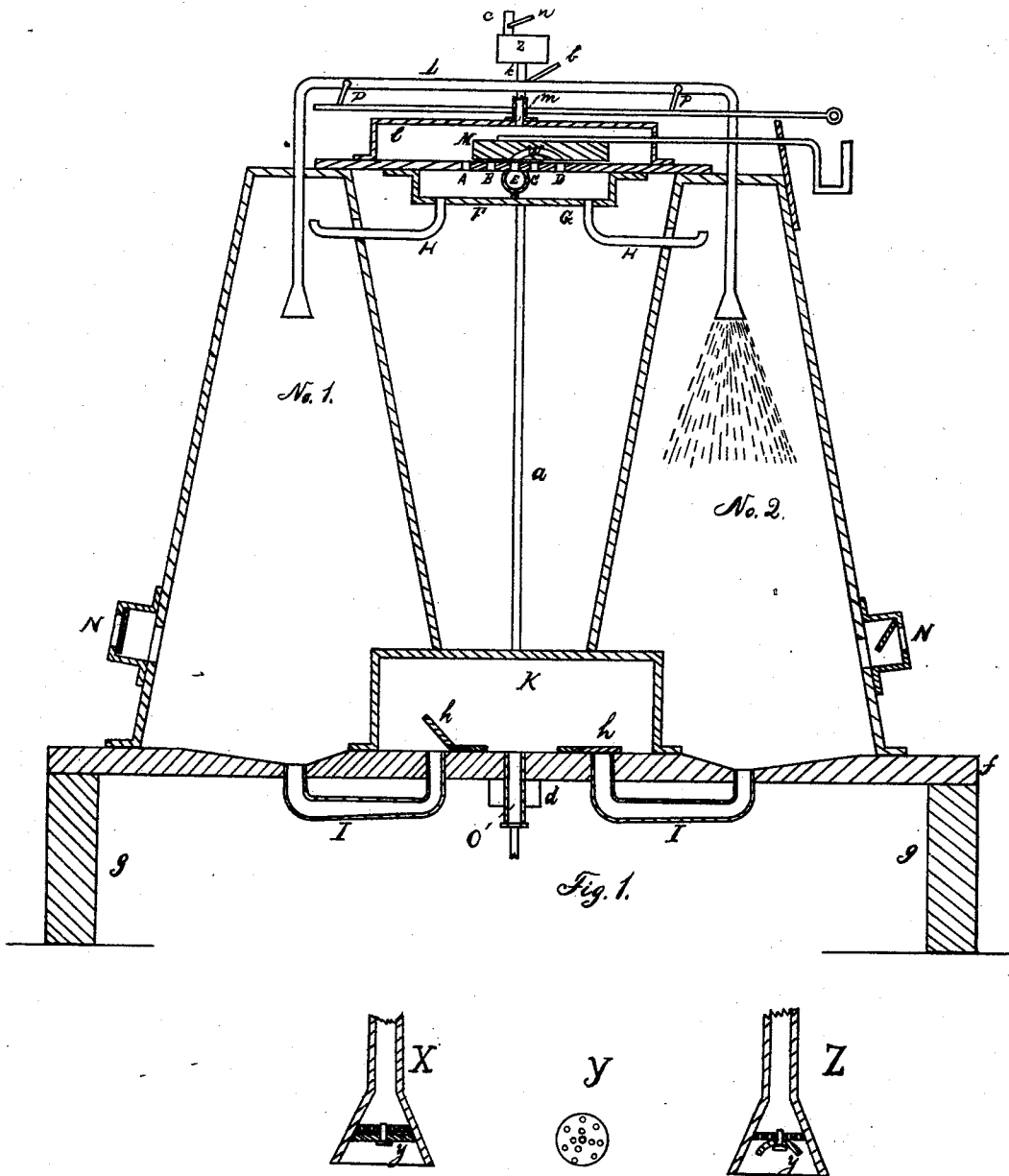


L. CHASE.

Air-Compressors or Blowers.

No. 151,753.

Patented June 9, 1874.



Witnesses:
 Frank H. Jordan.
 Chas W. Carlson

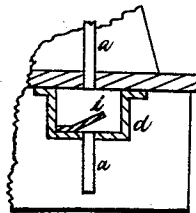
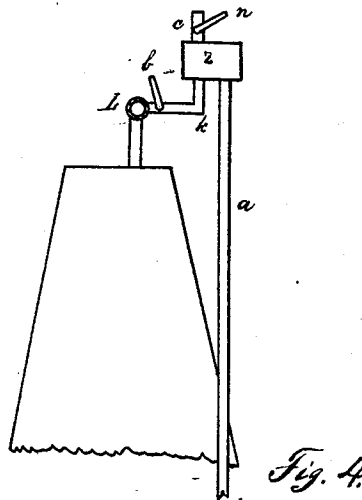
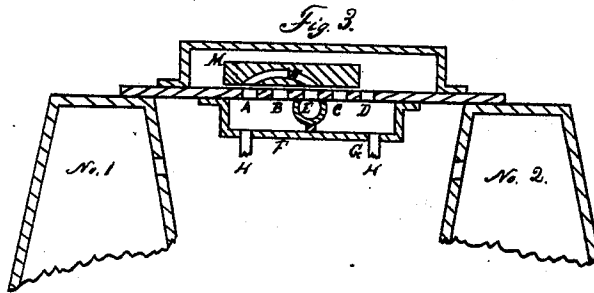
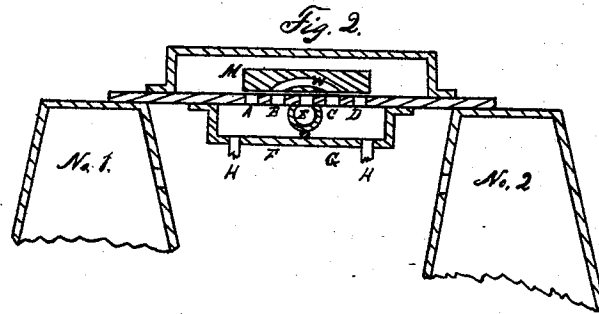
Inventor:
 Lorenzo Chase

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Chas W. Cahoon

Inventor:-
Lorenzo Chase

UNITED STATES PATENT OFFICE.

LORENZO CHASE, OF PORTLAND, MAINE, ASSIGNOR OF ONE-HALF HIS
RIGHT TO CHARLES W. CAHOON, OF SAME PLACE.

IMPROVEMENT IN AIR COMPRESSORS OR BLOWERS.

Specification forming part of Letters Patent No. **151,753**, dated June 9, 1874; application filed
May 4, 1874.

To all whom it may concern:

Be it known that I, LORENZO CHASE, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Air Compressors or Blowers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a vertical section of my invention. Figs. 2, 3, 4, and 5 are detail views.

Same letters show like parts.

My invention constitutes an improvement in air compressors or blowers, having reference to that class which has double alternating-acting chambers. Its object is to allow the steam, after having compressed the air in one chamber, to be expanded into the other, and admitting new steam of higher pressure in addition thereto, until the requisite pressure is reached, thus greatly economizing the use of the steam. It also consists, in addition to the above, in allowing the steam beyond atmospheric pressure to escape before furnishing the water for producing the vacuum for the supply of the air, and in the supply and discharge of the water for the purpose, thereby saving water and power. This is all brought about by a few simple changes in the steam-chest and valve, and in their operation, as is hereinafter fully described.

Nos. 1 and 2 represent conical chambers attached to a bed-piece, *f*, having standards, *g*. *K* shows a rectangular chamber in front, attached to the same bed-piece. *I I* are curved pipes leading out of the bottom of the chambers 1 and 2 into the chamber *K*. These pipes have valves *h h*, which open into said chamber *K*. Leading out of this chamber from the bottom is a pipe, *O*. *N N* represent valves opening inwardly to the chambers 1 and 2. *z* is a tank, situated over the top of these chambers, having a pipe, *a*, entering it, which leads downward to a box, *d*, which has

a check-valve opening inwardly. A side view of this tank, with its connections, is shown in Fig. 4. Another pipe, *k*, leads from the bottom of this tank into a pipe, *L*, the latter having branches, one of which leads into chamber No. 1, the other to chamber No. 2. Each branch has a conical end with spraying-nozzle, and a check-valve, *y*. The sides of these cones extend beyond the valves, so as to prevent the water from striking the sides of the chambers as it enters. In this pipe *L* are two cocks, *P P*, which are connected, so as to operate together, by a long rod. These cocks may be used for the purpose of checks in case of there being too low a pressure in the chambers to close the valves *y* against the water. *l* is the steam-chest, and *M* the steam-valve. *w* is a port in the valve. *A, B, C, D*, and *E* are steam-ports in the chest, the latter being the exhaust. *x* is a check-valve to the exhaust-port *E*, opening outwardly. *F* and *G* are separate compartments, to which the ports *A, B, C*, and *D* lead, and *H H* are pipes leading from these compartments into the chambers 1 and 2, curving upward after entering the same. *m* is the steam-pipe for supplying the steam-chest from the boiler.

Having thus explained the object and construction of my invention, I will now proceed to describe its operation.

The steam-port *A*, Fig. 1, being open, steam passes from the steam-chest *l* into the compartment *F*, and from thence through the pipe *H* into the compressor No. 1, and, striking against the top of the same, forces the air downward through the compressor, and, through the pipe *I* at the bottom, into the air-reservoir *K*. From thence it passes through the pipe *O* into the water, for the propulsion of vessels, or for other blowing purposes. The steam-valve *M* then shuts off the port *A*, as in Fig. 2, and places the ports *B* and *C* in connection through the port *w* in the valve, so that the steam in chamber No. 1 will be expanded into No. 2. The steam-valve, then, continuing its course in the same direction, opens the port *D*, as in Fig. 3, and lets new steam of higher pressure from

the steam-chest into No. 2 in addition to that which it had previously received from No. 1. This brings up the pressure in the No. 2 chamber to the requirements of the work, and places the ports A and E in connection, which exhausts the remaining pressure from No. 1. After the pressure has thus been exhausted, the weight of the water in the tank *z* will open the valve *y* in the pipe L, and will cause it (the water) to flow in upon and condense the remaining steam, thereby creating a vacuum and drawing the outside air through the valve N to fill the chamber again for further action. The check-valve *x* prevents the return of steam during the vacuum, and the steam-valve M rests at the end of each stroke, so as to give time for the steam to condense, and for the entrance of the air. The same process is repeated in chamber No. 2, each chamber working alternately, and compressing the air in the reservoir K, opening and closing the valves *h h* as the pressure alternates in the chambers. When the water is drawn from the tank *z*, a vacuum is created therein, which draws up an additional supply through the pipe *a* from a well outside. Before commencing to operate, the tank *z* and pipe *a* above the valve *i* should be filled with water through the pipe *c*, which has a cock, *n*, to shut it airtight after being filled. In case the automatic supply of water should not be used, the tank *z* may be supplied by a force-pump, the cocks

P P regulating the supply to the chambers, and in case the pressure of steam should not be let off from the chambers before the water for condensation was furnished, the port E may be dispensed with or closed up, which, when it is simply desired to blow the air without any very material force, may be done without much disadvantage. The steam-valve may be operated by a rocker-arm connected with a steam-engine, moving in the link at the end of the valve-stem, and the cocks P P, by cam motion, connecting with the rod attached to the handle of the same. X, Y, and Z show enlarged detail views, in section, of the conical nozzles and check-valves *y*. Fig. 5 shows a detail view of the exhaust-port and its check-valve *x*.

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

The combination of the ports A and D with the ports B and C, and with or without the port E, operating in conjunction with the steam-valve M and its port *w*, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

LORENZO CHASE.

Witnesses:

FRANK H. JORDAN,
EDWIN W. HASKELL.