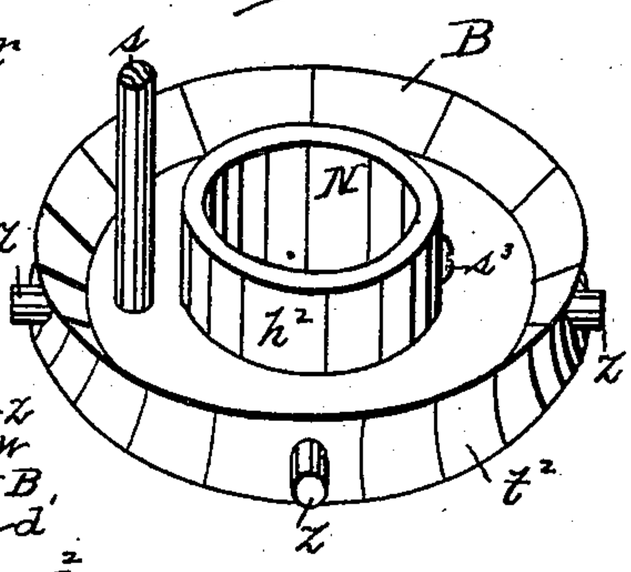


Fig. 5.

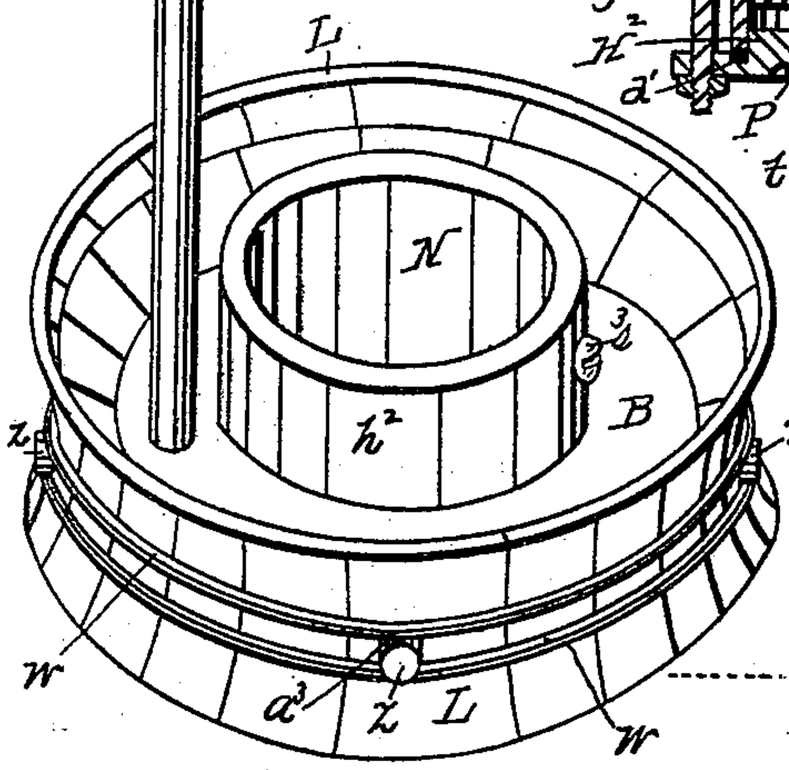
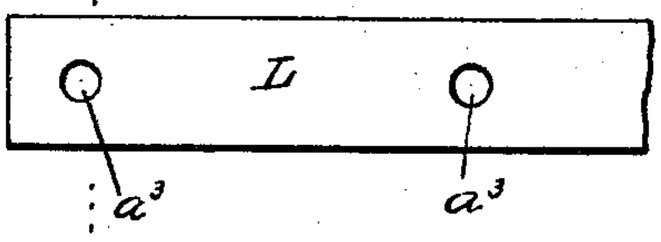


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM H. CLOUD, OF DETROIT, MICHIGAN.

PUMP.

SPECIFICATION forming part of Letters Patent No. 345,116, dated July 6, 1886.

Application filed March 5, 1886. Serial No. 194,036. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. CLOUD, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of pumps known as "deep-well" pumps, in which the cylinder of the pump is suspended within the well and below the freezing-point. The cylinder in the act of pumping is raised and lowered by means of the ordinary pump-handle. The piston-head is fixed stationary, over which the cylinder travels in its up and down movements, causing in its downward movement a vacuum in the cylinder, whereby the water is lifted from the well into the cylinder, the water being discharged from the cylinder and the pump by the upward movement of the cylinder, as hereinafter fully set forth. In the construction of this pump but one water-tight joint is required, that being in the lower head of the cylinder C; and my invention consists in the arrangement of parts, as hereinafter set forth, and pointed out particularly in the claims.

In the drawings forming a part of this specification, Figure 1 is a perspective, in elevation, of my invention. Fig. 2 is an enlarged longitudinal section of same on dotted line *x x* of Fig. 4. Fig. 3 is a top view of upper cylinder-head and its dome. Fig. 4 is an enlarged view of the valves. Fig. 5 is an enlarged isometrical perspective of the piston and its guide-pin. Fig. 6 is an isometrical perspective of the piston, having the packing or leather covering removed from the concave of its periphery. Fig. 7 is a view of the leather covering partly broken away.

In the drawings, E represents the inner stationary cylinder. At the center of its longitudinal length I locate a series of port-holes, P, and over said port-holes I locate the upper valve, G, being secured within the cylinder E by means of a set-screw, e^2. Said valve has a discharge-opening, *i*, through the center, over which I locate the common leather cap *v*. On said leather cap I locate a metal weight, a^2, upon which the free end of the spring s^2 presses, as clearly shown in Figs. 2 and 4. *l* is a packing surrounding the body of the valve. Said valve is made large enough to fill snugly the hollow of the cylinder E, as clearly shown in Fig. 2. I locate another valve, G, being a duplicate of the one described, in said cylinder near its lower end, as clearly shown in Fig. 2. I attach to each end of said cylinder a coupling or reducer, R, one being screw-threaded to said cylinder and screw-threaded to receive a suction-pipe, S, leading to the water, the other screw-threaded to receive a discharge-pipe, *d*, as shown in Figs. 1 and 2. Said pipes are of a less diameter than the cylinder E. I attach surrounding said stationary cylinder a piston, B. Through the hub h^2 of said piston I form a hole, N. Through said hole the cylinder E is inserted, and by a set-screw, s^3, through the hub said piston is firmly secured to the cylinder at its longitudinal center.

The periphery of the piston I form concave, as shown at t^2 of Fig. 6. Projecting horizontally from the center of the concave is a series of pins or studs, *z*, as shown in Figs. 2, 5, and 6. I cover the periphery of the piston with a packing, such as leather.

In Fig. 7 I show a strip of leather. This I cut wider than the face of the periphery of the piston and long enough to pass around the piston. I punch through the leather a series of holes, a^3, which are so located in the leather that said holes will register with and pass freely over the series of studs *z* of the piston, as clearly shown in Figs. 2 and 5. I then confine the covering L to the piston by winding a wire, *w*, over the covering above and below the series of studs *z*, as shown in Figs. 2 and 5. These studs project through the covering or packing far enough to separate the wires *w* and prevent them from coming together and to form two bearings around the leather. This piston I locate in the traveling cylinder C, as clearly shown in Fig. 2. Said cylinder is provided with a traveling head, H^2, at the lower end. Said head has a neck, z^2, which fits snugly over the stationary cylinder E. The neck of said head is chambered, within which I locate

a packing, t'. (See Fig. 2.) d' represents a packing around the lower end of the cylinder C where it joins the lower head.

I attach to the upper end of the cylinder a traveling head, F, its central portion forming a dome, D. Through said dome is a hole, H, to receive freely the stationary cylinder E, as shown in Figs. 2 and 3. Surrounding the hole H in the dome is a series of vent-holes, *a*, for the admission and discharge of air to the cylinder C, as it is raised and lowered, as will be hereinafter fully explained.

Passing through the holes g' of the heads F and H^2 of the traveling cylinder are rods *r*, which are provided with nuts c' at each end, by which the heads are firmly bound to the cylinder. I anchor firmly in the upper face of the piston B a guide-rod, *s*, being screw-threaded to the piston, as shown at *g* of Fig. 2. Said rod is longer than the distance traveled by the cylinder C. Its upper free end projects freely through the hole a^6 in the dome of the cylinder C, as shown in Figs. 1, 2, and 3. The object of this rod is to prevent the cylinder C from turning on the cylinder E as it is moved up and down. Projecting from the cap F is a lug, *o*, to which I pivot at a^4 the operating-rod *t* of the pump. The other end of said rod extends upward through the well-top, and is attached to one end of the pump-handle *h*, as shown at e^5 of Fig. 1. The discharge-pipe *d* extends upward through the well-top *n* and chair C'. To its upper end I attach the coupling T, and by the chair and coupling the pump is suspended in the well. I attach to the upper end of the coupling an extension-pipe, *m*, which is provided at the top with a cap, J, in which I fulcrum the handle *h*. Said pipe acts also as an air-chamber. I attach to the pipe *m* and the well-top a brace-rod, *f*, and to the horizontal opening of the coupling T, I attach the spout s' of the pump.

The operations are as follows: When the pump-handle *h* is raised from the dotted position of Fig. 1 to its normal position, the cylinder C moves down from the dotted position of Fig. 1 to its normal position, and when the handle is thrown down to the dotted position of Fig. 1 the cylinder C rises to the dotted position of Fig. 1 and the position shown in Fig. 2. It will be observed as the cylinder C is is moved down from the position of Fig. 2 a vacuum is formed in said cylinder below the stationary piston B, thus producing a suction in the lower half of the stationary cylinder E, causing the lower valve, G, to rise and the water to flow through the series of port-holes into the descending cylinder C, and as said cylinder ascends the lower valve closes, when the water in the cylinder C below the piston is forced back through the ports P and up through the upper valve, G, said valve opening, as shown in Fig. 4, when the water will be forced out through the spout of the pump. As the cylinder C rises and falls the air passes in and out at the holes *a* of the dome.

Having thus fully set forth my present invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pump, the combination of the stationary cylinder, having port-holes P and valves G located therein, the discharge and suction pipes coupled to said cylinder, the piston made fast to the cylinder, the guide-rod anchored to the piston and passing through the dome, the traveling cylinder, its lower head being air-tight, its upper head or dome having a series of air-holes, and mechanism for reciprocating the traveling cylinder, as and for the purposes specified.

2. In a pump, the combination of the stationary cylinder, having port-holes midway of its length, the valves located in said cylinder, the suction and discharge pipes joining said cylinder, the said cylinder, the guide-rod anchored to the piston, the traveling cylinder, its head adapted to travel over the stationary cylinder, the lower head having a packing around the stationary cylinder, the upper head having a dome in which is a series of air-holes, the guide-rod of the piston working through the upper head, the bolts for securing the heads to the traveling cylinder, and means for operating said traveling cylinder, substantially as specified.

3. In a pump, the combination of the stationary cylinder, its port-holes and valves, the piston anchored to said cylinder, the guide-rod anchored to the piston, the traveling cylinder moving over the stationary cylinder and having a dome with air-holes therein, the guide-rod passing through said dome, and means for operating the traveling cylinder, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. CLOUD.

Witnesses:

R. B. WHEELER,

C. W. RUSSELL.