J. S. ASH.

Pump.

No. 160,742. Patented March 16, 1875.

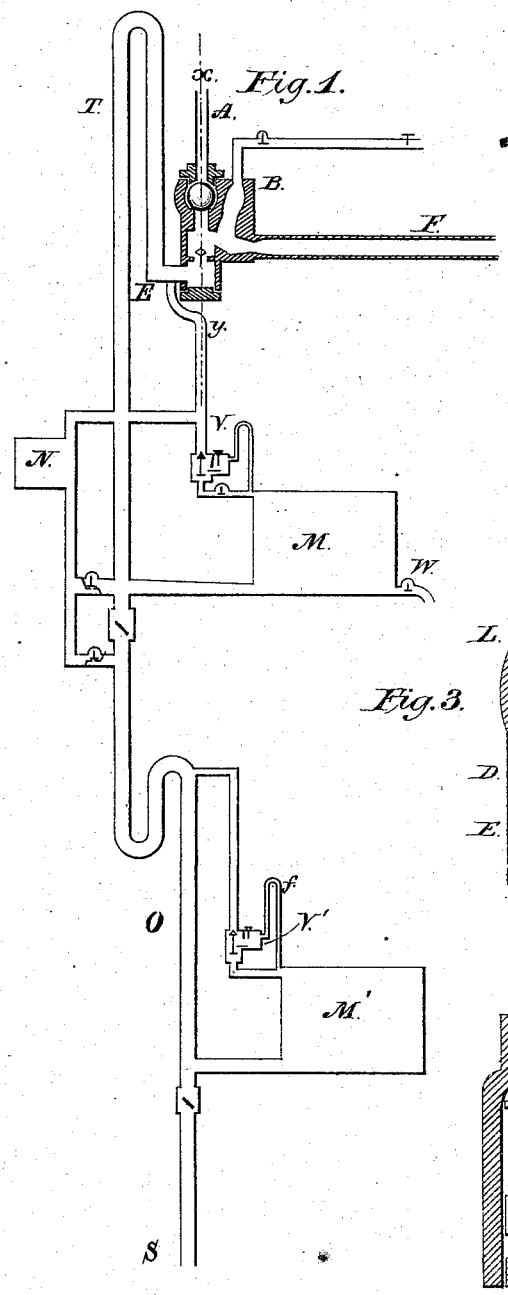

Fig. 1.

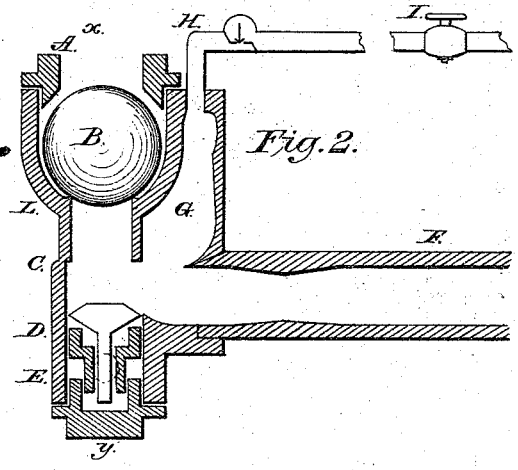

Fig. 2.

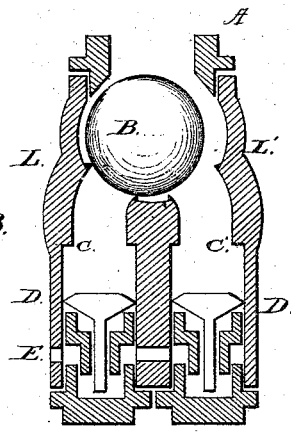

Fig. 3.

Fig. 4.

Attest:
S. Edward Paschall.
Henry C. Taylor.

Inventor:
John S. Ash

UNITED STATES PATENT OFFICE.

JOHN S. ASH, OF BUCKINGHAM, PENNSYLVANIA.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 160,742, dated March 16, 1875; application filed September 15, 1874.

To all whom it may concern:

Be it known that I, JOHN S. ASH, a resident of Buckingham, county of Bucks, State of Pennsylvania, have invented a Pump, of which the following is a specification:

The object of my invention is the employment of the force derived from the sudden checking of a fall of liquid for the purpose of pumping either air or liquid, as shown in elevation, Figure 1, of the accompanying drawing. Fig. 2 is a vertical section of the body of the pump, showing interior parts. Fig. 3 is a section of the body of the pump, on line *x y*. Fig. 4 is the system of valves V of Fig. 1, enlarged and shown in section.

The liquid (ordinarily water) used as power enters the machine with what head is available through a pipe at A. It then flows past the ball B, which works over the two valve-seats L L′, Fig. 3, and down one of the outlets L′ until, when it has acquired sufficient velocity, the ball B rolls to the seat L′, and the water escapes at the other outlet L, passing over the valve D, and out at a tube, F, Fig. 2, there being two such tubes, one on each side, corresponding to the valves D D′, and outlets L and L′.

In flowing thus through F, the water will acquire sufficient velocity to move again the ball B to the seat L, and the flow through L will be suddenly stopped. The momentum of the water in F will cause a partial vacuum in the part nearest B, raising the valve D to an upper valve-seat at C, and allowing air or liquid, as may be supplied, to enter by a pipe at E, communicating alike with both sides of the machine. By closing C with the valve D, the ball B is retained somewhat longer than otherwise, and the working is much more regular and certain.

It will be understood that the machine is double as to the parts shown in Fig. 2, except the ball and its chamber, as is also indicated in Fig. 3.

It is evident that the same action will be repeated alternately in the two parts of the machine, the tendency of the successive shocks being to produce a vacuum in the pipe entering at E, which should be supplied with an ordinary check-valve.

Water passing from E through the valve D will be discharged with that from A at F, but most of the air passing over will collect in G, and, supposing the stop-cock I slightly opened, will be forced through the valve H and out at I with considerable force on the succeeding flow from A, the inertia of the water in F now slightly checking the renewed flow. A very small passage may be allowed under valve H, to return to G any water carried over.

By thus taking the air off at I, a solid working column is secured in F, and by carefully adjusting the stop-cock at I, or by supplying an air-chamber with water-outlet, a jet of air may be obtained to be used for blast or other purposes.

The pump thus formed may be used either for pumping air, or, by extending an air-chamber above E, to render the flow uniform, for pumping water from quite moderate depths, and discharging at F.

For pumping from greater depths, a series of chambers with valves is arranged, which may be discharged separately, as shown in Fig. 1. The pipes E V and E T O are connected with the part already described, at E. Air is withdrawn from M and M′. Water being supplied at S, it is forced by external pressure into M′ until full, and up the pipe as far as V′, shown enlarged in Fig. 4. Here it strikes clack *a*, closing the passage *h* and raising *b* by means of the disk *d*, thus allowing air to enter and pass on top of the water in M′ through the bent tube *f*. The water is now raised from M′ to M until the first is empty or the last is full. When all the water has passed from M′, air passes through and allows the valve V′ to assume its former position; or, when M is full, the valve V acts in the same manner as did V′, and the water is discharged at W, the height M T being greater than that of a column of water due to a pressure of one atmosphere, or greater than M N.

N is a chamber into which water may be pumped, (while that in M is discharging at W,) to flow into M when the pressure is equalized. The same process is continually repeated.

It will be evident that various other forms of valve may be substituted for the ball B,

such as connecting two disks or two balls with stem or chain, and that the relative position of passages L L′ may be changed.

I claim as my invention—

1. The passages L L′, communicating with a common valve-chamber, for the purpose specified.

2. Ball B or its equivalent, in combination with passages L L′, for the purpose of stopping and renewing the flow of liquid through L and L′.

3. The valves D D′, in combination with the upper valve-seats C and C′, for the purpose specified.

4. The branch G, for the purpose of separating air from a stream of liquid, the flow of which is made intermittent, for the reason specified.

5. The chamber M, combined with tubes E V and E T O, for the purpose specified.

6. The valve arrangement V, consisting of passages *h* and *m*, opened and closed by valves *a* and *b*, as and for the purpose specified.

7. The chamber N, communicating with M, for the purpose specified.

JOHN S. ASH.

Witnesses:

S. EDWD. PASCHALL,

HENRY C. TAYLOR.