T. S. DISSTON.
Rotary-Blower.

No. 165,805. Patented July 20, 1875.

FIG. 1.

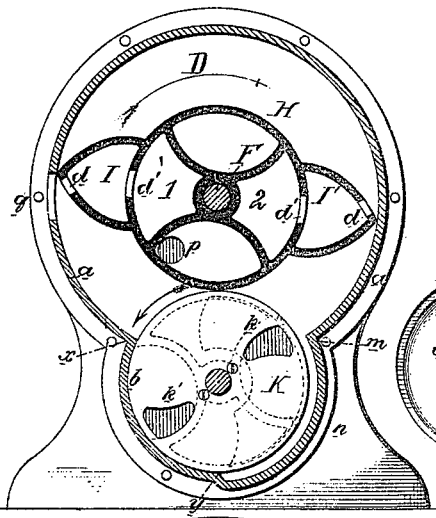


FIG. 2.

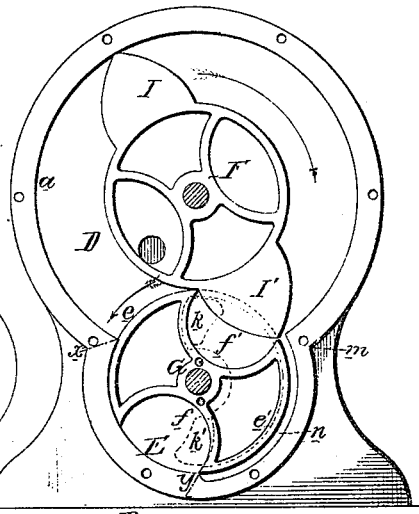


FIG. 5.

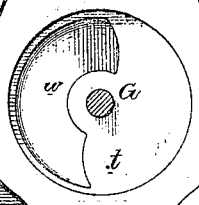
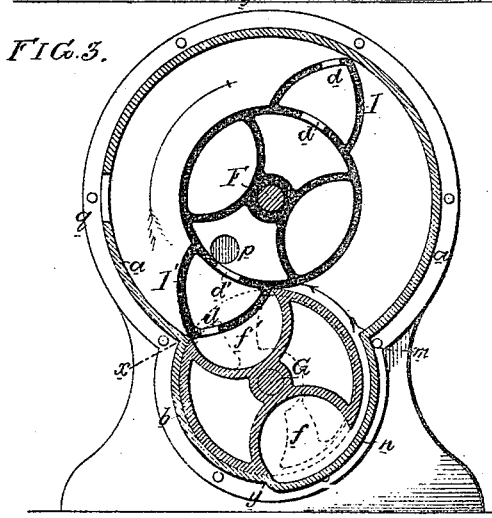


FIG. 3.



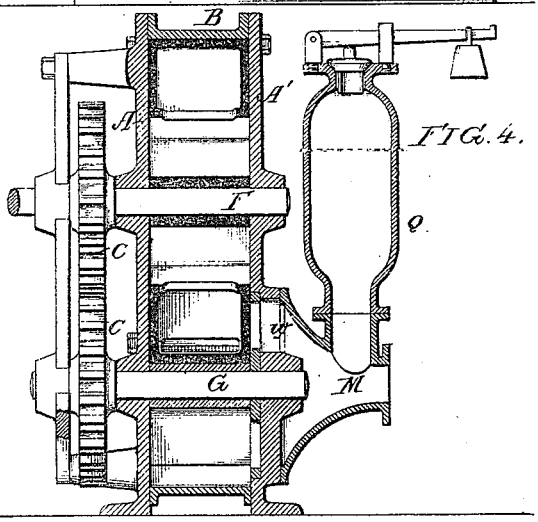


FIG. 4.

FIG. 6.

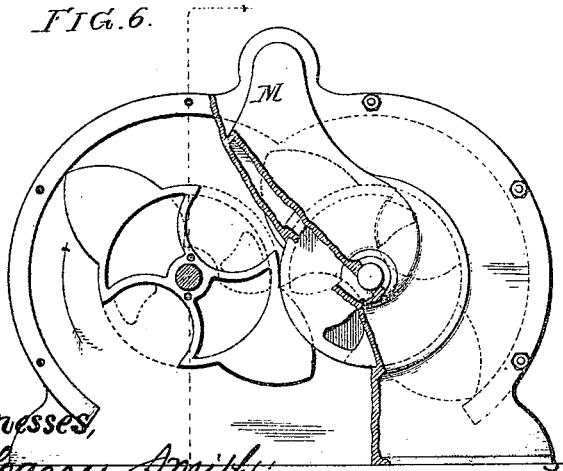
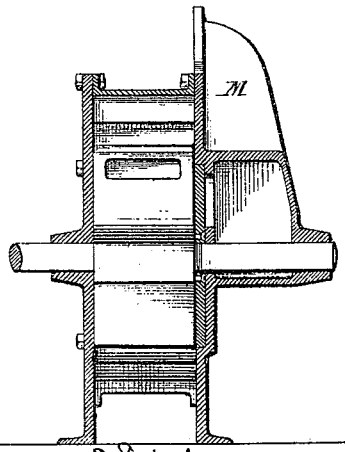


FIG. 7.



Witnesses,
Harry Smith
Hubert Howson

Thomas S. Disston
by his Attorneys, Howson and Howson

UNITED STATES PATENT OFFICE.

THOMAS S. DISSTON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ROTARY BLOWERS.

Specification forming part of Letters Patent No. 165,805, dated July 20, 1875; application filed June 8, 1875.

To all whom it may concern:

Be it known that I, THOMAS S. DISSTON, of Philadelphia, Pennsylvania, have invented certain Improvements in Rotary Blowers, of which the following is a specification:

The object of my invention is to obtain a continuous supply of compressed air by the combination of two or more revolving vanes having curved sides, two or more revolving segments with intervening concave recesses adapted to the said vanes, a chest or casing adapted to the vanes and segments, and a valve or valves operating in unison with the vanes, segments, and recesses, for controlling the outlet of the blast, all substantially as shown in the accompanying drawing, in which—

Figures 1, 2, and 3 are vertical sections of my improved rotary blower, showing the operating parts in different positions; Fig. 4, a transverse vertical section of the blower, and Figs. 6 and 7 views illustrating a modification of my invention.

The chest of the blower, as illustrated in Figs. 1, 2, 3, and 4, consists of the two side plates A and A′ and the intermediate casing B, the latter being of the shape shown in the drawing, so as to form with the side plates the larger chamber D and the smaller chamber E, communicating with each other. The portion *a* of the casing B, which incloses the larger chamber, is cylindrical, and is true internally, the only interruption of its continuity being at the opening between the two chambers. The portion *b* of the casing B, which partly incloses the latter chamber, is also cylindrical, but is made of smaller diameter from *x* to *y*, Fig. 1, than it is from *y* to *m*, so that between the latter points there may be a channel, *n*, for a purpose explained hereafter.

Through the center of the upper chamber D passes a shaft, F, and through the center of the lower chamber a shaft, G, both shafts having bearings in the opposite side plates A and A′, and being geared together by wheels C C, so as to revolve at the same speed. The upper shaft carries a hollow cylinder, H, which has two chambers, 1 and 2, (referred to hereafter,) the cylinder being open at the opposite ends, which, however, are very close to the side plates A and A′ of the chest, without being in absolute contact therewith. From opposite sides of the cylinder H project two hollow vanes, I and I′, each vane being closed at its opposite ends, but having an opening, *d*, through which, and through an opening, *d′*, in the cylinder H, air may pass, under the circumstances and for a purpose described hereafter.

The opposite sides of each hollow vane are made on a curve, and converge to a comparatively sharp edge, which is as close to the cylindrical casing of the chamber as possible without being in absolute contact therewith, the ends of the vanes being also very near to the opposite side plates A and A′.

The form of the curve on which the sides of the vanes are made will be determined by the requirements demanded in the operation of the blower, as explained hereafter, and will be readily understood by those familiar with machinery of this class.

The shaft G carries a cylinder, the continuity of which is interrupted by two opposite concave recesses, *f* and *f′*. These recesses, in fact, convert the cylinder into two opposite segments, *e* and *e′*, of a cylinder, the segments being precisely alike, and projecting from opposite sides of the shaft G.

The periphery of each segment revolves in close proximity to the cylinder H, and to that portion of the casing *b* which extends from *x* to *y*, but so far from the portion of the casing which extends from *y* to *m* that there shall always be a channel, *n*, before alluded to, between the segment and casing.

The segments at one end revolve in proximity to the interior of the side plate A, and the opposite ends of both segments are closed by a disk, K, which revolves with the shaft in a recess formed in the inside of the side plate A′. This plate performs the duty of a valve, as will be seen hereafter, and has two ports, *k* and *k′*. (Best observed in Fig. 1.)

The valve-face, against which the disk or valve K revolves, has a port, *w*, (shown in Figs. 4 and 5,) through which, and through the outlet-pipe M, the compressed air is discharged from the blower.

The disk-valve K may be cast on and form a part of the segments *e* and *e′*, and the shafts F and G may be dispensed with by casting

journals on the cylinder H and the hub of the segments.

In Fig. 1 the cylinder H, with its vanes, is revolving in the direction of the arrow, the segments *e* and *e'*, with the disk-valve K, consequently turning in the direction pointed out. The vane I has just passed the inlet-opening *q*, and is pushing before it, without yet subjecting it to pressure, a supply of air, which had been admitted to the chamber D through the said inlet. In the meantime the vane I' is pushing before it another supply of air, which cannot escape between the cylinder H and the segment, with which the cylinder is in contact, or very nearly so, the only avenue for the escape of this supply of air in advance of the vane I' being first into the recess *f'* between the segments *e* and *e'*, thence through the port *k* in the disk-valve K, and thence through the port *w* in the valve-seat, and thence into the outlet M, through which the air under pressure is forced.

When the vanes have reached the position shown in Fig. 2, a portion of the air in advance of the vane I' has been entrapped, as it were, by the latter in the recess *f'* between the segments *e* and *e'*, and as the space within the recess must be gradually contracted by the continued movement of the said vane the air under pressure due to this contraction must be disposed of; hence the port *k* of the disk-valve remains open for the discharge of this entrapped air through the port *w* in the valve-seat *t*, and thence through the outlet until the contraction of the space within said recess *f'* by the vane ceases, or shortly after it ceases. When the vane I' has reached the position shown in Fig. 2 the port *k'* in the disk-valve K has commenced to open, and the air in advance of the vane I in the chamber D will be forced through the channel *n* into the recess *f* between the segments *e* and *e'*, thence through the port *k'* of the disk-valve, and through the port *w* of the valve-seat *t* into the outlet M.

It will be understood that as each vane passes into and from its recess between the segments the extreme edge of the vane is in contact, or very nearly so, with the concave edge of the recess, and that the comparatively sharp ends of the segments are in contact, or nearly so, with the curved sides of the vane; hence there can be no communication between the two compartments into which the chamber D is separated by the cylinder H and its vanes when the latter are passing through the recesses. The several views, moreover, will show that under no circumstances, and during no relative position of operating parts, can there be any such communication.

It has already been remarked that a body of air is entrapped by each vane as it enters one of the recesses between the segments, (see Fig. 2,) and that this air is compressed as the recess is contracted by the vane and the compressed air forced through the outlet. After the space in this recess has been contracted and the air disposed of, the space, as the vane leaves the recess, must be expanded, and a partial vacuum would be caused therein but for the provisions best observed in Fig. 3. When each vane reaches such a position in its recess that the space within the latter commences to expand there is a communication between the recess and the outside of the blower through the opening *d* into the hollow vane, thence through the opening *d'* in the cylinder H, and thence through an opening, *p*, in one of the side plates in the chest. Thus the creation of a partial vacuum in the recesses *f* and *f'* is obviated, and the shocks which would result from such a vacuum prevented.

It will now be seen that during every complete revolution of the cylinder H two volumes of compressed air are discharged by the vanes through the outlet; but there are two additional volumes of air discharged from the outlet—that is, the minor volumes caused by the vanes forcing the air from the recesses *f* and *f'*, and these minor volumes tend to equalize the blast, for each minor volume is being forced through the outlet during the time when one vane is concluding its duty and the other vane is commencing its duty. The blast created will not be discharged by sudden intermittent pulsations. While there may be some irregularity, however, in the force of the blast, this may be modified by the use of an air-vessel, Q, which may be provided at the top with a safety-valve, as shown, for determining the pressure of the blast. A cylinder, H, with more than two vanes, may be employed, the segments and the recesses between the same being increased in number accordingly.

In the modification shown in Figs. 6 and 7 there are two shafts, each carrying two vanes similar to those described above; but these vanes, instead of being on a cylinder, H, separate from the segments, are attached, two vanes directly to each pair of segments, the vanes of one pair of segments being adapted to the recesses between the other pair of segments, and operating in conjunction with the said recess precisely as described above. There will of course be in connection with this modification two valves and valve-seats and two outlets, both of the latter communicating with one discharge-pipe, M.

This modified form of the machine has more blowing capacity in proportion to its size than that above described.

The mode of operation in the modification being precisely the same as that in the blower shown in Figs. 1, 2, 3, and 4, a further description of its construction and operation will be unnecessary.

I claim as my invention—

1. A rotary blower in which are combined the following elements, namely: two or more revolving vanes having curved sides, revolving segments *e e'*, with concave recesses adapted to the said vanes, a chest-casing

adapted to the vanes and segments, and a valve or valves operating in unison with both vanes and segments, for controlling the outlet of the blast, all substantially as set forth.

2. The combination, with the vanes and with the recesses between the segments, of an opening or passage through each vane, with an opening, *p*, in the casing of the blower, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOS. S. DISSTON.

Witnesses:
HUBERT HOWSON,
HARRY SMITH.