

UNITED STATES PATENT OFFICE.

JAMES M. SEYMOUR, JR., OF NEWARK, NEW JERSEY.

BLOWER.

SPECIFICATION forming part of Letters Patent No. 673,507, dated May 7, 1901.

Application filed February 25, 1899. Serial No. 706,812. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. SEYMOUR, Jr., a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Blowers, of which the following is a specification.

The improved blower acts by a rotary motion in a circular case. I will describe it as having the shaft and case horizontal. The shaft carries radial arms provided with obliquely-mounted thin blades or wings, which act on the screw principle. These parts may be in all respects identical with any approved form of screw fan-blower. The central portion is peculiar. The air is allowed to move freely parallel to the axis through the center of the screw and then is subjected to the influence of fan-blades, which force the air outward in a plane at right angles to the axis. The blades which act on the air to move it outward would impel the air tangentially if they were radial, but they are inclined relatively to the motion and curved in a form long and favorably known in centrifugal blowers, so as to drive the air in lines more nearly radial. The air thus driven outward by the centrifugal fan may mingle with the air driven by the screw action of the inclined blades or the air forced by the two separate means may move along in strata, the screw-driven air moving in a layer concentric to the other. If the parts are properly proportioned, there will be little, if any, difference in the condition of the air in regard to its rotatory motion. That driven by the fan will be forced axially in the desired direction and will also be thrown into a helical motion. The air driven by the interior centrifugal blower is given about the same amount of circular motion. There being no other way for its escape, it moves axially along the passage with about the same helical motion as the other air. I provide an additional disk a little distance from the disk of the centrifugal blower, which performs a function of great importance in cold climates.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a vertical longitudinal section. Fig. 2 is a face view seen from the right in Fig. 1, and Fig. 3 is a corresponding view seen from the left in Fig. 1. Fig. 4 is a perspective view of a portion detached.

Similar letters of reference indicate like parts in all the figures where they appear.

A is a fixed cylindrical casing of sheet metal or other suitable material, (wood serves well,) and A' A² are fixed spider-frames, which furnish bearings for the shaft B, extending along the axial line of the casing A and revolved rapidly by a steam-engine or other suitable motor. (Not shown.)

B' is a hub carrying arms B², upon which are riveted or otherwise firmly secured properly-inclined screw-blades B³.

On the back face of the screw is riveted a ring D, of sufficiently-stout sheet metal, on the rear face of which are set a series of wings D', smoothly curved, as shown. The front edges of these wings are riveted to a disk D², which prevents any axial movement of the air past it near the center. A little in rear of this disk D² is set a hub E, upon which is riveted a disk E². This latter receives the eddy currents of air which obtain in the space in rear of the whole. The air between the disks D² and E² is carried around idly and serves as a non-conductor for heat. In winter the air enters at so low a temperature that moisture in the eddy air if allowed to strike the disk D² would condense and freeze. This plate E² serves as a shield to prevent such. If moisture condenses there, it will be thrown off into the annular stratum or actively-moving air. If under any extreme conditions ice is formed, it forms on this disk E² and may remain or be thrown off at intervals by the centrifugal force without in any wise injuring or obstructing the working parts.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The number of the radial arms B' and the size and obliquity of the screw-wings B³ may be varied. So, also, the centrifugal wings D' may vary in size and number. The proportions of the diameters may vary somewhat, but I have shown what I esteem the best. The shaft may be suffi-

ciently supported by one bearing, having all the parts technically "overhung;" but what I consider the most complete form of the invention requires two bearings, and consequently the two spiders A' A².

Parts of the invention can be used without the whole. I can use the shield-disk E², set at a little distance from the disk D², so as to inclose and carry around air with it which shall serve as a non-conducting stratum to prevent the transmission of heat, and thus reduce or entirely avoid the difficulties otherwise accruing from the condensation of moisture on the disk D² with a single blower of the screw form without any equivalent of the centrifugal wings D'.

I claim as my invention—

1. The compound blower described having a screw-wheel with a series of oblique blades B³ with a practically-open center, the disk D² centrally mounted out of the plane of such wheel, and a series of centrifugal blower-blades D', combined and arranged for joint operation substantially as herein specified.

2. A blower comprising the shaft B, hub B', arms B² and screw-blades B³, in combination with the ring D, centrifugal blades D' and

disk D², arranged for joint operation substantially as herein specified.

3. In a screw-blower, the disk D² and the supplementary disk or shield E², separated by a stratum of air adapted to defend against the condensation of moisture on either disk, substantially as herein specified.

4. A blower comprising the shaft B, hub B', arms B² and screw-blades B³, in combination with the ring D, centrifugal blades D' and disk D², and with the supplementary disk or shield E², all arranged to serve substantially as herein specified.

5. In a disk fan having an open center, vanes formed and arranged to act centrifugally on air received near the center, in combination with pitched vanes on the periphery of the same disk acting as a propeller on different air received near the periphery, as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

J. M. SEYMOUR, JR.

Witnesses:

J. B. CLAUTICE,
M. F. BOYLE.