R. A. ILG.

ROTARY BLOWER.

APPLICATION FILED JUNE 10, 1912.

1,163,543.

Patented Dec. 7, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

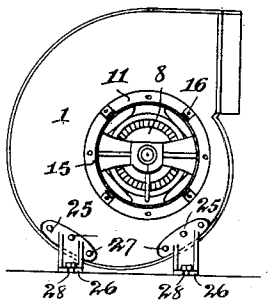


Fig. 2.

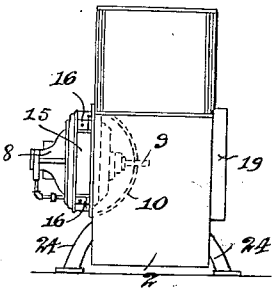


Fig. 3.

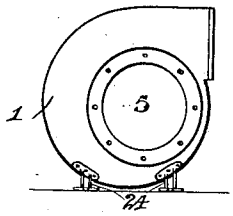


Fig. 4.

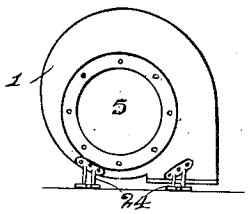


Fig. 5.

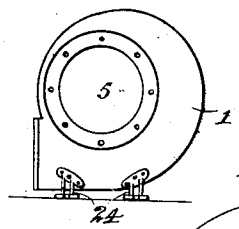


Fig. 6.

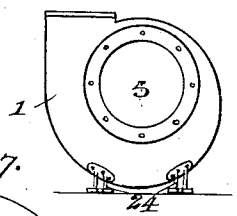
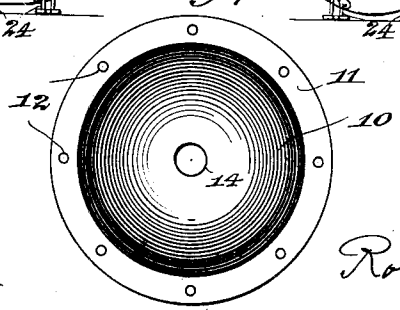


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 8.

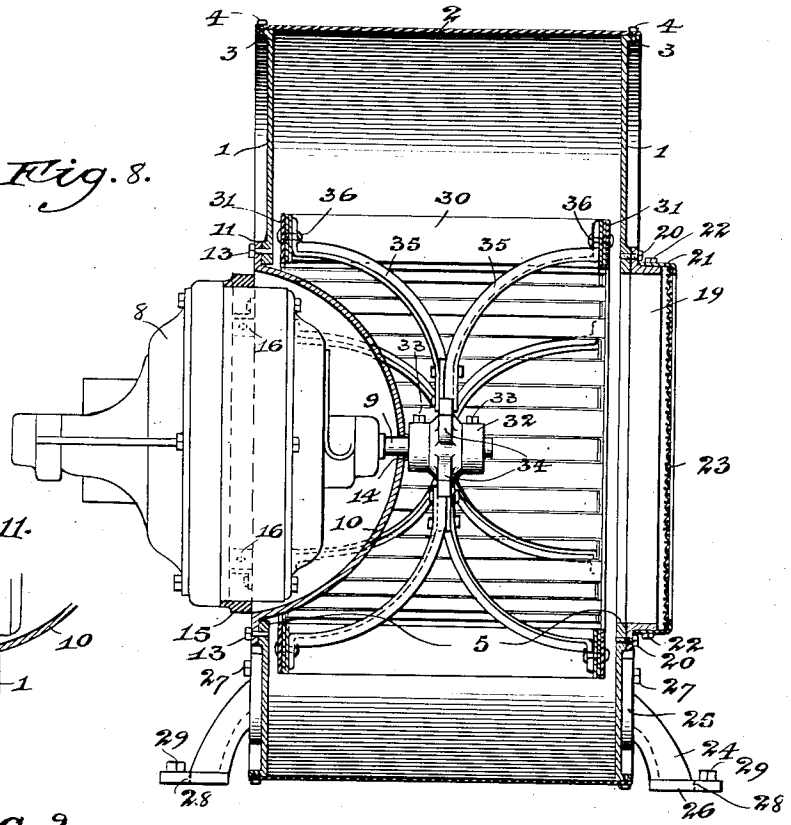


Fig. 11.

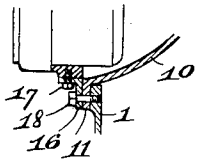


Fig. 9.

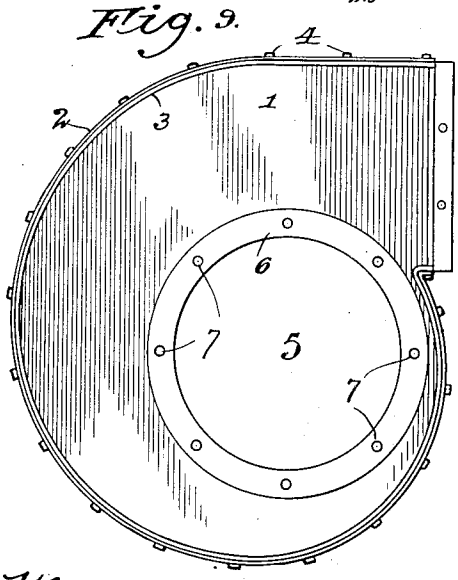
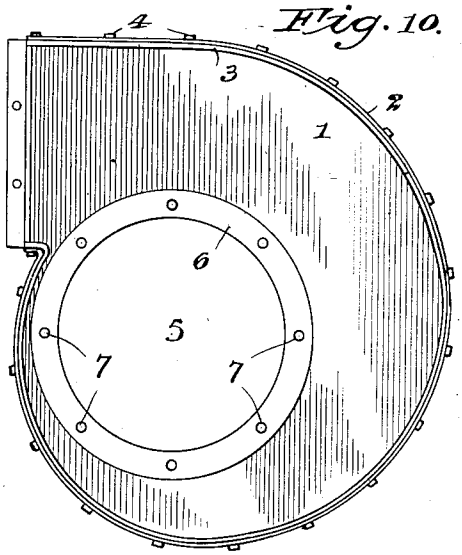


Fig. 10.



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UNITED STATES PATENT OFFICE.

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ROTARY BLOWER.

1,163,543. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed June 10, 1912. Serial No. 702,779.

To all whom it may concern:

Be it known that I, ROBERT A. ILG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Rotary Blowers, of which the following is a specification.

This invention relates to rotary blowers or fans of the direct driven type; that is, of that type wherein the fan wheel or rotor is directly mounted on the inner end of the armature shaft of an electric motor, which latter is rigidly secured to a side wall of the blower casing and projects partially within the latter, so that one side of the rotary fan or rotor overhangs that portion of the motor which lies inside the side wall to which it is attached.

Among the salient objects of the invention are, to provide a construction wherein the motor may, with facility, be applied to either side of the casing, without necessitating the reversing or turning about of the fan wheel or rotor,—or, in other words, to provide a construction employing duplicate openings in the two side walls of the casing, either of which may accommodate the motor while the other serves as a suction opening, to provide an improved closure for the opening on that side of the casing to which the motor is attached, which closure, together with the motor, shall be applicable with equal facility to either of the two side wall openings, to provide a new and improved construction of motor casing readily lending itself to the accomplishment of the above-stated objects, to provide a new and improved construction of fan-wheel or rotor that shall combine lightness with a high degree of strength and rigidity and facility for coöperation with the motor when the latter is applied to either side of the casing, and, generally, to simplify and improve the structure and organization of rotary blowers of the general type specified. These and other minor objects and advantages I secure by the construction illustrated in the accompanying drawings, which represents an approved mechanical embodiment of the several features of my invention, and in which—

Figure 1 is a side elevational view of my improved blower with the motor attached thereto. Fig. 2 is an elevational view from the discharge end of the motor casing. Figs. 3, 4, 5 and 6 are diagrammatic side elevational views illustrating four different positions in which the motor casing may be mounted to direct the discharge in as many different directions, by simply attaching the supporting feet to different positions around the marginal portion of the motor casing. Fig. 7 is a detail elevational view of a bowl-shaped closure for the opening in the side wall of the casing to which the motor is applied. Fig. 8 is an enlarged vertical axial section through the blower. Figs. 9 and 10 are opposite side elevations of the motor casing, with the motor and rotor removed, more particularly illustrating the applicability of the motor to either side of the casing and the means for shifting the angular position of the casing without shifting the motor around its own axis. Fig. 11 is a fragmentary detail in cross-section through the means for attaching the motor and closure to the side wall of the casing.

The casing of my improved motor is of the usual snail shell form, and comprises parallel side plates 1 and a rim 2. The side plates 1 are of relatively thick cast metal and are formed with outer marginal flanges 3 to which the margins of the thinner rim member 2 are secured by machine screws 4. In the side walls 1 are formed duplicate openings 5, the portions of the margin immediately surrounding said openings being of increased thickness to form annular bosses 6. As best shown in Figs. 9 and 10, these bosses are provided with a number of equally spaced tapped holes 7, eight of said holes being herein shown spaced 45° apart.

8 designates as an entirety an electrical motor, to the inner end of the armature shaft 9 of which is keyed the hub of the rotor, hereinafter more particularly described.

10 designates a bowl-shaped closure for the opening to which the motor is applied. This closure member has a marginal flange 11 that is provided with a plurality of clearance holes 12 corresponding in number and spacing with the tapped holes 7 of the bosses 6; and the flange of this closure is secured to one of said bosses, with its concavo-convex body portion projecting inwardly of the casing, by machine screws 13 that pass through the clearance holes 12 and screw into the tapped holes 7. The body portion of the closure 10 has a central aperture 14 through which the armature shaft 9 extends with a slight clearance.

The motor 8 is rigidly secured in place

by means of a ring or collar 15 that snugly fits the shell of the motor, as clearly shown in Fig. 8, and is, in turn, strongly secured to the side wall of the motor casing by angle brackets 16 (Fig. 11), one wing of each of said angle brackets being secured to the ring 15 by a machine screw 17, and the other wing of said angle bracket being secured to the boss 6 by a machine screw 18 that passes through one of the clearance holes 12 in the flange of the closure member and screws into one of the tapped holes 7 of the boss.

It is frequently desirable to equip the suction opening in the side wall of the casing opposite the motor with a suitable guard, such as a screen, to prevent the accidental indraft of foreign substances that might break or injure the rotor. Where such a guard is employed for the blower herein described, I provide an annular collar 19 of angle form in cross-section, one wing of which is suitably apertured to receive machine screws 20 by which the same may be attached to the boss 6 on the side wall of the blower casing opposite the motor, while the other wing is adapted to receive a ring 21 secured thereon by set screws 22 and carrying a screen 23.

From the foregoing it will be readily observed that the motor and its closure member are readily interchangeable with the screen and its supporting collar by simply removing the said parts from the supporting bosses of the side walls of the casing to which they are attached by the machine screws 13, 18 and 20, and transposing them. It will also be observed that the blower casing can be shifted, in the construction shown, to any of eight different angular positions, relatively to the direction of the discharge, without requiring any corresponding angular shift of the motor, by simply removing the screws 13 and 18, turning the casing to the desired position, and then replacing the screws 13 and 18 in such of the tapped holes 7 as then register with the clearance holes carrying the screws 13 and 18. To support the casing in these various positions (four of which are illustrated in the diagrammatic views, Figs. 3, 4, 5 and 6), I employ on each side of the casing a pair of supporting feet, which conveniently consist of cast metal brackets, each comprising a curved body portion 24, a flat upper attaching portion 25, and a horizontal flat sole portion 26. The attaching members 25 are provided with holes to receive machine screws 27 which may engage suitably positioned tapped holes in the side walls 1 of the casing, just inwardly of the flanges 3, and the sole portions 26 are preferably apertured or slotted, as indicated at 28, to accommodate screws 29 for attachment of the feet to the floor. The curved shank portions 24 enable the feet to be secured direct to the side walls of the casing and at the same time clear the flanges 3 of the latter. Figs. 3, 4, 5 and 6 illustrate the applicability of these supporting feet to different positions around the perimeter of the casing, so as to enable the discharge of the blower to be directed upwardly, downwardly, horizontally to either side, or in directions intermediate of these positions. Where these blowers are made to order on specifications submitted, which is quite extensively done in commercial practice, the desired direction of discharge is usually stated; and, that given, it is a simple matter to tap the side walls for the screws of the supporting feet at the proper positions to support the casing with the desired direction of discharge.

My improved fan-wheel or rotor is of that general type which employs a series of relatively narrow substantially flat fan blades 30 connected to and between a pair of parallel side rings 31, said parts being suitably connected by spokes to a central hub. In my present improved construction I employ a central hub 32, the bore of which extends from end to end or entirely therethrough, so that said hub may be entered on the armature shaft 9 from either end and secured thereon by set screws 33. Integral with said hub are a series of radially disposed stub spokes 34 of rectangular cross-section, to which are bolted the main spokes 35, these latter consisting of alternately arranged oppositely curved angle irons, the outer ends of which are turned outwardly into a vertical plane and are attached by rivets 36 to the side rings 31 and, preferably, also to the inwardly bent overlapping ends of the blades 30. This provides an exceedingly strong, rigid, and yet light construction of rotor, and one wherein the spokes present a minimum of interference with the in-flowing current of air from the suction opening.

From the foregoing it will be seen that the described blower effectuates the several stated purposes or objects of the invention. The duplicate openings in the side walls provided with attaching bosses formed with duplicate uniformly spaced tapped holes not only enable the motor and the suction opening to be interchangeably employed on either side of the casing, but also coöperate with the supporting feet in enabling the casing to be mounted with any desired direction of discharge of the air current without disturbing the fixed position of the motor. The closure member on the motor side of the casing prevents the intake of air around the motor and, of course, confines the suction effect to the opposite side, and the described symmetrical construction of fan-wheel or rotor also enables the motor to be applied on either side without requiring any change of position of the fan-wheel.

It will be manifest to those skilled in the art that detail changes and modifications might be made in the structure illustrated without departing from the essential character of the invention or sacrificing any of the benefits and advantages secured thereby. Hence I do not limit the invention to the exact construction shown and described except to the extent clearly indicated in specific claims.

I claim—

1. In a rotary blower, the combination with a casing having an opening in its side wall, of a bowl-shaped closure having a centrally apertured body portion projecting within said opening and an outer marginal flange secured to the marginal portion of said opening, a motor-supporting ring detachably secured to the outer face of said flanges, an electric motor supported substantially centrally thereof by said ring with its inner end entering the concave side of said closure and its armature shaft extending through the aperture thereof, and a rotor mounted on the inner end of said armature shaft.

2. In a rotary blower, the combination with a casing having an opening in its side wall, of a centrally apertured bowl-shaped closure having a marginal flange, a motor-support secured to said flange, a motor rigidly mounted in said motor-support and having its armature shaft passed through the aperture in said closure, and means for securing said flange to the marginal portion of said opening permitting adjustment of said casing around the axis of said opening, whereby the direction of discharge of the motor casing may be varied without shifting said motor around its axis.

3. In a rotary blower, the combination with a casing having an opening in its side wall surrounded by a marginal boss formed with a plurality of uniformly spaced tapped holes, of a bowl-shaped closure having a centrally apertured body portion projecting within said opening and a marginal flange overlying said boss and provided with equally spaced clearance holes adapted to register with the tapped holes of said boss in various relative positions of said casing and closure around the axis of said opening, machine screws uniting said flange to said boss, a motor-supporting ring detachably secured to said flange, an electric motor carried by said ring with its inner end entering the concave side of said closure and its armature shaft extending through the aperture thereof, and a rotor fast on the inner end of said armature shaft.

4. A rotor or fan-wheel for rotary blowers comprising a hub member, a pair of parallel rings, blades disposed between and at their ends connected to said rings, and a series of spokes connected at one end to the center of said hub member and alternately connected at the other end to said rings.

5. A rotor or fan-wheel for rotary blowers comprising a hub having a series of integral stub spokes, a pair of parallel rings, blades disposed between and at their ends connected to said rings, and main spokes of angle-iron form connected at one end to said stub spokes and alternately connected at the other end to said rings.

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