

A. J. SIMMONS.
Steam and Vacuum Pumps.

No. 143,725.

Patented Oct. 14, 1873.

Fig 1

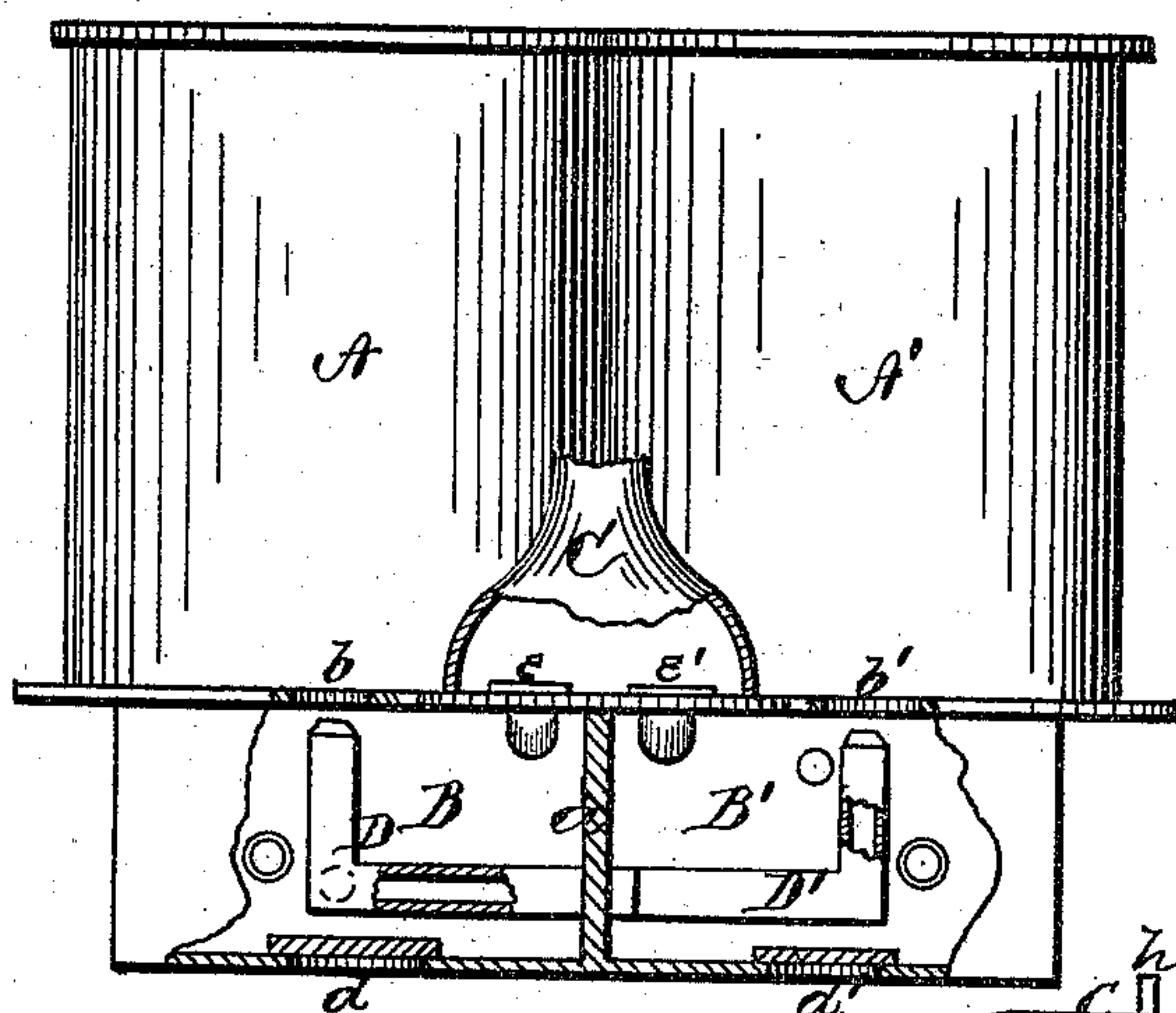
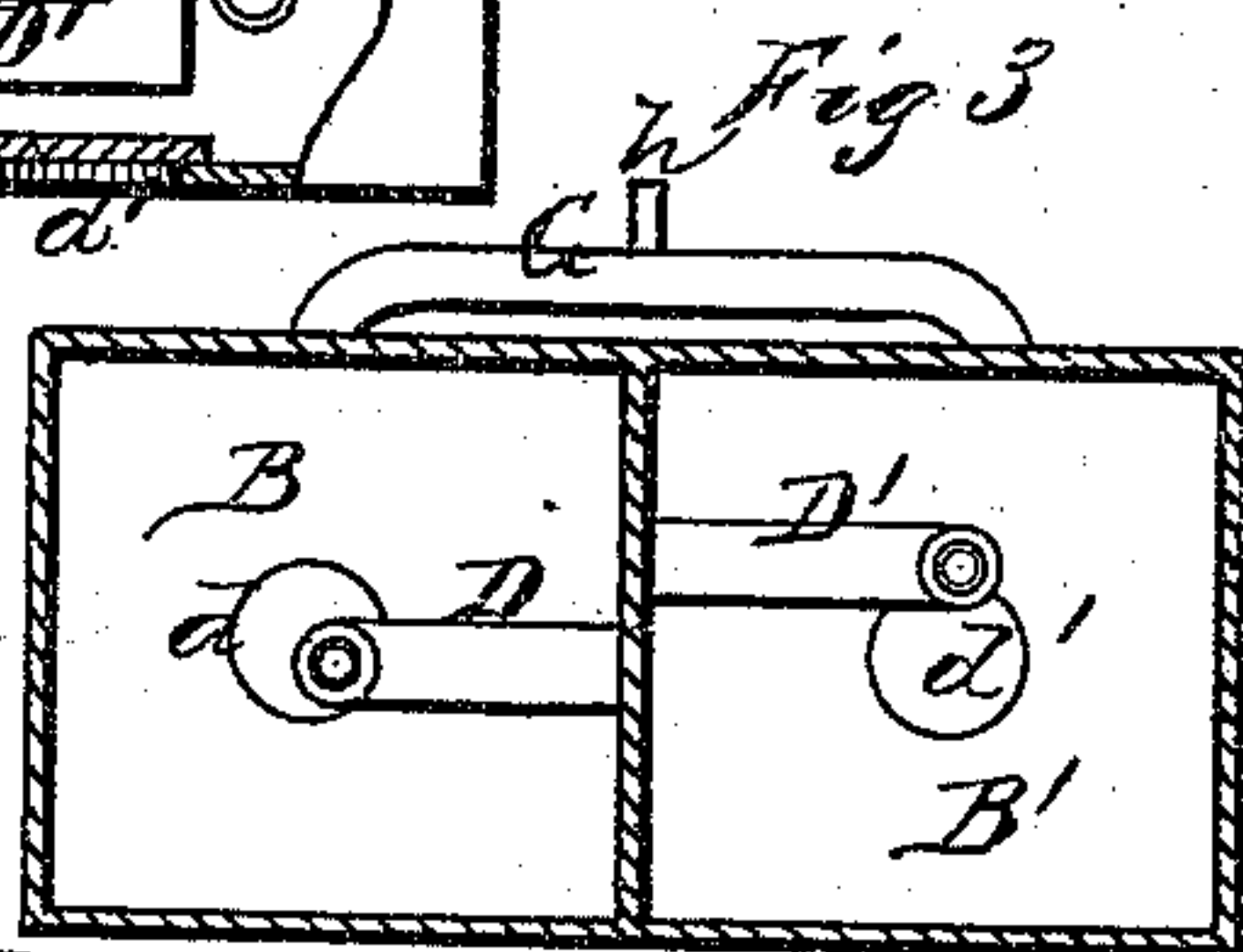
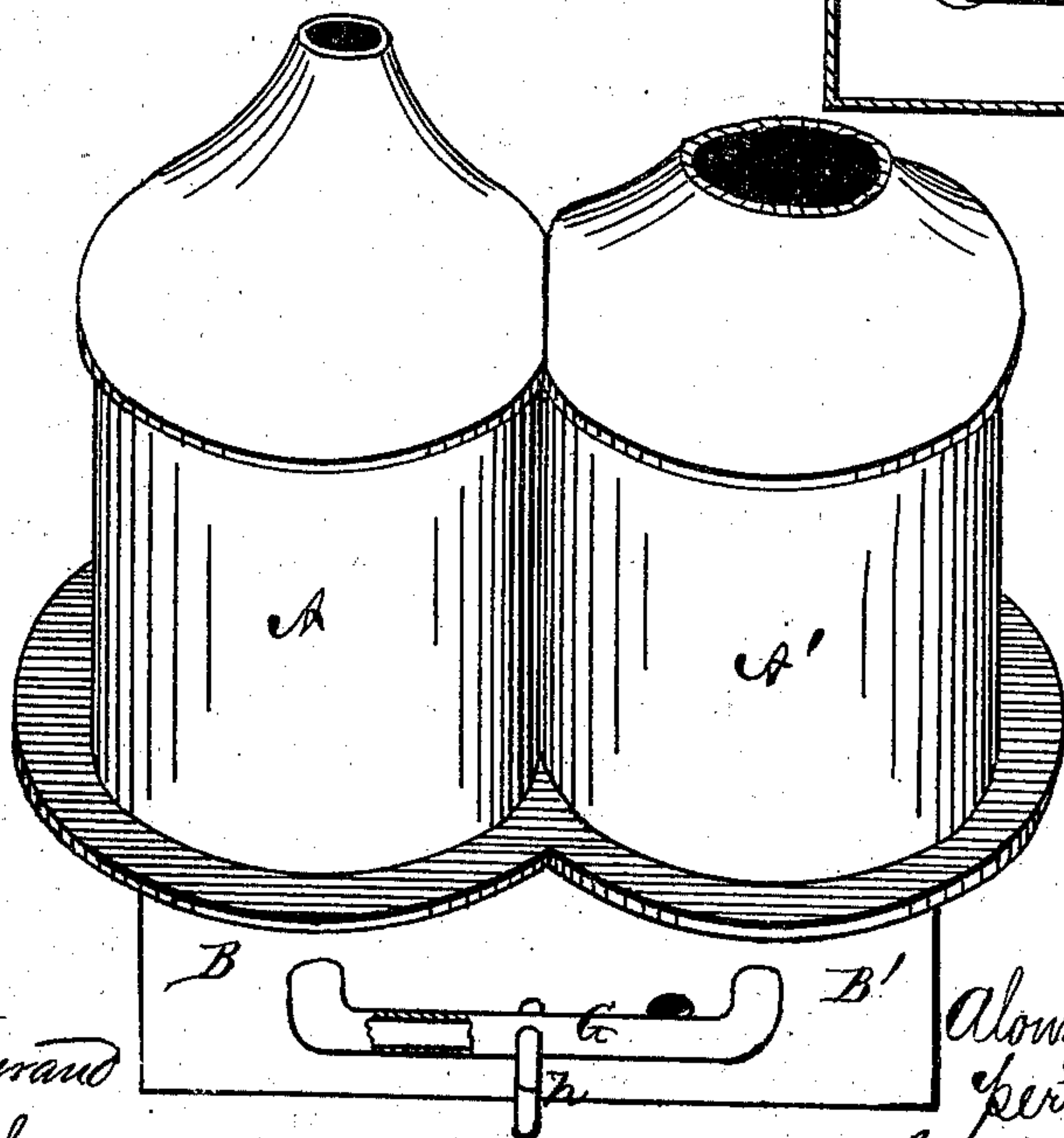


Fig 2



Witnesses:
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UNITED STATES PATENT OFFICE.

ALONZO J. SIMMONS, OF INDIANAPOLIS, INDIANA.

IMPROVEMENT IN STEAM AND VACUUM PUMPS.

Specification forming part of Letters Patent No. **143,725**, dated October 14, 1873; application filed May 14, 1873.

CASE B.

To all whom it may concern:

Be it known that I, ALONZO J. SIMMONS, of Indianapolis, in the county of Marion and in the State of Indiana, have invented certain new and useful Improvements in Steam and Vacuum Pumps; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon making a part of this specification.

My invention relates to that class of pumps known as automatic steam and vacuum pumps; and it consists in certain improvements in the valve-boxes of the same, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side elevation, showing the two cylinders with valve-boxes, the latter being partially broken open to show the interior arrangement. Fig. 2 is a perspective view of the same, and Fig. 3 is a horizontal section through the valve-boxes.

A and A' represent the two cylinders of an automatic steam-vacuum pump, below which is a valve-box divided, by a central partition, *a*, into two chambers, B and B', communicating respectively with the cylinders A A' by means of apertures *b b'*. In the bottoms of the chambers B B' are the usual valves *d d'* to prevent the water from going back into the well. *e e'* are the discharge-valves, and C is the discharge or column pipe. These parts may all be constructed in any of the known and usual ways, as I lay no claim to the same. In the partition *a* are inserted two bent or elbow pipes, D D', the former opening into the valve-chamber B', and its end directly below the aperture *b* in the bottom of the cylinder A. In like manner the pipe D' opens into the valve-chamber B, and its end is directly below the aperture *b'* in the bottom of the cylinder A'. These ends of the pipes D D' are contracted or provided with nozzles, as shown. As the water is forced from the cylinder A' by the steam, and through the discharge-valve *e'*, the cylinder becomes emptied, and the steam or re-

ceiving valve on top of the cylinders changed to cut off the steam from the cylinder A', and admit into the cylinder A to force the water out of the same. At the time when the change in the steam-valve is made, the pressure in the cylinder A at once becomes the greatest, and hence water is immediately forced through the pipe D', and injected into the cylinder A', so as to make a perfect condensation of the steam in the same, making or producing a more complete vacuum, so as to draw a greater quantity of water into the cylinder A'.

It will be seen that it is the coldest water which is forced through the pipe D' into the cylinder A', as it is taken from near the bottom of the valve-chamber B, where the steam does not come in contact with the water to heat it, and hence the condensation is of necessity more thorough and instantaneous, and the vacuum produced more complete. As soon as the water in the cylinder A is forced out, and the steam-valve changed again, water from the valve-chamber A' is in like manner forced through the pipe D, and injected into the cylinder A for the same purpose.

The two valve-chambers B B' are connected by a pipe, G, provided with a stop-cock, *h*, as shown in Figs. 2 and 3. This is for the purpose of opening a communication between the two cylinders to equalize the pressure when the pump is elevated more than ten feet above the level of the water. The stop-cock *h* regulates the size of this communication, according to the elevation of the pump, the object of thus equalizing the pressure being to facilitate the working of the steam-valve on top.

In the steam-pumps now generally in use the vacuum produced alternately in each cylinder will draw the water up into the cylinder in proportion to the distance the pump is from the water in the well, and the farther the pump is away from the water the greater space will be left in the cylinder not filled with water. This space must be filled in order to get opposite pressure before the other cylinder is empty.

The pipe G accomplishes this object in the following manner: As one cylinder is emptied, and the vacuum produced by the condensation of the steam, as above set forth, the water is drawn up into this cylinder to a certain height, according to the elevation of the pump above

the water, and the remaining space in said cylinder is filled from the other cylinder and valve-box through the pipe G, because the pressure in this cylinder is in excess of that in the cylinder only partially filled. This pipe G thus equalizes the pressure, and allows the two cylinders to have the same pressure, and consequently the flexible plate used at the lower end of the rod, which connects with the steam-valve on top, will have the same pressure on top and bottom, and when the steam strikes the bottom plate of the second cylinder the weight of the water, together with the pressure already acquired through the pipe G, causes the flexible plate to shift its position and change the steam-valve.

When the pump is close to, or, say, three or four feet from, the water, the pipe G is not necessary, because then the vacuum is sufficient to so nearly fill the cylinder that the little remaining space is almost instantaneously filled through the pipe on top; but when the pump is elevated to any distance from the water the pipe on top will not accomplish the object.

The same effect may be produced by an aper-

ture in the partition *a* to be provided with a stop-cock, if so desired.

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

1. In combination with the cylinders A A' and valve-chambers B B' of a steam-pump, the bent or elbow pipes D D' within the cold-water chambers B B', and leading respectively from the valve-chambers B' B, at or near the bottom, to the valves in the bottom of the cylinders A A', as and for the purposes herein set forth.

2. In combination with the valve-chambers of a steam-pump, the pipe G, with stop-cock *h*, connecting the two valve-chambers, and forming a communication between them, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of May, 1873.

ALONZO J. SIMMONS.

Witnesses:

C. L. EVERT,

A. N. MARR.