May 1, 1923. 1,453,416

R. L. STANLEY

ORGAN BLOWER

Filed Feb. 14, 1922

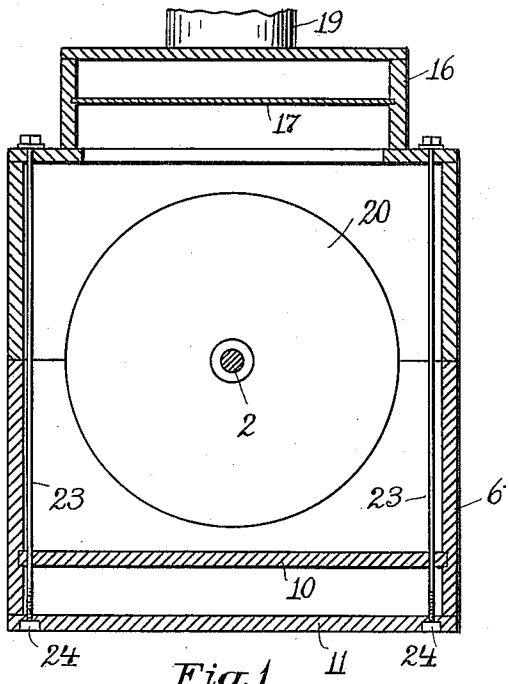


Fig. 1

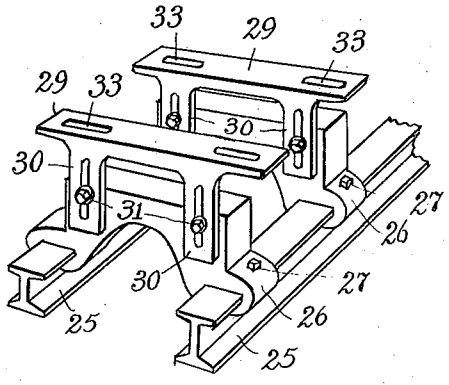


Fig. 3

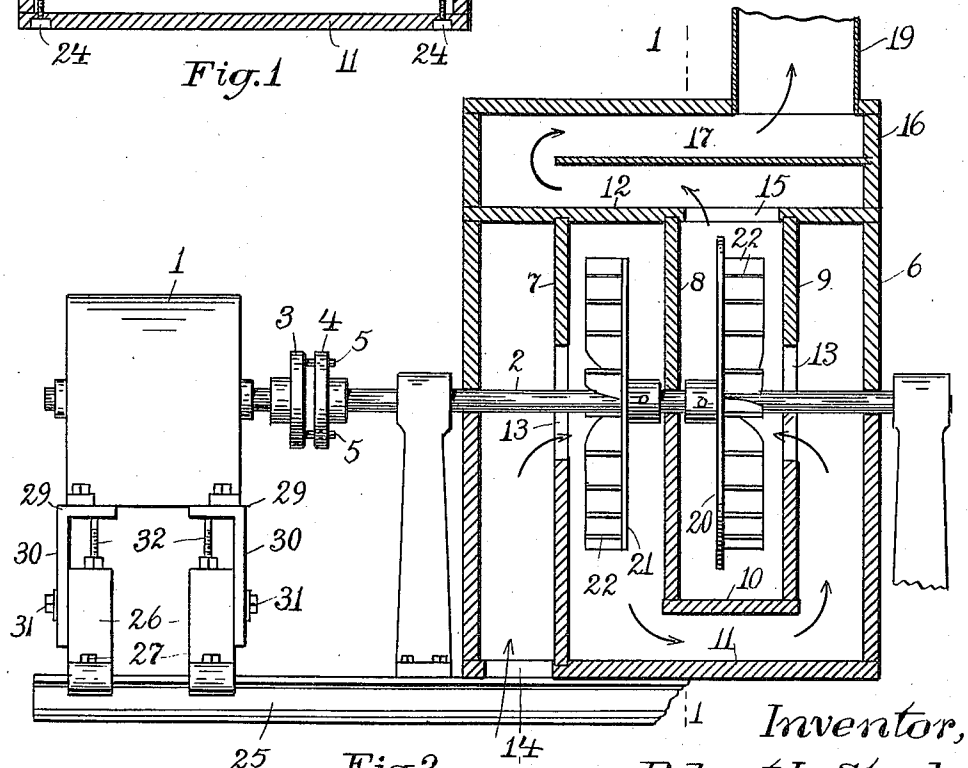


Fig. 2

Inventor,
Robert L. Stanley;
By A. B. Upham,
Attorney.

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UNITED STATES PATENT OFFICE.

ROBERT L. STANLEY, OF RICHMOND, MAINE.

ORGAN BLOWER.

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To all whom it may concern:

Be it known that I, ROBERT L. STANLEY, a citizen of the United States, residing at Richmond, in the county of Sagadahoc and State of Maine, have invented certain new and useful Improvements in Organ Blowers, of which the following is a specification.

It is customary in fan blowers for pipe organs to compound the air pressure by providing two fans upon the same motor-driven shaft. Although some manufacturers have mounted the two fans in opposition to each other in an attempt to overcome the end-thrust given by the fans to the shaft, I have found that this is only partially successful; and the object of this invention is the effecting of means for entirely remedying this defect. A further object is the provision of means for enabling any size of motor to be coupled to the blower with no other labor than the turning of a few bolts. This is a most important feature, inasmuch as the same size of blower can be supplied to different sizes of organs by simply providing a more powerful motor for the blowers of the larger organs.

Another purpose of the invention is the provision of more perfectly operating muffling means for keeping from the organ the noise of the fans.

In the drawings forming part of this specification, Fig. 1 is a sectional end elevation through 1—1 in Fig. 2 of a blower embodying my improvements. Fig. 2 is a central side section of the same. Fig. 3 is a perspective view of the adjustable motor-support.

The electric motor 1 is coupled to the blower shaft 2 by means of two face plates 3, 4 movable toward and from each other but made to rotate together by pins 5 projecting from the face plate 3 through holes in the face plate 4.

Upon the shaft 2 are mounted two fan blowers each consisting of a circular disk and vanes attached to one surface of each. These fans are located within a box 6 having three transverse partitions 7, 8 and 9 therein, one fan being in the compartment included between the partitions 7 and 8, and the other between the partitions 8 and 9, the latter space or chamber having a floor 10 spaced from the bottom 11, but having an open top where the other chambers are closed by a board 12. The chamber between the partition 7 and the box-side has an opening through the bottom 11 for the entrance of air to the blower. The partitions 7 and 9 have each an opening 13 concentric with the shaft 2 for the passage of the air, but the partition 8 is imperforate, except for a hole penetrated by the shaft.

Hence, when the fans are set in motion, the air is drawn in through the opening 14 and up and out through the opening 13 of the partition 7; thence down beneath the floor 10 and up between the partition 9 and the box-side; thence in through the opening 13 and up through the opening 15, on its way to the organ.

The opening 15 leads into a chamber 16 partially divided at its midheight by a shelf 17, whereby the air issuing from the opening passes as far therefrom as possible, and thence back over the shelf to the conduit 19 which leads to the organ. By thus intercepting the air, the vibration and noise of the blower are very largely deadened and rendered so obscure as to be practically inaudible at the organ.

To entirely overcome end thrust on the shaft by the fans, I make the disk 20 approximately two inches larger in diameter than the disk 21, the disk 20 being immediately below the discharge opening 15 and the one which receives the back pressure from the organ. The vanes 22 may in each case have their outer limits from the shaft equal, or those of the disk may be located with their outer ends at the periphery of the disk 20, as it makes no difference in the results, but I have illustrated the two sets of fans as of equal radius. By thus having the disk 20 thus larger than the disk 21, all end thrust given by the fans to the shaft 2 is entirely eliminated. The probable explanation is that the air in passing through the pump casing is raised from atmospheric to some higher pressure, i. e., it is compressed; a given weight of compressed air has less volume than the same weight of atmospheric air: the air at lower pressure must therefore move more rapidly than the compressed air to take the place of the compressed air leaving the casing; and, as the compression is progressively greater from the inlet of the casing to the outlet, the velocity of the air in the low pressure stage must be greater than the velocity of the air in the high pressure stage. The consequence is that, since the pressure in each runner chamber against the working face of the

runner is diminished by the amount of the velocity head of the air passing through the runner, the difference between the pressures against the working face of the low pressure runner and the discharge thereof is greater than the difference between the pressures against the working face of the high pressure runner and the discharge thereof, so that the net thrusts upon the two runners, if they are of the same diameter, do not balance, but there is an unbalanced thrust toward the low pressure side. This unbalanced thrust applicant overcomes by making the high pressure runner of greater diameter.

As shown in Fig. 2, the box and partitions separate on a horizontal line cutting the center of the shaft 2, the two parts being removably bound together by two or more elongated bolts 23 passing through the top board 13 and engaging nuts 24 in the bottom 11, the chamber 16 being made narrower than the box, as shown in Fig. 1, thus permitting shorter bolts to be used than would otherwise be the case.

As shown in Figs. 2 and 3, the metal rails 25 upon which the blower is mounted have clamped thereon two claw-members 26 slidably gripping the top flanges of the rails and fastened in place thereon by set screws 27. Above each member 26 is a cross piece 29 attached to said member by slotted ears 30 and bolts 31, adjusting screws 32 shown in Fig. 2 serving to positively raise and lower the cross piece. A motor being bolted to the cross pieces, which are slid along the rails to accommodate the bolt holes of the motor, the bolts passing through slots 33 to nuts beneath the cross pieces.

The bolts 31 are then loosened and the adjusting screws 32 turned to present the shaft of the motor in exact alinement with the shaft 2, to permit the coupling plates 3, 4 to be correspondingly located and engaged.

What I claim is:

1. A centrifugal blower comprising a rotative shaft, and two fan blowers mounted thereon, each blower consisting of a disk having vanes attached thereto, the vanes of each blower being on the opposite side of its disk relative to the other, and the diameter of one disk being greater than that of the other, and means for delivering air to the smaller fan and receiving it from the larger, whereby all end-thrust on the shaft is eliminated.

2. A centrifugal blower comprising a rotative shaft, two fan blowers mounted thereon, means whereby the air admitted to one fan is delivered to the center of the other fan and centrifugally received from the latter, the fans facing oppositely, and the diameter of the last-named fan being larger than that of the other, whereby endthrust on the shaft is eliminated.

3. A centrifugal blower comprising a rotative shaft, a box therefor, two fan blowers mounted on said shaft within said box, a partition separating the two fans, partitions exterior to the fans centrally apertured, a floor spaced from the bottom of the box closing the space between two of the partitions enclosing one of the fans, an exit opening being provided for the top of this said space, the fan in this space being larger than the other in diameter, and the two fans facing oppositely to each other whereby endthrust on the shaft is eliminated.

4. A centrifugal blower comprising a box, a rotative shaft therein, fan blowers mounted on said shaft, the box being separable along a line coincident with the axis of the shaft, a second box permanently attached to the top of the first-named box and communicating therewith but narrower than the same to leave shoulders at both sides, and a plurality of elongated bolts passing through the top of the first-named box to its bottom, the heads of said bolts being exterior to said top and pressing upon said shoulders, and nuts held by the latter for said bolts, whereby said elongated bolts can be readily unscrewed and the top and bottom sections of said box easily separated.

5. The combination with a fan blower having an operative shaft and a box enclosing the same, of rails supporting and attached to said box, and motor supporting means in two parts slidable on said rails, and vertically adjustable, whereby any proper sized motor can be supported to present its axis in alinement with said shaft.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 13th day of February, 1922.

ROBERT L. STANLEY.