(No Model.)

J. DICKENS.

PUMP.

No. 259,673. Patented June 20, 1882.

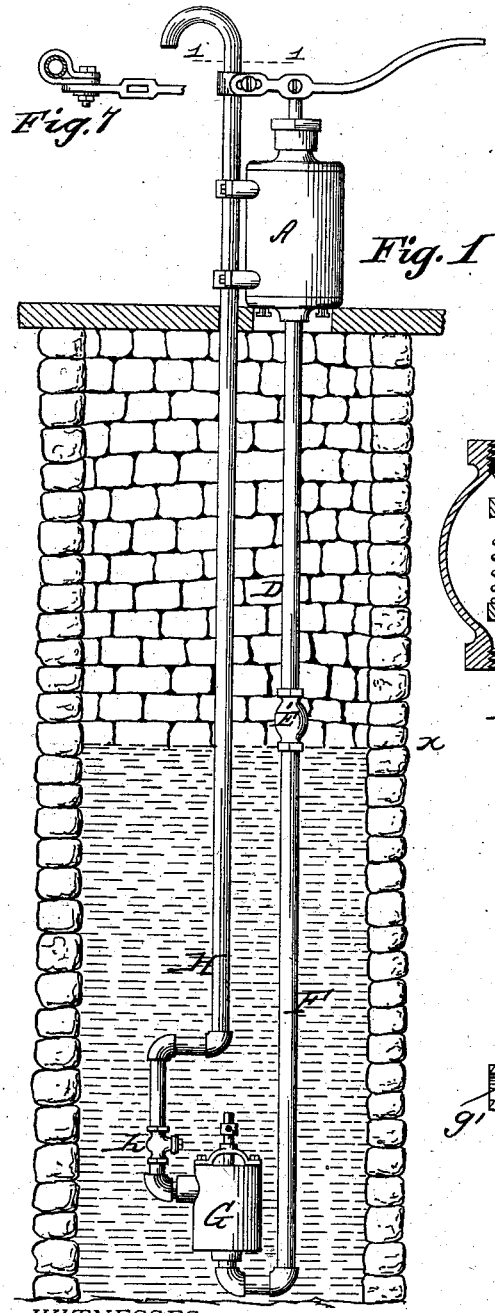

Fig. 1

Fig. 1

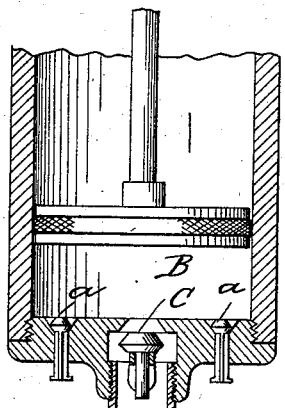

Fig. 2

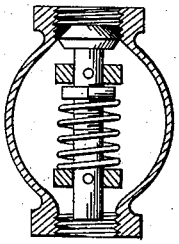

Fig. 3

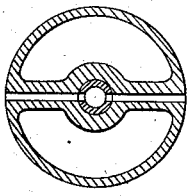

Fig. 4

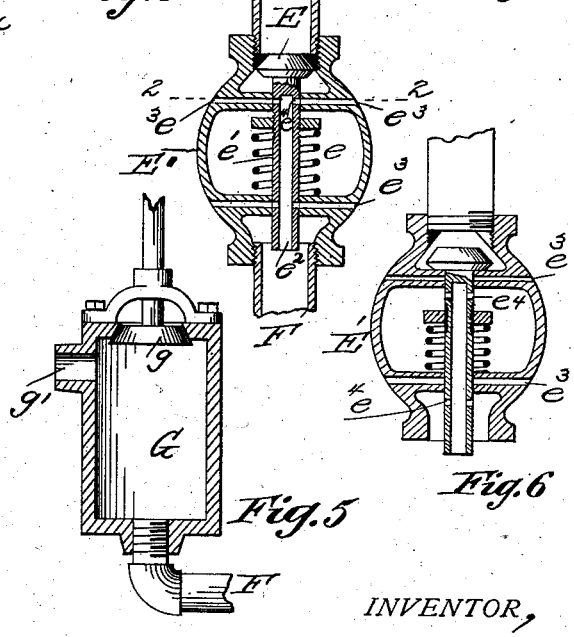

Fig. 5

Fig. 6

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN DICKENS, OF KINGSTON, NEW JERSEY.

PUMP.

SPECIFICATION forming part of Letters Patent No. 259,673, dated June 20, 1882.

Application filed October 15, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN DICKENS, a citizen of the United States, residing at Kingston, in the county of Somerset and State of New Jersey, have invented certain new and useful Improvements in Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a vertical elevation of pump. Figs. 2, 3, 5, and 6 are vertical sections of details; Fig. 4, a transverse section of valve on line 2 2, Fig. 2; and Fig. 7 is a section on line 1 1, Fig. 1.

My invention has relation to means for lifting water by the agency of compressed air; and my improvements consist in the peculiar construction and combination of parts hereinafter described and specifically claimed.

A represents a cylinder, having a piston, B, one or more inlet-valves, *a a*, opening inwardly, and an outlet-valve, C, opening downwardly.

D is a pipe connected with the cylinder A, and having communication therewith through the valve C.

E is another valve, located at the lower end of pipe D. Said valve has a spring, *e*, of sufficient strength to keep the valve closed until overcome and opened by the pressure of compressed air in the pipe D above. The strength of this spring will be regulated by the extent to which the air is compressed, and this will be governed by the depth from which the water requires to be lifted. The stem e' of the valve E is made hollow, or formed with an internal opening, e^2, which communicates by lateral passages e^4 with other registering passages, e^3, in the body E′, so that when the valve is closed atmospheric pressure from the outside will be exerted on the valve on its under side. When the valve is opened the passages e^4 e^3 do not register, as shown in Fig. 6, and external atmospheric pressure is thus cut off from the under side of the valve.

F is a pipe extending downwardly from the valve E, and communicating with a cylinder or chamber, G, which has an inwardly-opening valve, *g*, and a discharge-opening, g'. With this opening is connected a pipe, H, having an upwardly-opening check-valve, *h*. Said pipe H ascends to the surface of the ground above, or to any point to which it is desired to lift water from the well.

The valve E is located above the water, and the chamber G, which may be called the "water-supply" chamber, is submerged to any desired extent, so as to always fill whenever its contents are discharged.

The operation is as follows: At every downstroke of the piston B air is compressed in the cylinder A and forced into the pipe D, where it accumulates until its pressure is sufficient to overcome and open the valve E. As soon as said valve opens the compressed air escapes through the valve until the pressure in the pipe D is not strong enough to keep said valve open, whereupon it closes. The compressed air which passes through the valve E exerts its force upon the water in the pipe F, said water having entered through valve *g* and filled said pipe F, as well as pipe H, up to the surrounding water-level *x*. The pressure thus exerted closes valve *g* and forces the water ahead from pipe F out of chamber G and up pipe H, in which latter the water is prevented by valve *h* from falling. When the compressed air in pipe D has expanded so much as to be ineffectual to hold valve E open, said valve closes and the compressed air in pipe F escapes through the openings e^4 e^3, valve *g* opens, water is admitted to chamber G and fills pipe F. At every subsequent stroke of the piston a body of compressed air is forced into pipe D and a corresponding body forced into pipe F, acting upon the column of water in latter and forcing it upwardly through discharge-pipe H, which is eventually filled and discharges at its upper end.

What I claim as my invention is as follows:

1. The combination of an air-compressing cylinder or chamber, A, with a connecting-pipe, D, forming a reservoir for a column of compressed air, a spring-valve, E, opening outwardly or downwardly, pipes F and H, and intermediate water-supply chamber, G, with valve *g*, substantially as shown and described.

2. The combination of an air-compressing cylinder or chamber, A, located above a fluid to be lifted, a downwardly-extending pipe, D, located below and communicating with said

cylinder, a spring-valve, E, opening downwardly or outwardly and having ventages for admitting atmospheric pressure to its under side when closed, a water-pipe, F, connected to said valve, a supply-chamber submerged in the fluid to be lifted, and an ascending discharge-pipe having an upwardly-opening check-valve, said parts being constructed and combined for operation substantially as shown and described.

3. The valve E, having hollow stem e', with lateral passages e^4, and valve-body E', having corresponding passages, e^3, whereby when said valve is closed on its seat external atmospheric pressure is admitted to its under side and when said valve is opened or unseated such external pressure is cut off, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of October, 1881.

JOHN DICKENS.

Witnesses:
W. W. VAN DUYN,
C. VAN DUYN.