

JOHN A. SVEDBERG.

Blowers.

No. 123,304.

Patented Jan. 30, 1872.

Fig:1

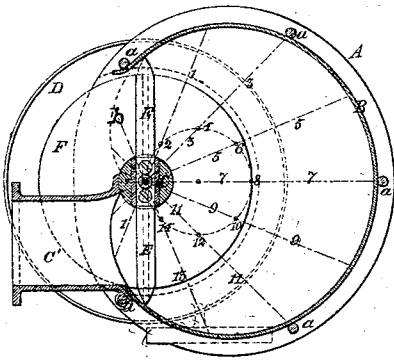


Fig:2

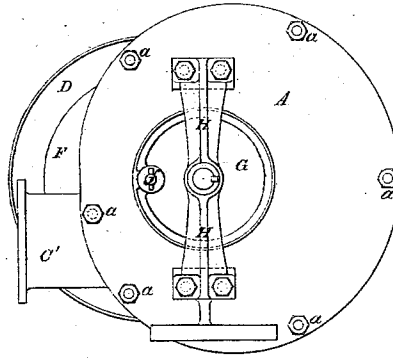


Fig:3

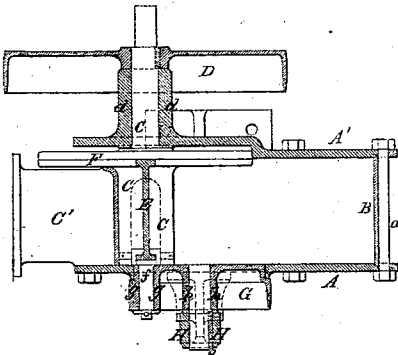
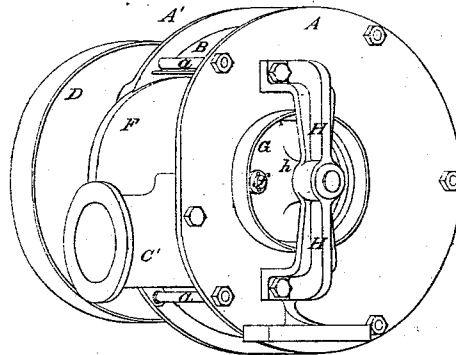


Fig:4



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN A. SVEDBERG, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN BLOWERS.

Specification forming part of Letters Patent No. 123,304, dated January 30, 1872.

*To all whom it may concern:*

Be it known that I, JOHN A. SVEDBERG, of the city of Washington, in the District of Columbia, have invented certain new and useful Improvements in Rotary Blowers, of which the following is a specification:

My invention relates to that class of blowers in which a piston-like blade is mounted eccentrically, and so as to have a sliding and rotary movement within a suitable cylinder or case provided with openings for induction and eduction of the air. The invention may be stated in general terms to consist in the combination, with the cylinder or case, of the blower, and a rotary shaft slotted in the direction of its length, and mounted eccentrically within the same, of a piston-like blade or fan passing through said slotted shaft, and pivoted at its center or midway between its two ends to a rotary pulley or its equivalent, arranged eccentrically to the slotted shaft, and making two revolutions to each one revolution of said shaft. The eccentric pulley is arranged upon the exterior of the case, so as not to occupy any of the space in the air-chamber of the blower, which is thus free of all mechanism, except the fan or blade and the slotted shaft. The variation between the rates of movement of the pulley and shaft is such as to cause the pulley, and, consequently, the fan which it carries, to make two revolutions to one of the shaft. During these movements, as the pulley and shaft have different centers, the fan or blade must necessarily slide back and forth in the slotted shaft, which serves to guide and determine the plane of movement of the blade or fan, while the latter is being driven or carried around by the pulley, whose size and center of motion are so proportioned and arranged, with respect to the cylinder or case of the blower, as to always maintain the one or the other of the ends of the fan or blade in close proximity to the inner periphery of the case.

The manner in which my invention is or may be carried into effect will be readily understood by reference to the accompanying drawing, in which—

Figure 1 is a longitudinal vertical section, and Fig. 2 is a side elevation of a blower made in accordance with my invention. Fig. 3 is a horizontal section, and Fig. 4 a perspective view of the same.

The cylinder or case consists of two heads, A A', preferably of cast metal, placed at a suitable distance apart, and having the greater portion of the space between them inclosed by a sheet-metal plate, B, the curvature of which follows the curved path described by the piston-blade or fan, hereinafter mentioned. The parts A A' and B are united by air-tight joints, and, in order to give more strength to the case thus formed, stay-rods or bolts, *a*, pass through and bind together the heads at their outer edges upon the exterior of the peripheral plate B. The front end of the case is provided with two openings—the one, *b*, for induction, and the other, *c*, for eduction of the air. The eduction-opening is provided, as shown, with a flanged tube, *c'*, fastened to the case, and intended to connect with the conduit through which the discharged air is conducted to the point where it is to be used. In the front of the case, midway between and forming the division between the induction and eduction openings, is a transverse shaft, C, which extends out through the side A' of the case, and is supported in a tubular bearing, *d*, formed thereon. Upon the end of the shaft, projecting beyond the bearing, is fixed a pulley, D, by means of which said shaft is rotated. The end of the shaft next the head A has no bearing in said head, for the reasons hereinafter stated. That portion of the shaft within the air-chamber of the blower is made larger than the part supported in bearing *d*, in order to admit of a longitudinal central slot being formed through it, extending the length of that part of the shaft included within the chamber. Through this slot freely passes a fan or blade, E, which, when operated as hereinafter described, has a sliding piston-like movement in it. In order that the blade E may be properly supported and stiffened, it is provided at each side with a T-flange, which, on the side next to the head A, is received in a recess of corresponding shape formed in the end of the shaft C. The flange on the other side slides in a groove or recess formed in the disk F, which is fixed to and revolves with the shaft, and is of such size as to fill a circular recess formed for it in the head A', thus closing the chamber against escape of air at that point. The flanged blade or fan E is of a width equal, or very nearly so, to the distance between the heads

A A', and its length is such as that in whatever position it may happen to be it will extend across to form a diaphragm between the shaft C and periphery B of the case. On one side of, and midway between the ends of the blade, is bolted or otherwise fastened a projecting pin, *f*, which works in a socket, *g*, formed for it in a pulley, G, the hub *h* of which is mounted on a horizontal pin or axis attached to a bracket, H, secured to the head A of the case. This pulley works in a circular opening cut for it in the head A, and its inner face is flush with the inner surface of the head. The axis of the pulley, as represented, is in the same horizontal plane as that of the shaft C, and the distance between its axis and the socket *g*, in which the pin *f* works, is equal to the distance in said plane between the two axes. Thus when the slot in the shaft C is vertical, the blade, guided by said shaft and held in said slot, will also be vertical, and the axis of pin *f* will coincide with that of the shaft.

The rate of movement of the shaft C and pulley G should be in the proportion of two revolutions of the latter for one of the former, because were they to revolve only with equal speed, a quarter revolution of the shaft C would bring its slot in the horizontal plane 7, while a quarter revolution of the pulley F would only carry the pin *f* to the point 4, and this, of course, would be practically impossible, and could only result in the breaking of the machine; whereas if the pulley should move twice as fast—that is, make a half revolution in the same time that the shaft makes a quarter revolution—the pin *f* would be carried around to the point 8, in the same horizontal plane 1 with the slot in the shaft, which would be just what is necessary to the successful operation of the machine.

This difference in the movement of the two can readily be effected in many ways. Supposing that they receive motion from the same driving-shaft and from pulleys of equal size mounted thereon, then it will be sufficient to make the pulley G of one-half the diameter of the pulley D. Or these pulleys may be of equal size, and the proper difference in size may be made in their driving-pulleys. Or, in lieu of pulleys, the motion may be communicated to the blade and shaft by means of gearing properly proportioned. All that is necessary is, that there should be the above-specified difference between the movement of the blade and shaft.

The operation of the blower is as follows: Supposing the blade to be in the upright position shown in the drawing, when both pulleys are put in motion running at different speeds, as above specified, the shaft will revolve, while at the same time the blade will be carried around, its motion being a compound of that of the shaft C and the pulley G. For instance, when the slot in the blade is in the plane 1, the pin *f* will have traveled to 2, and so on throughout the circuit, the figures

3, 5, 7, 9, 11, 13, indicating the planes in which the slot will be when the pin *f* reaches the points 4, 6, 8, 10, 12, 14, the greatest departure of the pin *f* from the axis of the shaft C being at the point 8. The blade will, of course, slide back and forth in the slotted shaft during these varied movements, its end or ends being maintained all the time in such proximity to the periphery of the case as to prevent any appreciable escape of air back of it.

It will be seen that the blade will make two revolutions for every single revolution of the shaft, and that thus every time the shaft revolves the cylinder or case of the blower will be filled and emptied twice.

A blower operating on the principle above described is of great value, and can be used to much advantage in the industrial arts. It is comparatively inexpensive, is very effective in its operation, and is not liable to get out of repair. With slight changes in construction, but without any change in principle, it may be used as a pump for water and other liquids, all that is necessary in this case being that care should be taken to have tighter joints than needed for forcing air.

It is manifest that the construction and arrangement of the various parts of the blower may be varied in minor details; and I do not, therefore, limit my claim to the precise mechanism herein shown and described; but

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

1. In an apparatus for forcing air or other fluids and liquids, the combination, with the case or cylinder, of the slotted shaft and the driving-pulley or its equivalent revolving at different speeds, as herein specified, and the piston-blade, sliding in said slotted shaft and connected with and operated by said driving-pulley or its equivalent, substantially as herein shown and described.

2. The combination, in an apparatus operating substantially as specified, of the slotted and grooved shaft, the cylinder or case, the flanged piston-blade, and the grooved disk, in which one flange of the piston-blade is supported and moves, arranged substantially as shown and described.

3. The driving-pulley for the piston-blade, supported on one of the heads of the cylinder or case, and arranged to fit a circular opening formed therein, so that its inner face may be flush, or nearly so, with the inner surface of the head.

4. A rotary blower or apparatus for forcing air or other fluids and liquids, composed of the parts herein specified, arranged, and operating substantially as herein shown and described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

Witnesses: JOHN A. SVEDBERG.  
M. BAILEY.  
A. POLLOK.