

UNITED STATES PATENT OFFICE.

GARDNER C. HAWKINS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN FAN-BLOWERS.

Specification forming part of Letters Patent No. **148,951**, dated March 24, 1874; application filed December 29, 1873.

To all whom it may concern:

Be it known that I, GARDNER C. HAWKINS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fan-Blowers, of which the following is a specification:

My invention relates to the method of constructing the parts of a fan-blower, and to their form and arrangement, so that the greatest effective work may be obtained from them, the whole being so arranged that the least possible resistance is offered to the flow of the air.

To obtain the best economical effect from a fan-blower; other things being equal, it is necessary to give a rapid circular motion to a volume of air, so that the centrifugal force may be called into action. A body of air thus subjected should be left as nearly free as possible; but, to utilize it, it must be subjected to certain conditions, which depend upon the use to be made of the blower: First, if the blower is to be used as a condenser—that is, to obtain a pressure—so that the air may be used to urge a fire, furnish fresh air to a room or apartment, &c., then the air, as it leaves the instrument, must be conducted into a suitable conduit, which, of necessity, must offer back pressure, and lessen, to a certain extent, the amount of air delivered. The amount of this back pressure will be lessened by the atmospheric pressure fifteen pounds to the inch at the inlet of the blower—that is, supposing that the inlet is so arranged that there is nothing to prevent the free flow of air to the interior of the blower.

To construct a blower in such a manner as to offer the least possible resistance to the inflowing air is one of the objects of my invention, and I obtain this by constructing the fans so that they, and consequently their inclosing disks, shall overhang or project beyond the radial or shaft-connecting frame of the machine. In machines of ordinary construction the radial frames are in, or nearly in, the plane of the disks, so that by their rapid revolution, they prevent the free flow of air to the interior. Thus a partial vacuum is formed inside of the blower, and the force of the external atmosphere acts against the effect of the centrifugal force, the counterbalancing effect of the pres-

sure of the atmosphere at the inlet being greatly impeded by the revolving frame, through which it must flow and act.

Second, when a blower is to be used to create a partial vacuum, then the delivery of air is into free space, and if the inlet of air could be absolutely free, then the pressure would be in equilibrium at the inlet and outlet, thus allowing the centrifugal force to act in full power. In the common blower, as above cited, the inlet of air is impeded, and thus work is lost when the blower is to be used as an exhaust.

Figure 1 is a perspective view of my invention. Fig. 2 is a diametric section of the same. Fig. 3 is a plan of one of the radial frames. Fig. 4 shows one of the fans and its connections with the shaft.

In the drawings I have only shown the moving parts of the blower, as it is to that part alone that my present invention relates.

F represents the shaft of the blower. Upon this shaft I form two collars or shoulders, F', Figs. 2 and 4, these collars being solid parts of the shaft, and serve as flanges to which the fan-supporting frames are to be bolted. In Fig. 3 I show one of these fan-supporting frames, which consists of a ring or hub, A, which is to be bolted to the collars F', as shown in Fig. 2. From the ring A radial arms B B¹ B² B³ extend, and terminate in a ring, C. This ring C constitutes the base upon which my fan-supporters are formed. The fan-supports proper D D', &c., project tangentially, and are strengthened by braces E E', &c., as shown in Fig. 3. The object of this construction is to obtain strength with lightness, and offer as little obstruction to the flow of air as possible. The radial frames, as above described, are made fast to the shaft F by bolts, as shown in Fig. 2.

The fans K are perfectly flat, and formed as shown in Fig. 4. These fans are riveted to the arms D so that each forms a tangential plane. (See Fig. 1.) The edges of these fans form the only support of the coned disks H' H', as shown in Figs. 1, 2, and 4. These disks each have a large central opening for the inflowing air. The outer edge of each of these disks is re-enforced by a ring, H, Figs. 1 and 2, which gives it stability, and also serves to

form a true edge for fitting the opening in the outer case and making the same air-tight, or nearly so. The coned casings H' H' overhang the supporting-frames, as shown, so that there is a free passage for the inflowing air, as shown in Figs. 1 and 2.

I claim as my invention—

1. In a fan-blower, the radial frame A C, when the same is made with arms B B', &c., ring C, and tangential supporting-arms D D', &c., braced by stays E E', &c., all substan-

tially as described, and for the purpose set forth.

2. The combination of the radial frame A C with the fans K and concavo-convex disks, substantially as described, and for the purpose set forth.

GARDNER C. HAWKINS.

Witnesses:

WILLIAM EDSON,
FRANK G. PARKER.