No. 640,023. Patented Dec. 26, 1899.

P. B. PERKINS.

COMPRESSED AIR PUMP.

(Application filed July 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

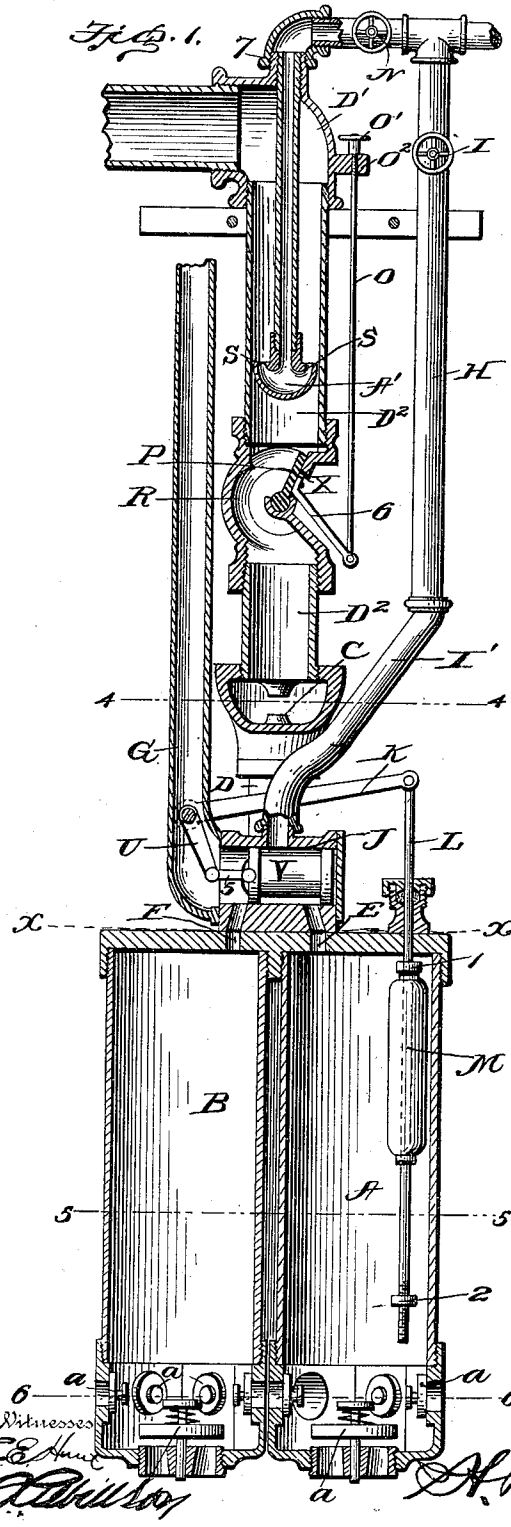


Fig. 3.

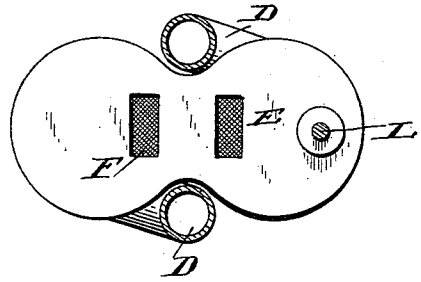
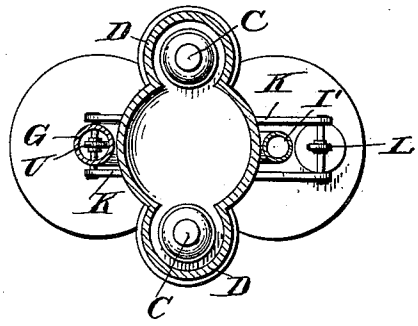


Fig. 4.



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Fig. 2.

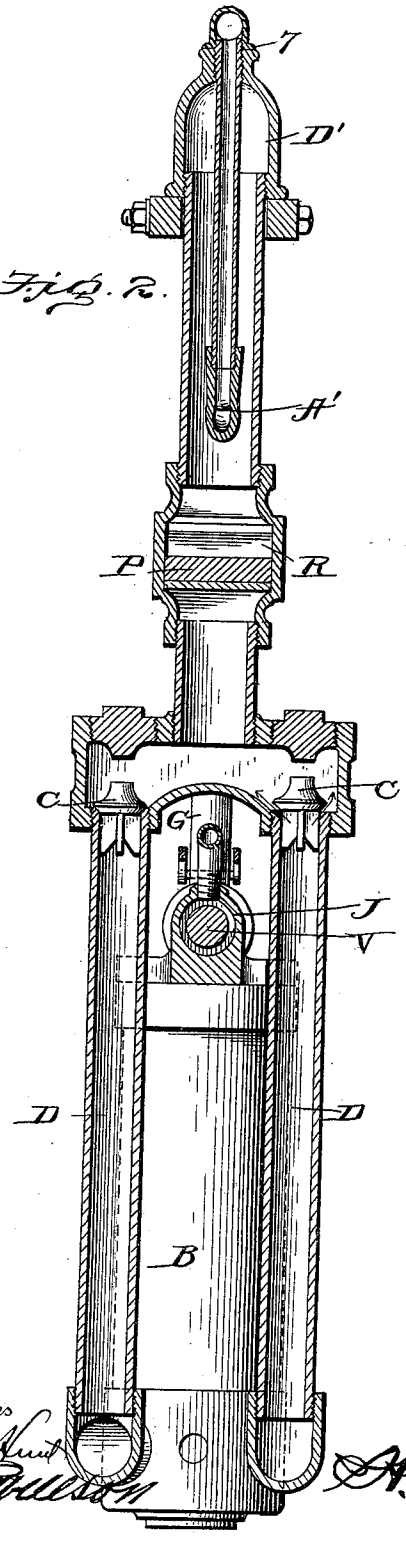


Fig. 5.

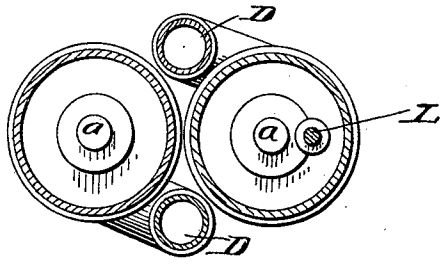
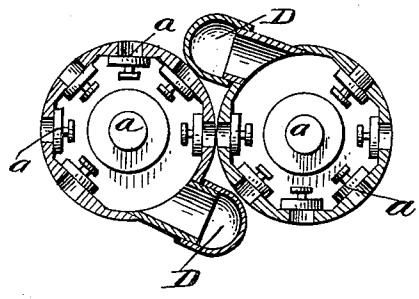


Fig. 6.



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UNITED STATES PATENT OFFICE.

PAUL B. PERKINS, OF LOS ANGELES, CALIFORNIA.

COMPRESSED-AIR PUMP.

SPECIFICATION forming part of Letters Patent No. 640,023, dated December 26, 1899.

Application filed July 22, 1899. Serial No. 724,795. (No model.)

To all whom it may concern:

Be it known that I, PAUL B. PERKINS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Compressed-Air 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.

My invention relates to improvements in compressed-air pumps; and the object is to provide a pumping device operated by compressed air and readily adapted to all of the conditions presented in the various sources of water-supply and by the use of compressed air provide a comparatively frictionless mechanism in lieu of the ponderous cylinders, rods, and other clumsy details heretofore required in this class of pumping machinery.

To these ends my invention consists in the construction, combination, and arrangement of the several elements of the device, as will be hereinafter more fully described, and particularly pointed out in the claims.

In the accompanying drawings the same reference characters indicate the same parts of the invention.

Figure 1 is a side elevation, partly in section, of my improved compressed-air pump. Fig. 2 is a similar view taken at right angles to Fig. 1. Fig. 3 is a horizontal section on the line *x x* of Fig. 1. Fig. 4 is a horizontal section on the line 4 4 of Fig. 1. Fig. 5 is a similar view on the line 5 5, and Fig. 6 is a similar view on the line 6 6, of Fig. 1.

In the direct-pressure pumping reference to the drawings will show two pumping-chambers A and B side by side in a small-diameter well. These chambers are provided with inlet-valves *a a* in the bottom and sides, which permit the water to flow into and fill the chambers with the greatest rapidity, there being no other openings in the chambers excepting the air-ports E and F, which are finely screened to prevent sand getting to the valve, and the discharge-pipes D, which are provided with check-valves C C.

The pumping-chambers A and B when in position for operation are submerged in the water to be pumped any desired depth, usually within a few feet of the bottom of the well.

The compressed air is admitted to and exhausted from the chambers alternately. One filling with water while the other is being discharged insures a double action or a continuous steady flow of the water elevated at D, the capacity of the pumping depending upon the rapidity with which the chambers are filled and discharged.

The mechanism for directing or switching the current of compressed air to and exhausting it from the chambers is valve-chamber J, (shown in section,) in which is operated a balance-valve V, operating upon the ports E and F, which form a passage-way between the valve-chamber J and pumping-chambers A and B and exhaust-pipe G. This valve-chamber J is fastened upon the top heads of the chambers A and B. The compressed air is supplied to valve V by pipe H, leading from the compressor (not shown) through valve I, pipe I′ entering chamber J on top center, as shown, the quantity of air being regulated upon the surface by valve I. A reciprocating movement given to valve V changes the currents of inlet and exhausting air to and from ports E and F or chambers A and B. Valve V is operated by the action of float M, rod L, nuts 1 and 2 on rod L, lever K, arm U, and connecting-rod 5. The float M is guided by rod L and is free to rise and fall with the rise and fall of the water in chamber A the entire length, except when approaching either end the nuts 1 and 2 set short on rod L of the full travel of the float, so that the completion of the travel of the float must come against nut 1 when rising and nut 2 when lowering. This imparts to rod L a reciprocating movement. This moves lever K, swings arm U, connecting with valve V by rod 5, and imparts the desired movements for the continuous operation of the pumping-chamber whenever compressed air is turned on by valve I, the number of the discharges being governed in two ways—first, by quantity of air admitted by valve I, and, second, by supply of water. If this runs short, the chambers will fill more slowly, and the discharge in either

chamber cannot take place until the float has been moved the extremes—that is, chambers entirely filled with water.

A′ denotes the air-jet aspirator, which combines with the pumping system by means of the three-way valve-casing R, (shown in section,) connected to discharge-pipe D^2. Gate P in valve R is opened or closed by the screw-wheel O′, rod O extending through the guide-bracket O^2 on the elbow D′, and the arm 6 connected therewith. Inlet-passage X and air-jet discharges S S are connected to air pipe and valve N, which enters the discharge-pipe D at elbow D′ in the connection 7, extending downward as near valve-casing R as practical, and this aspirator is supplied with compressed air through the valved branch pipe N, which connects with the main pipe H, leading from the compressor. (Not shown.)

A pump thus constructed may be operated in four different ways, as follows:

First. Pumping the water by direct application of compressed air, hereinbefore explained.

Second. The direct pumping and the air-jet aspirator working in combination. This is accomplished by opening both air-valves I and N, the power of both being the discharging of water at pipe D^2.

Third. Air-jet aspirator working separately. This is accomplished by opening the gate P in valve R, which shuts the pumps out and opens water-inlet X from the well, and by opening valve N the air-jet aspirator will be in operation, discharging the water through pipe D^2 independent from the pump.

Fourth. This is a separate operation wherein the exhausting air from either of the above operations is combined and applied to accomplish the fourth operation—that is to say, if the direct-pumping plan is forcing water a long distance or high elevation several of the aspirator air-jets may be supplied or operated under a lesser elevation from the exhausting air from the direct pumping.

Thus the several sources of water-supply may be gathered into one reservoir, from which the direct pumping plan may make an extended distribution.

The accompanying drawings show my invention in the best form now known to me; but many changes in the details might be made within the skill of a good mechanic without departing from the spirit of my invention as set forth in the claims at the end of this specification.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

1. In a compressed-air pump, the submerged valve-casing R, gate P, arm 6, the threaded valve-rod O and the coacting hand-wheel O′; in combination with the elbow D′ and guide-bracket O^2 encompassing said valve-rod, the aspirator A′ and the compressed-air-inlet pipe N, substantially as and for the purpose set forth.

2. In a compressed-air pump, the submerged valve-casing R, gate P, arm 6, threaded valve-rod *o*, and its hand-wheel *o′*, the elbow D′ and the pipes D^2, D^2 communicating with said valve-casing; in combination with the vertical pump-chambers A and B, the inlet-valves *a*, *a*, the horizontal valve-chamber J, the ports E and F communicating with said valve-chamber, the guide-rod L, the float M having a sliding engagement therewith, the valve V operatively connected with said rod L, and the discharge-pipe for connecting the pump-chamber A and lower pipe D^2, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PAUL B. PERKINS.

Witnesses:
WM. M. HUGHES,
A. W. EWING.