

W. Hartley,

Print.

No. 109,896.

Patented Dec. 6. 1870.

Fig 1.

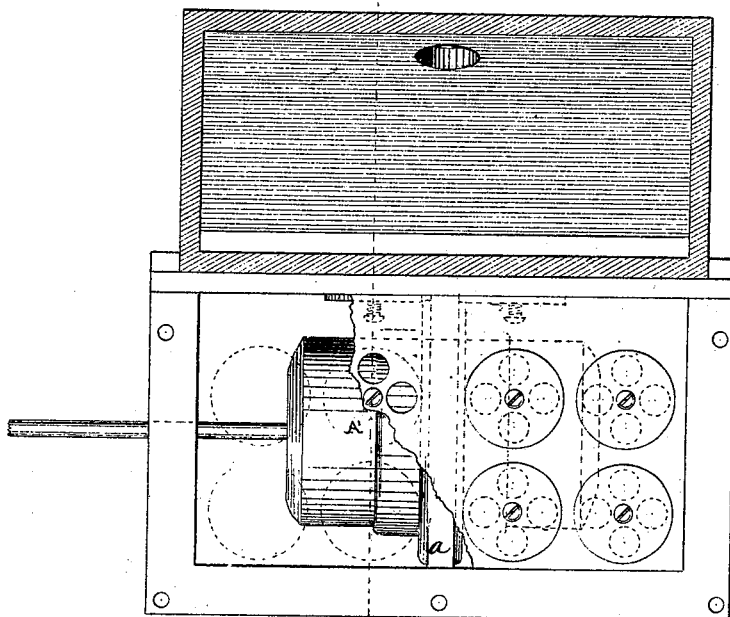


Fig 2.

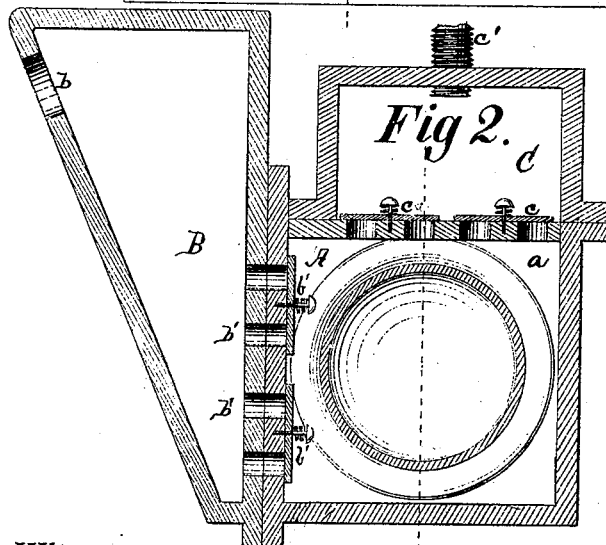
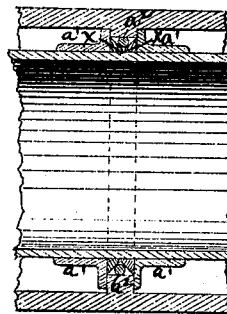


Fig 3.



Witnesses:

E. H. Pierson
Newton L. Crawford

Inventor

William Hartley by
H. M. Beadle atty.

United States Patent Office.

WILLIAM HARTLEY, OF DURAND, ILLINOIS.

Letters Patent No. 109,896, dated December 6, 1870.

IMPROVEMENT IN PUMPS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known, that I, WILLIAM HARTLEY, of Durand, in the county of Winnebago and State of Illinois, have invented a new and improved Pump; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

This invention consists in certain details of construction, which will be fully described hereinafter.

In the drawing—

Figure 1 represents a plan view of my improved pump, with the upper chamber removed and a portion of the separating-diaphragm broken away to show the interior of the ram-chamber below.

Figure 2 represents a central sectional elevation through the line *x x*, fig. 1, the upper chamber being shown in place.

Figure 3 represents a partial sectional view of the ram and its packing through the line *x x*, fig. 2.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and operation.

A represents the ram-chamber, which is separated by suitable walls from the side supply-chamber B and delivery-chamber C.

It is itself divided into two equal parts by a diaphragm, *a*, which has a suitable central orifice, in which moves the ram *A'*.

The supply-chamber B may be of any proper form, but is preferably triangular in its cross-section, as shown in fig. 2, and is arranged with its larger area above the ram-chamber, in order that the passage of the water from the former to the latter may be assisted by gravitation. It should be sufficiently capacious to hold three or four times the quantity received into the ram-chamber at each movement of the ram.

b represents the opening through which the water is received into the chamber B; and

V V, valves, of which there may be one or more opening into each division of the ram-chamber, through which the water is discharged.

The floor of chamber C is also provided with a suitable number of valves, *c c*, through which the water is received from the divisions of chamber A.

Its delivery is effected through a nozzle, *c'*, as shown.

The valves *V c* consist of a disk, of leather or other suitable material, which rests over suitable orifices in the partitions separating the different chambers. They are secured in place by means of a screw or headed pin, located at the center of the disk, upon which is placed a spiral spring, as is clearly shown in the drawing.

To make a perfect joint between the ram and the separating-diaphragm in which it moves, I employ metallic bearings, *a' a'*, fig. 3, which are secured in

place and caused to bear against the surface of the ram by a spiral spring, *a''*.

The operation is as follows:

The ram *A'* is given a reciprocatory movement in the diaphragm *a* by any suitable means, and water is admitted into the chamber B through the opening *b*. As the ram moves to and fro in the chamber A, it produces a vacuum alternately in each division of the chamber, which is immediately filled, of course, by the water from chamber B.

The water is instantaneous in its action, because it is moved not only by the pressure incidental to the creation of the vacuum, but it is also actuated by its own gravity, as the water-line of chamber B is above that of chamber A.

The large area of valve-surface attainable from the form and arrangement of the chamber permits a large mass to be quickly moved. From the divisions of chamber A the water is forced at each movement of the ram into chamber C, and thence discharged to any desired point by means of a pipe connected to nozzle *c'*.

One of the main points in the upper air-chamber, beside the large valve area, is the bringing down of the atmospheric cushion close to the top of the valves, or half way down the valve, so that they will strike the cushion at once without concussion.

By means of the spring upon the valve they are enabled to work rapidly without concussion.

From the construction described several advantages are obtained. The water in the supply-chamber is delivered instantaneously to the ram-chamber and fills it perfectly full, whereby the ram is enabled to deliver its full capacity at each stroke. The water is caused to flow into chamber B in a continuous instead of an intermittent stream. A large amount of valve-surface is obtained, and the direction of the water in passing through the pump is not materially changed.

Having thus fully described my invention,

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

1. The chamber B, constructed specifically as described, and arranged as and for the purpose set forth.
2. The combination of the chambers B and A, when constructed as described, and arranged relatively to each other, as and for the purpose set forth.
3. The combination of the chambers A, B, and C, and ram *A'*, when the parts are constructed specifically as described, for the purpose set forth.
4. The ram *A'*, with its packing *a'*, and spiral spring *a''*, as and for the purpose set forth.

This specification signed and witnessed this 23d day of September, 1870.

WILLIAM HARTLEY.

Witnesses:

G. W. FORD,
G. C. MILLER.