F. S. Pease.

Oil Pump.

No. 51,965. Patented Jan. 9, 1866.

Fig. 1.

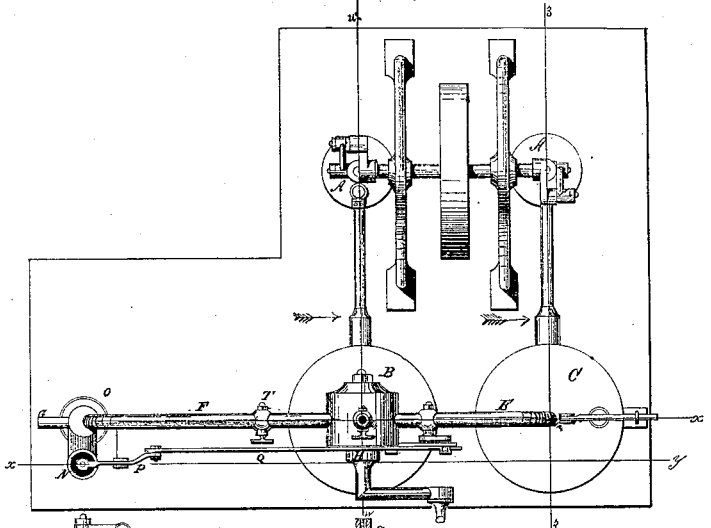


Fig. 2.

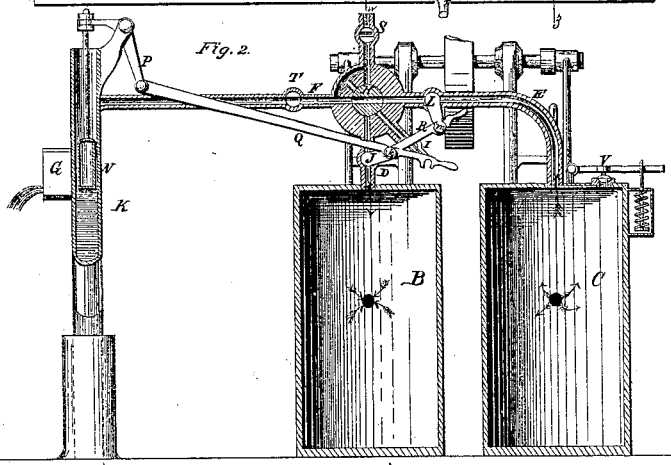


Fig. 4.

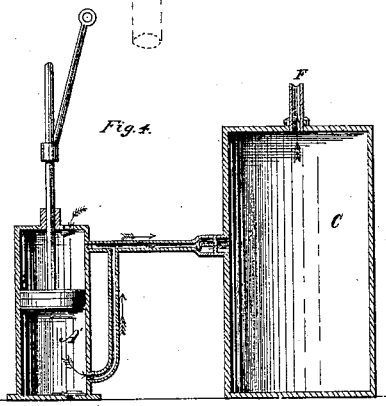
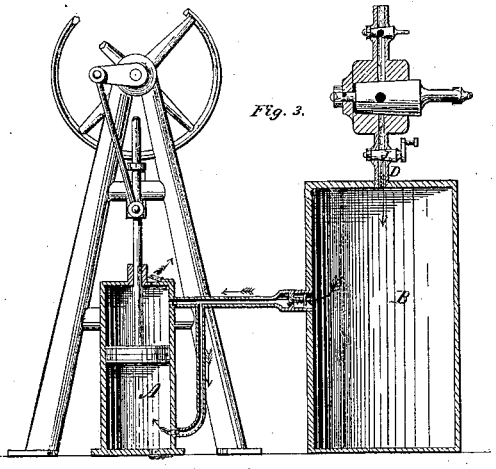


Fig. 3.



Witnesses.

Edward H. Knight

W. F. Ball.

Inventor.

F. S. Pease.

UNITED STATES PATENT OFFICE.

F. S. PEASE, OF BUFFALO, NEW YORK.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **51,965**, dated January 9, 1866.

To all whom it may concern:

Be it known that I, F. S. PEASE, of the city of Buffalo, in the county of Erie and State of New York, have made new and useful Improvements in Pumps for Mining and Oil-Wells; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to which my invention appertains to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a plan or top view of my apparatus. Fig. 2 is a vertical section through the centers of the cylinders, but showing the valve-rods in elevation, and is on the lines *x x* and *x y*, Fig. 1. Fig. 3 is a transverse vertical section on the line *w w*, Fig. 1. Fig. 4 is a transverse vertical section on the line *z z*, Fig. 1.

The same letters refer to corresponding parts in the several figures.

The improvement relates to the method of regulating the action of the exhaust and pressure apparatus, by means of which an alternate action or pulsation is communicated to the air in the pump-tube to alternately fill and empty the pump-chamber, which is situated deep in the well.

The immediate feature of improvement consists in making the pump self-regulating by causing the liquid which rises in the well-tube to so act upon a float as to move the cocks which open and close the pipes which connect the exhaust and pressure chambers alternately with the pump-tube.

Some portions of the apparatus shown in the drawings are only exhibited to show the design and connection of the several parts, and do not form the subject-matter of the present invention. The air-pump and its connected exhaust and pressure chambers, with the rotary valve or cock which makes the changeable connections, are not new features, but have been before exhibited by me in previous specifications. The present improvement, I repeat, consists in the method of causing the matter which rises in the well-tube to act upon the cocks to modify the action of the air passing to and from the exhaust and pressure chambers respectively.

A A′ are the cylinders of an air-pump, the former communicating by valved passages with the exhaust-chamber B and the latter with the pressure-chamber C. The action of the air-pumps is continuous upon the air in the chambers with which they communicate—in the one, B, to withdraw it and produce a partial vacuum, in the other, C, to condense the air therein. The arrangement of valves for this purpose is probably sufficiently evident from an examination of the drawings, and is not peculiar to my present improvement.

The chambers B and C connect, by pipes D and E, with the pipe F, which passes down the well-tube to the pump, which is located deep in the well. The object, as I have said, is to communicate a pulsative motion to the air in the said pump-tube F, so that by lifting the air or diminishing its pressure the oil or water in the bottom of the well may be caused to enter the pump, and then, by increasing the pressure of the air in said pump-tube, to drive the contents of the pump-chamber out of the same and up through the well-tube to its exit at the spout G. This is accomplished by alternately connecting the pipe F with the pipes D and E by means of the rotary valve H, which revolves continuously, and by means of its one through-passage consecutively connects the pipe F with the air-pressure chamber C, as shown in Fig. 2, then with the open air by means of pipe I, Fig. 2, and then with the vacuum-chamber B by means of pipe D, so that the action following the order last stated is, first, to fill the pipe F with a condensed column of air; secondly, to allow it to escape and attain its normal or outside pressure; and, thirdly, to partially exhaust the air from pipe F. Each of these three connections is made twice in one revolution of the valve. There is, however, nothing peculiar to this invention in the said valve, as it forms the subject of a patent granted to me.

I now come to speak of the peculiar features of my improvement, which consists of a self-regulating arrangement by which the action of the previously-described apparatus is modified according to the varying circumstances of the case—such, for instance, as the lessening of the depth of water in the well under continued pumping. The well, when the pumping commences, may have a very considerable

depth of water, so that as the pressure of the column of air is reduced in the pipe F it may rush rapidly in through the valve-opening in the bottom of the pump-chamber, to which the pipe F is connected. As the water falls in the well it will not have so great a tendency to rush into the said chamber under the diminished height of the column, and it will be necessary, therefore, to somewhat increase the exhaust, which is done by turning the cock J, which regulates the passage of air through pipe D to the exhaust-chamber B. The means by which I cause the rising liquid in the well-tube to perform this motion of the cock J will be presently described.

In pumping water from wells in which springs are continually running in and keeping the water at an even height, or when the column is of a sufficient height, the vacuum may be disconnected and the pulsation be kept up by the alternate pressure from chamber C and the relief afforded by the waste I; but when the water sinks in the shaft, and the consequent pressure is relieved which forced the water into the pump-chamber, the vacuum is connected so as to draw the water in. This requires regulation, and it is done by means of the float K and the connections to the valves J and L, which control the passages D and E from the pressure and exhaust cylinders proceeding to the well through pipe F, for when the pressure of the column of water is so reduced that it does not fill to the former extent the chamber, then air rushes in, and, expanding as it rises, makes an eruption at the top, which raises the float and increases the valve-opening in the pipe leading to the vacuum-chamber, while it decreases the supply of compressed air, and thus reduces the latter while it increases the draft which fills the chamber.

The float K moves up and down in the chamber N, which is connected to the well-tube, so that the height of water in chamber N and well-tube O are the same, and the float is connected by a rod to the rocking arm P, and that to the connecting-rod Q, which sets upon a stud, *k*, or wrist on the arm R, so as by its motions to rotate the cock J, while the arm R, resting on a wrist, *m*, connected to the cock L, communicates motion to it.

The connecting-rod Q may be joined to the wrist *m*, so as to influence the cock L alone; or the arm R may be withdrawn from the stud *m*, so as to influence the cock J alone; or, as in Fig. 2, the connections may be made to both the cocks which command the passages from the vacuum and the exhaust chambers respectively.

The spout G has an orifice of the proper sectional area; but it is made high and narrow, so as to cause the water to have a greater range of vertical motion in the pump-stock, and consequently give the float a greater range of motion.

The vacuum and pressure chambers are provided with check-valves, so as to prevent back action of the air.

The waste-pipe I has a cock or valve to regulate the size of the waste-orifice.

The pipe S leads to other wells, if required.

The cock T in the pipe F is for the purpose of closing the compressed air within the pump-tube, so that when the pump is out of use the tube may remain full of compressed air, and prevent the entrance of air, sand, or other extraneous matters and hold the pump-valves forcibly down.

The pressure-cylinder C is provided with a safety-valve to guard against excessive pressure therein.

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

1. The combination of the float on the water in the pump-stock, or in a chamber connected therewith, with the necessary connecting portions, such as the rod, the rocking arm P, and the rod Q and the cocks (or either of them) which regulate the passage of the air through the pipes D and E, which connect with the vacuum and pressure chambers respectively.

2. The vertically-elongated pump-nozzle G, in combination with the float K.

3. In combination with the rotary valve, as described, the combination of the cock T with the pipe F, for shutting the compressed air in said well-pipe, for the purpose described.

4. In combination with the rotary valve, as described, the valve or cock in the waste-pipe I, for the purpose described.

F. S. PEASE.

Witnesses:

EDWARD H. KNIGHT,

W. F. HALL.