

S. GIBBONS.

Steam Air-Pumps and Condensers.

No. 142,333.

Patented September 2, 1873.

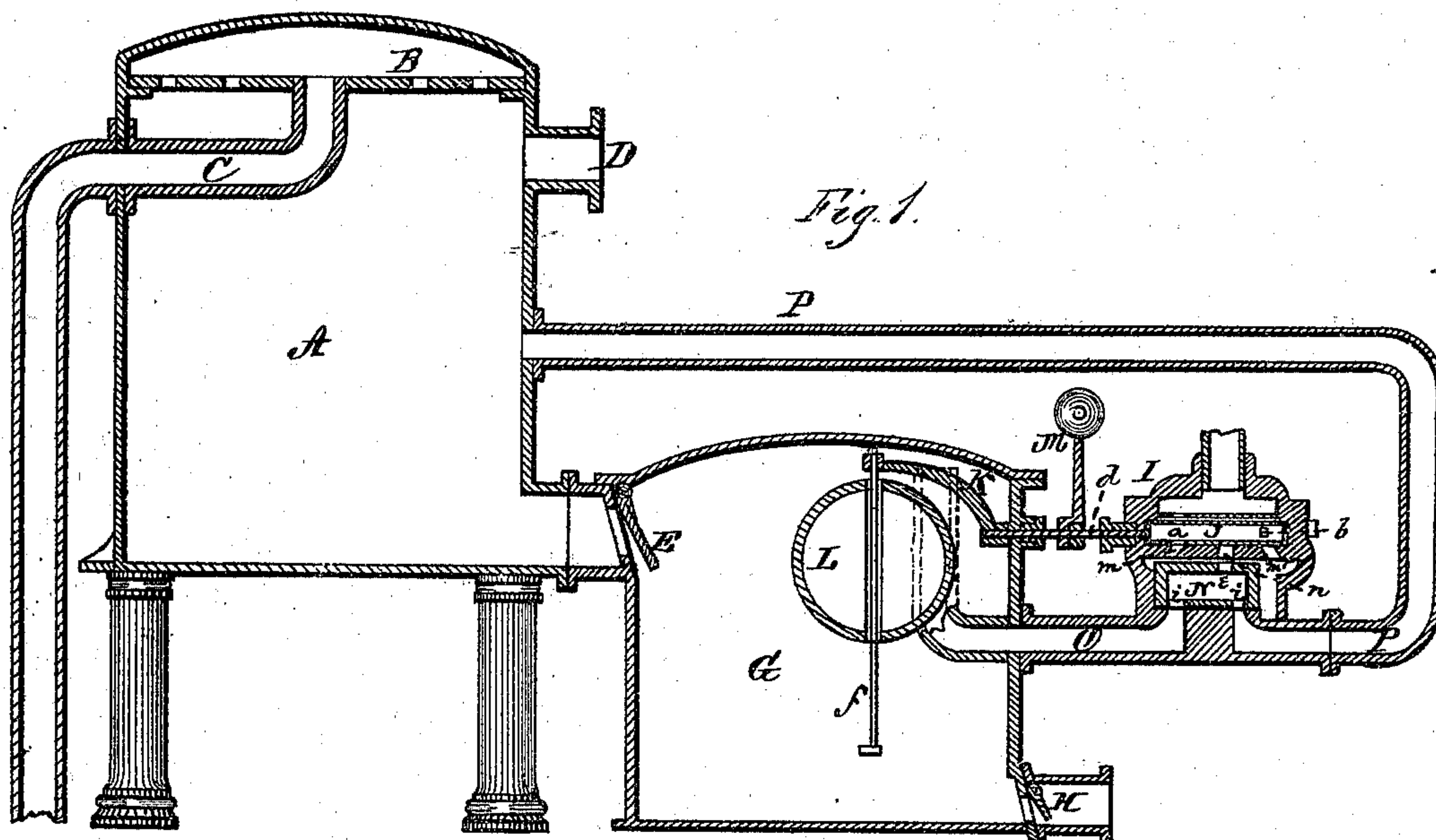


Fig 2

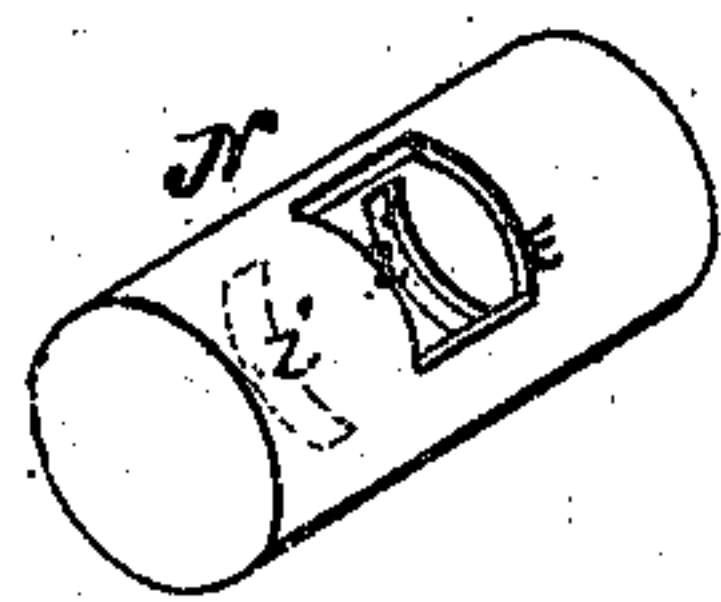
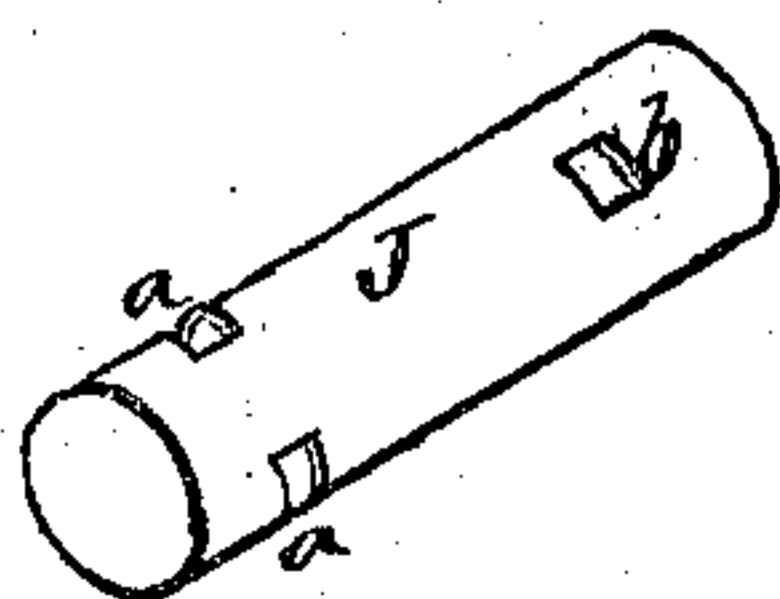


Fig 3



Witness:

Frank L. Durand  
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Inventor.

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per. *Handwritten signature of Samuel Gibbons*

Attorneys.



# UNITED STATES PATENT OFFICE.

SAMUEL GIBBONS, OF FREEDOM, PENNSYLVANIA.

## IMPROVEMENT IN STEAM AIR-PUMPS AND CONDENSERS.

Specification forming part of Letters Patent No. **142,333**, dated September 2, 1873; application filed December 26, 1872.

*To all whom it may concern:*

Be it known that I, SAMUEL GIBBONS, of Freedom, in the county of Beaver and in the State of Pennsylvania, have invented certain new and useful Improvements in Steam Air-Pumps and Condensers; 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.

The nature of my invention consists in the construction and arrangement of a steam air-pump and condenser, 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 longitudinal vertical section of the entire machine, and Figs. 2 and 3 represent the two valves in the steam-chest.

A represents the condensing-vessel, provided on the inside, near the top, with a perforated plate, B. C is the pipe conducting cold water to and up through the center of the plate B. D is the inlet for the exhaust steam into the condenser A, said inlet being located immediately below the perforated plate B. E is a valve at the bottom of the condenser A, opening into and at the top of the air-pump G; and at the bottom of this air-pump is an outward-opening valve, H. I is the steam-chest, with a rocking valve, J, having ports *a a* and *b b*, as shown in Fig. 3. From this valve a valve-stem, *d*, passes into the air-pump G; and upon the end of the stem *d*, within the air-pump, is attached a curved lever, K. From the outer end of this lever depends a rod, *f*, upon which is a hollow ball, L, capable of moving up and down on the rod. On the valve-stem *d*, between the air-pump and the steam-chest, is a weighted lever, M, to hold the rotary or rocking valve J in position. Below the rocking valve J is a piston-valve, N, having an opening, *e*, in the top, and an opening, *i*, in the bottom at or near each end, as shown in Fig. 2. From the bottom of the steam-chest, one pipe, O, leads to the inside and nearly to the top of

the air-pump G, and another pipe, P, into the condenser A. Through a partition in the steam-chest, between the valves J and N, are ports *m m'*, one at each end, and another port, *n*, at or near the center.

The steam to be condensed is admitted into the condenser A at the inlet D, and the cold water passes in through the pipe C over the perforated plate B, and, falling through the perforations in the same, comes in contact with the steam, condensing the same, and forming a vacuum. The water falls to the bottom of the condenser, and flows through the valve E into the air-pump G, and, as it rises in the same, the ball L rises on the rod *f*. When the air-pump G is full of water, the hollow ball L, having risen to the top of the rod *f*, forces the lever K upward, turning the valve J in such a position as to open the ports *a*, and allow the steam from the top of the steam-chest to pass through the passage *m* and force the piston N past the opening of the pipe O. The steam will now pass through said pipe into the air-pump G, and force the water out of the pump through the valve H. As soon as the water is out of the pump the hollow ball E falls to the bottom of the rod *f*, pulling the lever K down, turning the valve J into such a position as to allow the steam from the top of the steam-chest to pass through the ports *b b* and passage *m'*, and force the piston N into the position shown in the drawing, allowing the vapor to pass out of the air-pump, through the pipe O, piston N, and pipe P, into the condenser A. As soon as the pressure is out of the air-pump the water at the bottom of the condenser passes through the valve E into the air-pump again, and the same operation is gone through with again. The steam that moved the piston N from *m'* to *m* is now allowed to escape from that end of the piston, as soon as the valve J is turned by the rising of the ball, through the passage *m'* into the valve J, and through the passage *n* and port *e* into the piston, and from thence through the pipe P to the condenser. As soon as the steam at the end *m'* of the piston is thus exhausted, the steam from the ports *a* of the valve will move the piston N and pass through the pipe O to the air-pump, continuing the operation as above described.

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

1. The pump G, in combination with the hollow ball L, rod *f*, lever K, attached to the valve-stem *d*, the rocking valve J, steam-chest I, and piston N, constructed and arranged substantially as and for the purposes herein set forth.

2. The combination of the steam-chest I, having partition, with passages *m*, *m'*, and *n*, the rocking valve J, with ports *a a* and *b b*, and the piston N, with ports *e* and *i i*, all con-

structed and arranged substantially as and for the purposes herein set forth.

3. The arrangement, with the condenser, pump, and steam-chest, of the pipes O and P, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 23d day of November, 1872.

SAML. GIBBONS. [L. S.]

Witnesses:

WM. M. BRYAN,  
H. BRYAN.