2 Sheets--Sheet 1.

J. A. SVEDBERG.

Rotary Blowers.

No. 138,448. Patented April 29, 1873.

Fig. 1

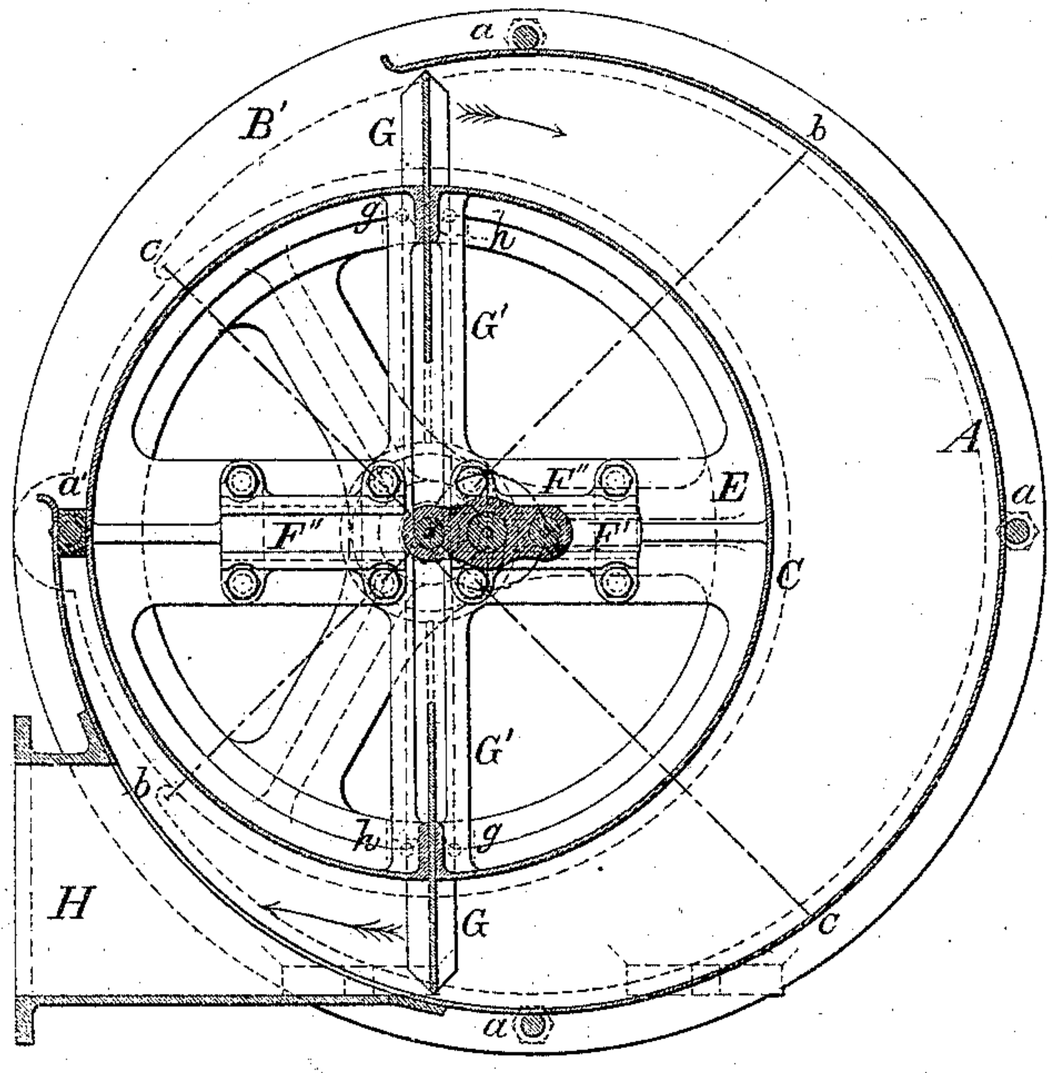
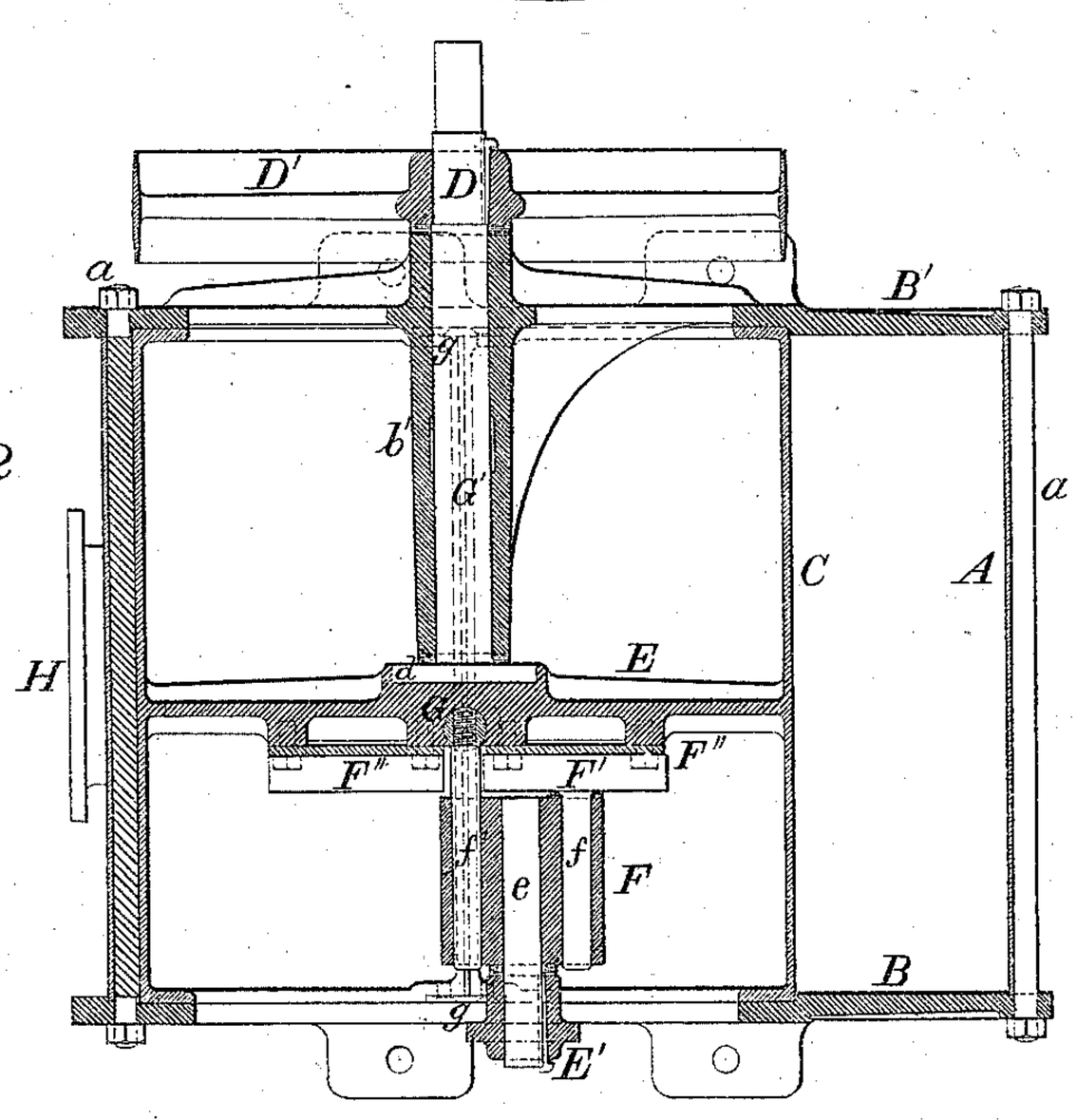


Fig. 2



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2 Sheets--Sheet 2.

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Fig. 3

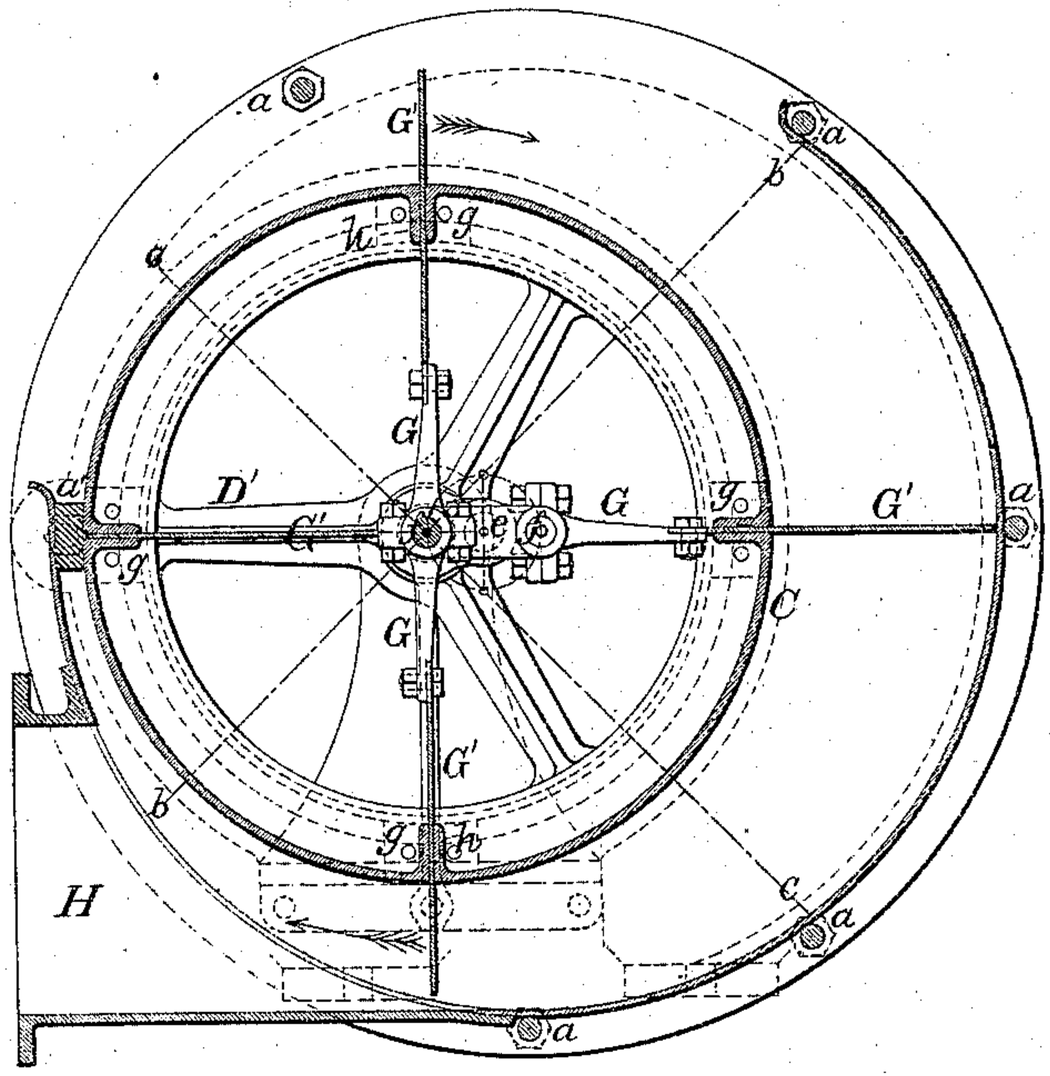
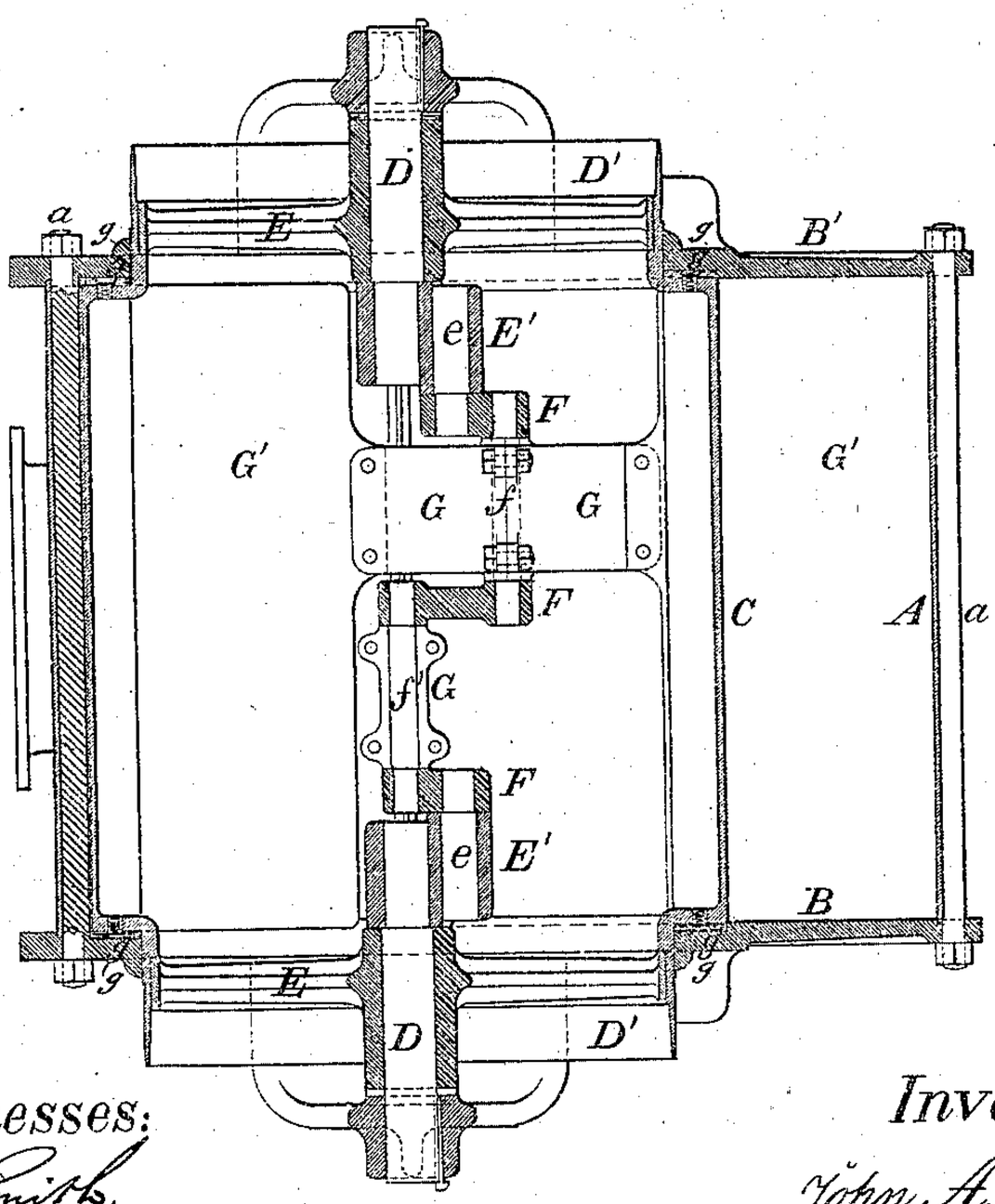


Fig. 4



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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN ROTARY BLOWERS.

Specification forming part of Letters Patent No. **138,448**, dated April 29, 1873; application filed February 18, 1873.

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 Improvements in Rotary Blowers, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to that class of blowers in which the blades are mounted so as to revolve eccentrically within and longitudinally of a cylindrical casing having induction and eduction air-ports, the effect upon the said blades of the eccentrical action being the imparting to them of a reciprocal sliding movement within bearings formed in a drum having its axial center removed at a distance from the corresponding center of the cylindrical casing. The said distance operates with the throw of the devices, giving the said eccentric movement to the blades in such a manner as to cause the extremities of the said blades, when in rotary motion within the casing, to be at all times in contact, or nearly in contact, with the interior surface of the said casing.

Referring to a rotary blower as I preferably construct it, the following is an outline of the distinctive features therein constituting my invention, although the machine is susceptible of modifications in construction, one of which modifications, in which no varying principle is exhibited, being herein described and shown in a separate sheet of drawing, and claimed as a part of my invention.

My invention consists in the drum aforesaid, not in itself absolutely, but as provided interiorly with a bearing-support having formed within it a rest or socket for a part of the driving-shaft and a double bearing for the sliding part of the devices, imparting to the blades the eccentric movement aforesaid, the space existing between the said bearing-support and the head next thereto constituting a chamber or recess in which all the said eccentrically-moving parts are contained, this arrangement bringing practically the whole width of the blower within the length of the cylindrical casing. My invention further consists in the combination with the said drum of a piston-like rod or rods, the bearing of which is partly formed in the bearing-support aforesaid, and terminates at and within opposite parts of the periphery of the said drum, through and past which the said piston-like rod is adapted, by means of another part of my invention, to slide, the said rod having mounted upon it the blower-blades, which, sliding with the rods, have their immediate bearings in slots arranged diametrically of and within the said drum, along the whole length of the space between the inside surfaces of the respective heads of the cylindrical casing. Strips or ribs *h* are cast within the drum at each side of the slots, thus deepening the said slots and giving to the blades a steady and substantial bearing. My invention consists, further, in a combination of parts which, when applied to the blades through the mediumship of the piston-like rod aforesaid, gives to the blades the eccentric movement before alluded to. One of these parts is a double crank, having three points of attachment and revolution, placed upon a right line with reference to each other, the central one of which points is the axis about which the double crank revolves upon its shaft or pin. The bearing for this pin is formed in the center of a yoke placed across the opening in one of the heads of the cylindrical casing. The said center around and upon which the double crank revolves is placed at a mean distance between the fixed center of the aforesaid drum and the center limiting the throw of the eccentrically-moving parts, so that, as one of the end centers of the double crank is made to reach and coincide with the said fixed center of the drum, a double effect is produced upon the aforesaid piston-like rod and blades thereto attached, in that, as one blade is forced from the drum to the extent of the eccentric movement, the other is drawn in a corresponding distance within the drum. To accomplish this result there are provided, in addition to the bearings for the piston-like rod formed within the aforesaid bearing-support in the drum, other bearings at a right angle with the rod for the reception of a dovetailed slide attached to an end of the double crank, the other end of the crank being attached to the piston-like rod. The bearing for the slide is upon a plane

higher than the bearing for the piston-like rod, so that the rod and slide do not touch in passing each other.

In the further description of my invention which follows, due reference must be had to the accompanying drawing, in which—

Figure 1 is a vertical section of my improved blower as I preferably construct it. Fig. 2 is a sectional plan of the same. Fig. 3 is a vertical section of the blower modified in construction. Fig. 4 is a sectional plan of the same.

Similar letters of reference indicate similar parts of the invention in all the views.

Referring to Figs. 1 and 2, A is the cylindrical casing of sheet metal, having cast heads B B′. The heads are provided with feet, by means of which the blower is secured to the floor. The sheet-metal casing is fitted within grooves formed in the heads B B′, the several parts of the entire casing being held together by the bolts *a a′*. C is the drum, the axial center of which is fixed at a point intersected by the dotted lines *b b* and *c c*, the center, as has been hereinbefore stated, being removed a certain distance from the corresponding center of the cylindrical casing. Centrally of the drum is a driving-shaft, D, having keyed to it the pulley D′. The bearing for this shaft is formed by a part, *b′*, of the head B′ extending as a sleeve into the hollow drum. E is the bearing-support, which may either be solid or, as shown in Fig. 1, cored out to render it lighter, cast in the drum, having at one side a rest or socket for fastening the end of the driving-shaft, which end may either be square or, as I prefer to make it, round to facilitate the correct centering of the shaft within the drum. At the other side of the bearing-support E are the bearings for the respective sliding parts of the devices, producing the eccentric movement aforesaid. The double crank represented by F has its central bearing upon a pin, *e*, keyed to the yoke E′, secured to the head B of the cylindrical casing. F′ is the dovetailed slide, having a pin, *f*, forming a part thereof, passed through a hole drilled to receive it at one of the end-centers of the double crank F. The other end-center of the double crank has a hole drilled thereat, through which a pin, *f′*, tapped into the piston-like rod G at its center longitudinally, is passed. The bearing for the dovetailed slide F′ consists of two parts, F″, bolted to the bearing-support E, a cavity circular in cross-section cast in the bearing-support E itself forming a bearing for the piston-like rod. The blower-blades, shown by G′, are securely attached to the piston-like rod G, and of a width equal to the distance between the interior surfaces of the heads of the cylindrical casing, their bearings being formed in slots cut in the drum, deepened by the strips or ribs *h*. The ends of these slots are covered, and the drum stiffened by plates *g* tapped to the drum. The induction air-port is that opening bounded by the upper part of the periphery of the drum, the upper termination of the casing, and the respective heads thereof. The nozzle H, secured to the casing, forms the eduction-port.

In Fig. 1 the blades are represented in a position in which they are equidistant from the axial center of the drum. To illustrate the sliding movement of the blades let it first be supposed that they are moved to the angle shown by the line *b b*, the double crank F assuming a position in which its end centers are brought to a vertical line. The upper end-center or pin *f* makes one-fourth of a revolution, or is removed ninety degrees from the point in which it is shown in Figs. 1 and 2. The drum, however, makes in the same space of time but one-eighth of a revolution, the variation between the rates of movement of the drum and double crank being such that the form makes but one revolution to two of the latter. As the piston-like rod is caused to slide within its bearings by the one-fourth revolution of the double crank F, the upper blade is forced out from the drum to, or nearly to, the interior surface of the casing. The lower blade is of course drawn in toward the center of the drum, a distance corresponding with that to which the upper blade is forced out, the upper and lower blades maintaining at all points in their travel their contact with, or close proximity to, the interior surface of the casing. The dovetailed slide is subject of course to the revolutions given to the drum revolving upon its center. The slide, it will be seen, overcomes the stopping of the blades upon a dead center, and were the slide removed they would, when they reach a vertical position, fall of their own weight, and make only a rotary movement with the drum instead of the sliding and rotary movement herein described. The piston-like rod is subject also to a double movement, the sliding, reciprocal, and rotary. The rotary movement is dependent upon that of the drum, with which the rod revolves. In order to give to the blades their greatest movement, they must be brought to a horizontal plane.

In this case the upper blade, Fig. 1, would be extended to its greatest distance beyond the drum, and the lower one drawn entirely within the drum, so as to clear the bolt *a′*, which also serves as a packing between the drum and cylindrical casing. To accomplish the one-fourth revolution necessary to bring the blades to a horizontal plane, one-half of a revolution is made by the double crank, the end center thereof intersected by the lines *b b c c*, being carried over to the point shown in Fig. 1, occupied by the other end center. One-half stroke is made by the dovetailed slide F′, and a half-stroke given to the blades—that is to say, they are moved to the greatest distance they are capable of achieving from the central position—in which they are shown in Fig. 1.

In Figs. 3 and 4 four blades are shown, the identical principle hereinbefore described be-

ing called into requisition to effect their movement. The fixed pin or center *e* of the double crank is equidistant from the two end centers *f f'* thereof, as in Figs. 1 and 2; and the pin *f'* in this construction, as in the other, takes hold of the rod G attached to two of the blades, the only difference being that, whereas, in Figs. 1 and 2, the office of the other center *f* of the double crank is to pivot upon the dovetailed slide, its office in this modification of my invention is to operate another set of blades, which in themselves take the place of the slide aforesaid. It is manifest that the eccentrical movement of the double crank and its attachments is the same as that hereinbefore described. The driving-pulleys D' D' and drum are, in this construction, cast together, and other minor changes are introduced which it is evident are not required by reason of any departure from the principle herein explained, but only because of the use of four blades instead of two, which, being placed at a right angle to each other, act mutually as a guide and brace.

This blower, in common with others of its class, produces a blast having a positive force, and should be distinguished from the various centrifugal blowers or fans which do not produce a pressure-blast. This machine is analogous, rather, to blast-cylinders, as in either case the air must find escape or vent, or the machine stop; but a centrifugal fan can run with the outlets closed without being in the least impeded in its action.

The advantages of a positive-force blast are great, and do not require demonstration. The saving of power for producing the same cubical quantity and pressure of air by a machine of the class similar to that herein described, over that required for an ordinary fan, is at least fifty per cent. A pressure of from two to three pounds per square inch can easily be attained by such a machine revolving at a rate of from one hundred to one hundred and fifty revolutions per minute, while a pressure of only from one-fourth to one-half of a pound per square inch, can be gained by the fan running at a speed of from two thousand to four thousand revolutions per minute.

With slight changes in construction, but without any change in principle, this machine can be used as a pump for water or other liquids, or as a rotary engine, to be operated by steam or hot air. Care would, however, be necessary in rendering the joint tight enough for such purposes.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. In combination with the drum C, the bearing-support E revolving with it, and the stationary yoke E', placed axially upon different center lines as bearings for the parts operating the blades of the blower, as set forth.

2. The drum C of the blower, having the bearing-support E revolving with said drum as a part thereof, in combination with the shaft or shafts D, fixed yoke and pin E' *e*, and double crank F, substantially as herein specified.

3. The strips deepening the slots formed within and lengthwise of the drum, as intermediate bearings for the sliding blades, as specified.

4. The combination of the plates *g*, covering the ends of the slots, with the drum, as set forth.

5. In combination with the drum C, the rod or rods G and blades G', the blades having their bearings in the deepened slots cut lengthwise of the drum, substantially as herein specified, for the purpose set forth.

6. In combination with the bearing-support E and bearings F'', the dovetailed slide F' *f*, and piston-like rod G *f'*, and blades G', substantially as and for the purposes set forth.

7. The pin *f'* of the rod G, and pin *f* of the slide F', in combination with the double crank F, fixed pin *e*, and bearing-support E of the drum of the blower, substantially as and for purpose specified.

In testimony whereof I have hereunto subscribed my name, in the city of Washington, District of Columbia, this 17th day of February, A. D. 1873.

JOHN A. SVEDBERG.

Witnesses:
GEORGE H. HOWARD,
EDM. F. BROWN.