Witsil & Burke,

Oil Pump.

No. 47,148. Patented Apr. 4, 1865.

Fig: 1.

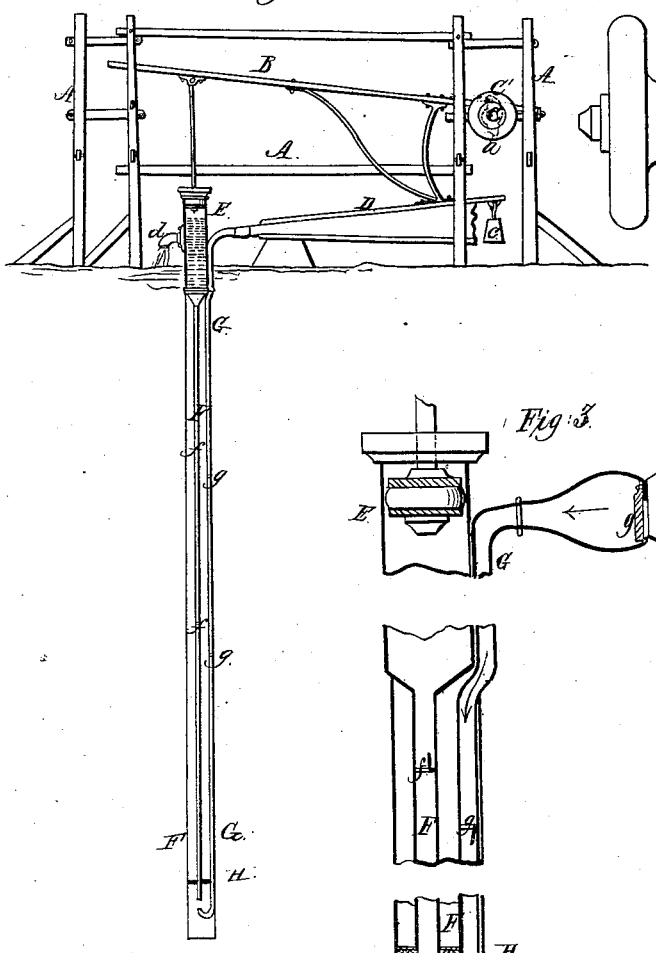


Fig: 2.

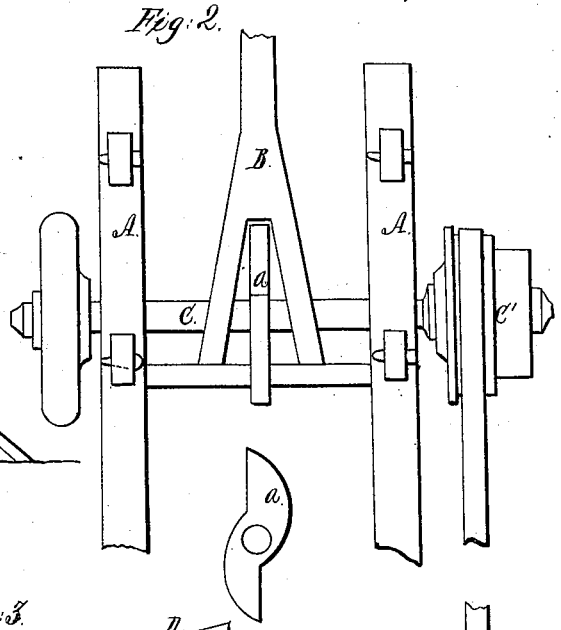
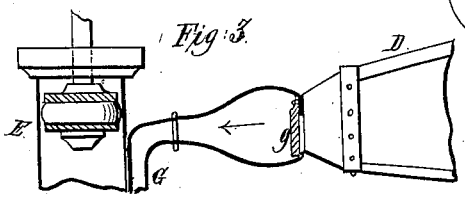
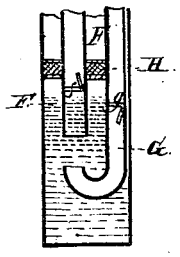


Fig: 3.





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UNITED STATES PATENT OFFICE.

GEORGE L. WITSIL AND EDWARD BURKE, OF PHILADELPHIA, PA.

IMPROVEMENT IN OIL-EJECTORS.

Specification forming part of Letters Patent No. **47,148**, dated April 4, 1865.

To all whom it may concern:

Be it known that we, GEORGE L. WITSIL and EDWARD BURKE, of the city and county of Philadelphia, State of Pennsylvania, have invented a new and Improved Air Injector, Compressor, and Exhauster for Coal-Oil Wells; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of our improved apparatus arranged for use. Fig. 2 shows in detail the application of the cam for operating the compressing and exhausting apparatus. Fig. 3 is a view in detail showing the application of valves to the pipes leading into and out of the oil-well.

Similar letters of reference indicate corresponding parts in the three figures.

It not unfrequently happens that oil-wells cease to eject up oil after flowing for a short time. When this occurs, and it is ascertained that such wells contain oil in abundance, but at considerable depths in the earth, contrivances are applied for forcing the oil up to the surface.

The object of our invention is to apply an artificial pressure upon the oil in wells where the natural pressure is exhausted, by means of an apparatus, which is so constructed that a powerful upward pressure is applied to force the oil to the surface at the same time that a partial vacuum is produced in the discharge-pipe above the oil, as will be hereinafter described.

To enable others skilled in the art to make and use our invention, we will describe its construction and operation.

In the accompanying drawings, Fig. 1, A represents a strong frame-work, which is erected over a well from which it is desired to obtain oil.

B represents a lever, which is pivoted at one end of frame A, and which is elevated by a two-throw cam, *a*, that is keyed to a transverse driving-shaft, C, carrying on one end a belt-wheel, C'. The lever B is suitably connected to a bellows, D, or compressing-pump of any suitable description, and it is also connected to the piston-rod of an exhausting-pump, E. A weight, *c*, is suspended to an arm projecting from the bellows D, for the purpose of bringing the lever B down very suddenly when released by the cam *a*. Other plans may be adopted for depressing the lever B or elevating this lever.

The exhausting-pump E is so constructed that as its piston rises it will allow the oil forced up through the discharge-pipe to flow freely from the nozzle *d*, as represented in Fig. 1. At the contracted base of the exhausting-pump E a pipe, F, is suitably attached, which pipe leads down into the oil-well, and has its lowest extremity submerged in the oil. To the nozzle of the compressing-pump or injector D a pipe, G, is suitably attached, which leads down into the oil in the well, and has its lowermost extremity turned upward, as shown in Figs. 1 and 3.

H represents a plug or packing of india-rubber or other suitable material, which is forced down into the well a suitable distance, so as to effectually close it, and thus prevent either oil or air from escaping upward outside of the induction and eduction pipes F and G. It is desirable to locate said plug as near the bottom of the discharge-pipe as possible. We apply to the induction-pipe G a number of valves of any suitable description, all of which open downward, and allow air which is forced through this pipe or hollow shaft to pass downward, but close against said air and prevent it from escaping back.

We employ a number of valves, *g*, arranged within pipe G at suitable intervals apart for the purpose of trapping the column of air in said pipe and keeping it there. The discharge-pipe F is also provided with a number of valves, *f*, arranged one above the other and all opening upward, for the purpose of allowing of a free ascent of the oil and preventing it from flowing back into the well.

The operation of forcing oil out of a well is as follows: The driving-shaft C is set in motion by any convenient prime motor, and the cam *a* on said shaft gives a rapid vibrating motion to the lever B, which, being connected to the exhausting-pump E and compressing-pump D, starts these pumps to work. At the lever B is thrown up air is drawn into the compressing-pump and exhausted from the dis-

charge-pipe F simultaneously, and as the lever B is suddenly depressed air is forced down into the well below the plug or packing H, at the same time the piston of the (air-pump) exhausting-pump is depressed. By continuing the operation of the pumps a pressure equal to a number of atmospheres will be brought to act upon the oil in the well, and when this pressure becomes sufficient the oil will be forced upward through the discharge-pipe F into the exhauster, and thence flow from its nozzle into suitable reservoirs for its collection.

By reference to Fig. 2 of the drawings it will be seen that the lower extremity of the air or inlet pipe G, which communicates with the condenser D, is turned upward beneath the lower extremity of the discharge-pipe F, the object of which is to cause the currents of inflowing air to act upward against the column of oil in the pipe F.

By means of the exhausting-pump we produce a partial vacuum in the discharge-pipe, and thus remove to a considerable extent the superincumbent pressure upon the oil in this pipe and give greater force to the compressed air in the well. We, in fact, force air into the well and pump the oil out by means of a single lever receiving a rapid vibrating motion.

If desirable, the connection between the compressing-pump and its pipe may be made flexible; but for all ordinary purposes a rigid connection will be found to answer a very good purpose.

The lever B may be pivoted in the center to its frame A, so that both ends will vibrate, in which case the compressor will be connected to one arm of this lever and the exhausting-pump to the other arm. By such an arrangement the air in pipe F will be exhausted simultaneously with the influx of air into the well.

We do not claim the principle of raising oil from wells by air or steam, said principle being employed by means different from those shown by us; neither do we wish to be understood as making a distinction between oil and water in the application of our particular means for raising and discharging these fluids from wells; but

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination of condensing and exhausting pumps in conjunction with induction and eduction pipes arranged within an oil-well, substantially as and for the purposes described.

2. Connecting both the exhausting and compressing engines to a lever which receives a rapid vibrating motion, substantially as and for the purposes described.

Witness our hands in the matter of our application for a patent for improved air injector, condenser, and exhauster for coal-oil wells.

GEO. L. WITSIL.
EDWD. BURKE.

Witnesses:
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