

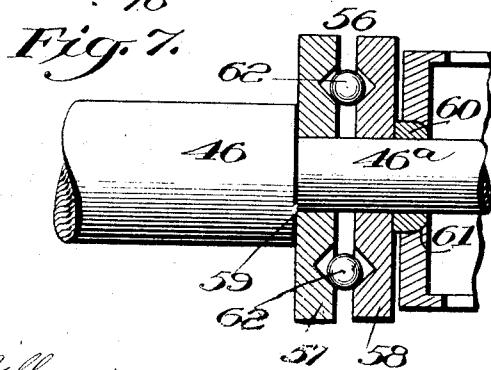
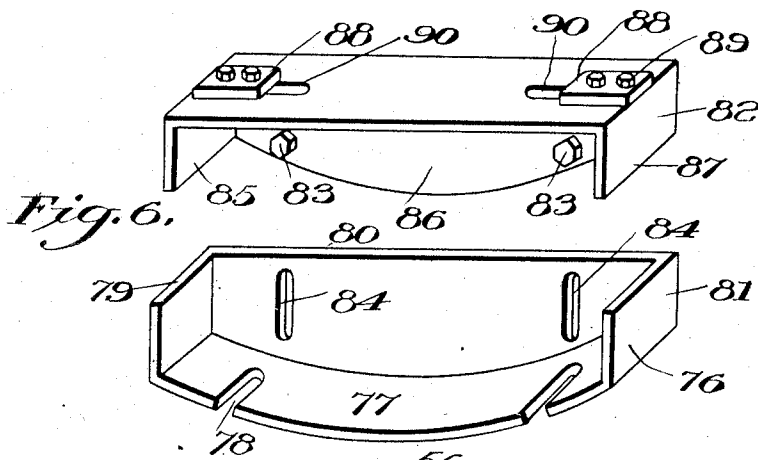
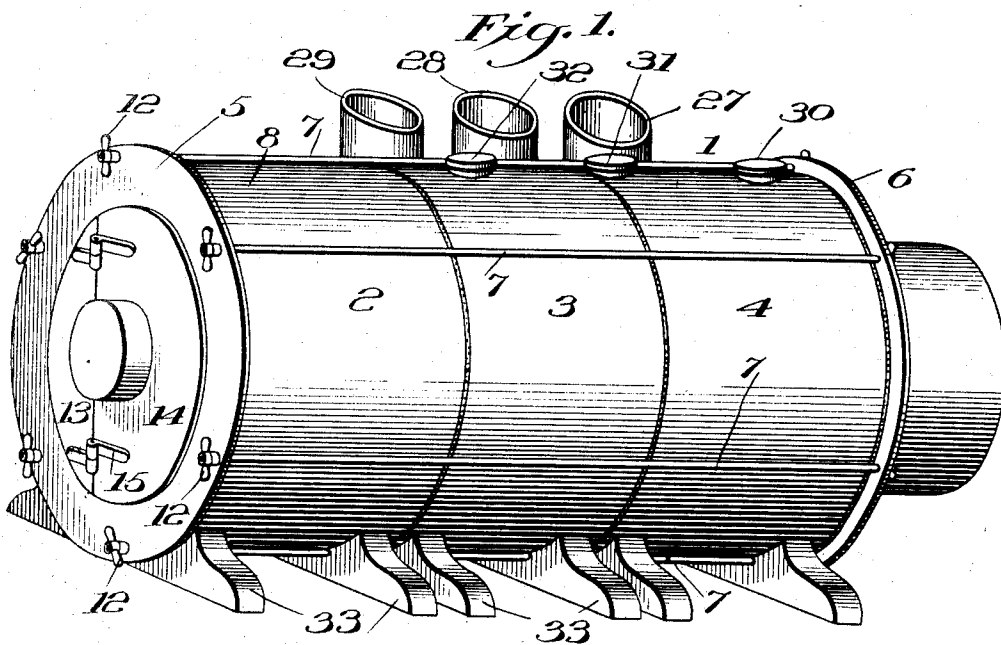
No. 893,756.

PATENTED JULY 21, 1908.

I. H. SPENCER.
BLOWER.

APPLICATION FILED OCT. 20, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

J. R. Millward
Allan T. Hoost.

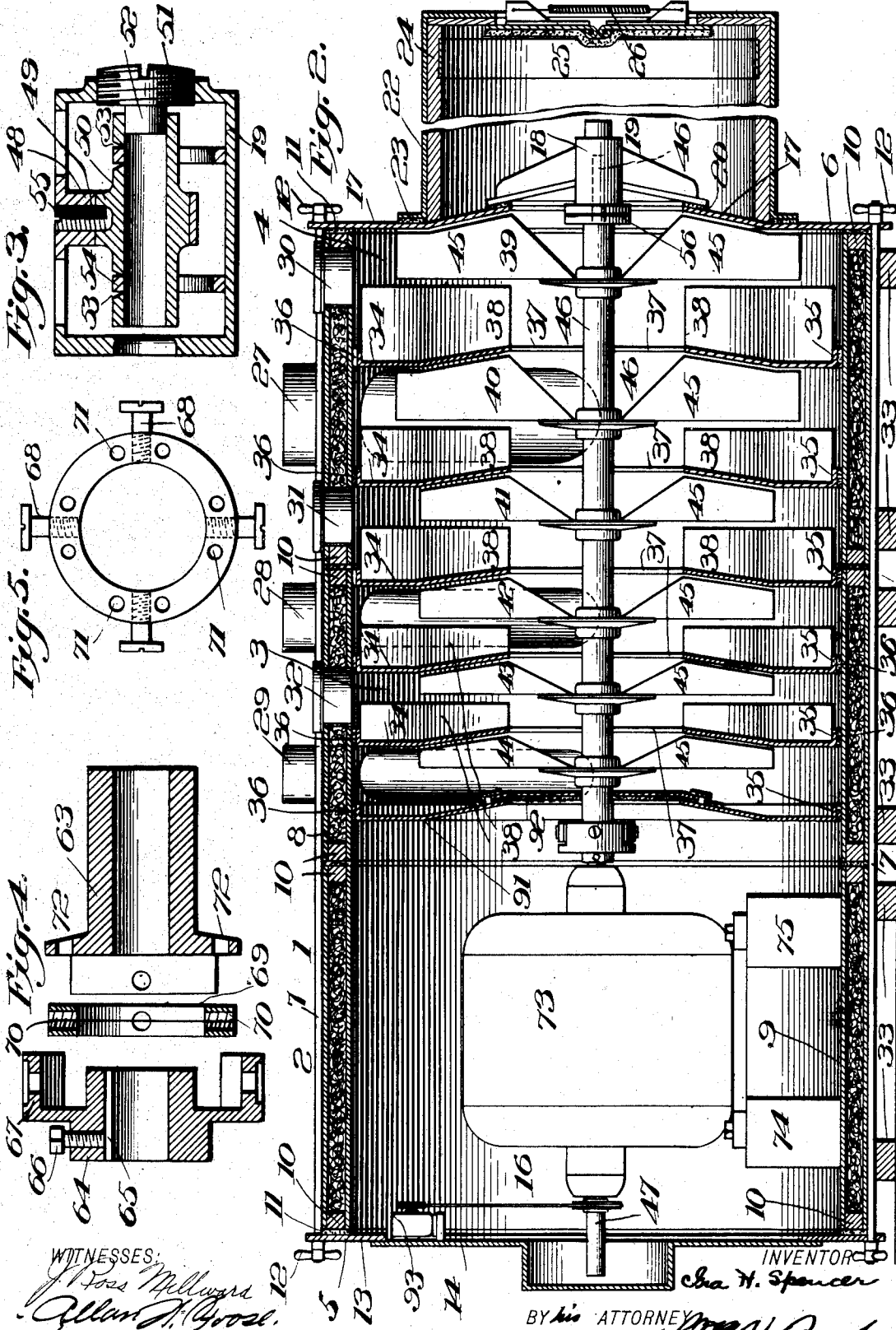
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2 SHEETS—SHEET 2.



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BLOWER.

No. 893,756.

Specification of Letters Patent.

Patented July 21, 1908.

Application filed October 20, 1905. Serial No. 283,599.

To all whom it may concern:

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, (whose post-office address is Hartford, Connecticut,) have invented certain new and useful Improvements in Blowers, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention relates to blowers of the centrifugal type for securing pressure of air for any desired purpose. The particular design herein shown is well adapted for securing wind pressure for operating musical instruments.

The primary object of the invention is to secure a blower of the greatest possible efficiency which will be practically noiseless in operation and will operate with a comparatively small power consumption.

A further object is to secure an efficient blower with all its several parts so alined with reference to the motor and its shaft, that it will have all the requisite features of easy running combined with lack of noise and surety of proper operation.

A still further object is to secure an arrangement of parts whereby blowers of large dimensions may be readily set up in inaccessible places by providing a casing and the several parts of such form that they may be assembled in sections.

A still further object is to provide a double sheet metal casing with sound insulating material so interposed that the tube like casing is substantially solid as to strength and supporting power, at the same time providing a fire and sound proof envelop for the entire mechanism of the blower.

A still further object is to provide a means for securing a correct and practically universal adjustment of the motor within the blower casing and provide a universal adjustment between the motor shaft and fan shaft.

Referring to the drawings:—Figure 1 is a perspective view of the blower. Fig. 2. Is a longitudinal section through the blower casing, the inlet valve being turned from the vertical to a horizontal position, to better illustrate its construction. Fig. 3. Is a detail sectional view through the fan shaft bearing. Fig. 4. Is a detail sectional view of the universal connection between the motor shaft and fan shaft. Fig. 5. Is a detail face

view of the ring of the universal connection shown in Fig. 4. Fig. 6. Is a perspective view of one of the motor supports. Fig. 7. Is a detail view of the auxiliary thrust bearing.

Centrifugal blowers of various types have long been used for moving air under various conditions, and in some instances such a type of blower has been directly connected with a motor by which it has been driven, the motor being insulated in various ways, to lessen vibration and noise while the fan casing has also been insulated. So far as known, however, it has not been the practice to incorporate within a single perfectly insulated sound and fire proof casing the motor and the blowing apparatus.

For providing a blower for introducing several inches of air pressure, it is necessary to use a plurality of fans, and, as shown herein, these are carried upon the same shaft thus making a blower of considerable length and having a number of parts which must be accurately associated one with the other. It is, therefore, necessary to provide parts of a form which may be readily assembled with the greatest facility, and which of themselves are of no great bulk. It is, also necessary to provide a casing of a form which may be easily transported and assembled, and, at the same time, be of the requisite form and strength to withstand the hard duty to which it is subjected with the device in operation. All of these several features are provided in the device herein shown and described.

In the accompanying drawings the casing 1, is shown as composed of three tubular sections 2, 3 and 4, held together by heads 5 and 6 and longitudinally extending stay rods 7. Each of the sections 2, 3 and 4 are composed of an outer sheet iron cylinder 8, and an inner sheet iron cylinder 9. At either end of each section, a fiber or wooden ring 10 is nicely fitted within the opening between the two cylinders and is insulated from each one by a covering of felt or other sound deadening material. In assembling, one of the wooden rings is first fitted at one end and the space between the two cylinders 8 and 9, is then solidly packed with mineral wool which is driven in, forming a solid non-vibratory connection between the two cylinders. The wooden or fibrous ring is then driven in to close the opening at the end of the cylinders. It will thus be seen that the

mineral wool having its peculiar fire and sound insulating properties, forms a very stiff and rigid tubular section having a smooth exterior and interior of perfect contour. The three tubular sections thus formed are arranged end to end, and between the abutting ends of each section as well as between the outer ends and the heads 5 and 6, are interposed felt washers or rings 11, which preclude any possibility of the transmission of sound through vibration. The heads and various tubular sections are firmly held together by the stay rods 7 which project through the heads and are secured in place under proper tension by the thumb nuts 12. One of the heads as 13, is provided with a hinge door 14, which is preferably felt lined and hinged as at 15 to permit access to the motor compartment 16 within the casing. The opposite head 17, supports a fan shaft bearing 18, which comprises a box like casing 19, having arms projecting outwardly and secured to the head 17, with an intermediate sound deadening washer 20 interposed between the parts. The head 17, is provided with an opening through which air passes into the blower casing. Surrounding this opening is a cylindrical casing 22, secured to the head 17 in suitable manner and with a sound deadening washer 23 between it and the head. This tubular casing 22 has a thick lining of sound deadening material 24, and at its outer end is provided with a pair of hinged members 25, normally held in place by spring 26, and providing an air valve or shutter which, while giving free admission of air to the blower, automatically closes to prevent the outward passage of sound when said blower though running is not passing any great volume of air.

It will be seen from the above described construction that when the several sections of the blower tube are arranged in place, there is practically a rigid casing having a smooth interior as well as exterior, except where the casing is broken as at 27, 28 and 29, to provide outlets from the several blower compartments where air at different pressures may be taken off.

Hand holes 30, 31, and 32 are also provided for giving ready access to the various compartments for the purpose of adjusting the fans if desired. The casing as a whole is supported upon brackets 33, which are suitably shaped to conform to the circular casing, and it is preferable to insert a sound deadening web between the foot brackets 33, and the casing. Interiorly the casing is divided into a number of compartments, within each of which is arranged a fan. These compartments are provided by forcing into the tubular casing, heads 34 of disk form, each of the heads being provided with a flange 35, by which it may be firmly seated

and have a considerable bearing within the tubular casing. Surrounding the flanges 35, are felt or other sound deadening washers 36, so that each of the heads is insulated from the inner metallic casing. These heads are of annular form, and provided with a central opening 37, through which the air after having been brought up to pressure by one fan, may pass to the next succeeding fan and compartment. Upon the face of each of the heads and preferably integral therewith, are vanes 38, extending substantially at right-angles from the face of the heads toward the rear of the fans. Their function is to catch the air as it is whirled off from the fan in order to direct it through the openings 37. It will thus be seen that the heads may be readily inserted and secured in place within the casing after said casing has been set up, by joining its various sections and the heads are thus adjustable so that the fans and heads may be nicely arranged with reference to each other, to give just the proper amount of clearance and prevent back leakage of air.

In each of the compartments thus formed by inserting the heads 34, are arranged fans or blowers 39, 40, 41, 42, 43 and 44. Each fan or blower comprising a disk larger in diameter than the opening which it faces and has disposed substantially at right-angles from one side of the disk, a series of fan blades 45. These fan blades are of somewhat peculiar form as indicated and run in close juxtaposition to the heads of the various compartments through which the air inlet is formed. All of the several fans are suitably mounted upon a shaft 46, having an adjustable bearing in the bearing box 19 at one end and a universal or flexible connection with the motor shaft 47 at the opposite end. The bearing at the outer end is of novel construction, and consists of a U shaped box or casting 48, having an inner web 48 bored out as at 49, and providing a loose fit for a bearing box 50. This bearing box extends substantially from end to end of the box 19, and forms a direct running bearing for the shaft 46 which is reduced as at 48^a just before it enters the bearing box. At the outer end of the box 19 is arranged an adjustable stop 51 which is screw-threaded in the end of the box and bears against a thrust block 52. This thrust block is preferably formed of hard wood, nicely calipered to fit within the bearing 50, and treated by boiling in suitable wax or the like to give it smooth running qualities. It abuts against the end of the shaft 46, and provides a thrust bearing for preventing the advance of the shaft and its fans. The upper surface of the bearing box 50 is cut away as at 53, and within the openings rest rings 54, which provide a convenient means for carrying the oil from the bottom of the box 19 up over the shaft 46, keeping it perfectly lubricated.

The bearing box 50 is held in place within the box 19 by a set screw 55. Obviously, should the thrust block 52 give way, the fan blades would be projected against their respective heads which would destroy the blower. As an insurance against such breakage an auxiliary thrust bearing is provided for the shaft 46 between it and the bearing box 19 as indicated at 56. This auxiliary bearing comprises two disks 57—58, the former resting against the shoulder 59, where the shaft 46 is reduced, and the latter loosely fitting upon the reduced portion 46^a, and resting firmly against a block 60, which has a ball and socket fit within the recess 61 formed in the end of the bearing box 19. It will thus be seen that the shaft 46 has a partial bearing through the ball and socket joint as well as in the main bearing 50, and in event of the thrust block 52 becoming disarranged the two disks 57—58 would close up upon the balls 62, which would provide an ample thrust bearing for running the fans.

The opposite end of the shaft 46 is connected to the motor shaft 47 through the adjustable or universal connection. This connection is formed into sections 63 and 64. The fan shaft 46 is secured to the former, while the motor shaft 47 is secured to the latter as by a key and set screw indicated at 65 and 66. Each of the sections 63 and 64 are provided with a flange like extension 67 upon diametrically opposite sides, and formed in such manner that the two flanges on one section extend into openings between the flanges on the opposite section. Through the flanges extend screws or studs 68, there being two studs for each of the sections 63 and 64. Within the chamber formed by the flanges of the two members 63 and 64, is located a two part ring 69, having threaded openings 70, formed in each of the meeting edges of the rings, and into which the studs 68 are screwed. These two ring sections are clamped together by screws 71, arranged on either side of the threaded openings 70. It will be seen from this construction that the studs 68 may be nicely adjusted with reference to the ring 69, and when the exact and proper adjustment is secured for proper alinement of the shafts 46 and 47, the set screws 71 may be tightened to securely clamp the studs 68 in adjusted position between the ring section.

Openings 72 are provided through the section 63, for giving access to the screws 71. The motor 73 is adjustably mounted upon two adjustable base sections 74 and 75, which are identical in form and construction. One of these sections is illustrated in Fig. 6. It consists of two flanged parts; one of which 76 has a base flange 77 of proper form to rest within the tubular casing, and provided

with slots 78, by which its position may be adjusted longitudinally of the casing. It has three flanges 79, 80 and 81 rising from the base 77, within which may be inserted the upper section or direct motor support 82.

The section 82 is secured in any desired position of vertical adjustment by bolts 83 passing through elongated slots 84 in the flange 80, while the downwardly extending flanges 85, 86 and 87 rest against and are supported by the upwardly extending flanges 79, 80 and 81, the parts of one section telescoping within the parts of the other.

The motor rests upon the upper section 82, and may be adjusted along said section by moving the stop blocks 88 which are secured by bolts 89 passing through slots 90.

It will be seen that with two supports such as described, one at each end of the motor, said motor may be adjusted transversely of the casing, vertically with reference thereto or longitudinally, and, of course, either one of the motor supports may be raised or lowered.

With this construction and arrangement of parts, the motor shaft and fan shaft may be brought into proper axial relation and thus the parts may be adjusted to the nicest degree to prevent untrue running and consequent noise.

The motor compartment is formed by introducing a head 91, the shaft opening through which is closed by a padded disk 92 fitting nicely about the shaft 46 and permitting the shaft to move laterally with reference to the head 91.

Where the blower is used for musical instruments, such as organs, it is very desirable to provide a source of electrical energy for operating the organ, which shall be produced whenever the blower is in use. As shown herein, a small generator 93 is connected either directly with the shaft 47 of the motor 73, or is driven by said shaft through a belt or other suitable connection. This motor is located within the motor compartment and is, therefore, insulated within said casing, and producing the necessary current for operating the organ whenever the blower is in operation.

The device herein shown is analogous to the device shown in my application for patent Ser. No. 240,712, filed Jan. 12, 1905, issued as Patent No. 869,868. The present invention, however, embodies features not fully shown, described and claimed in said prior application.

What I do claim and desire to secure by Letters Patent is:—

1. In combination in a blower for musical instruments a casing consisting of a plurality of sections, each section consisting of an outer sheet metal tube and an inner sheet metal tube, and a supporting filling of fibrous sound deadening material, means for secur-

ing the various sections in axial alinement and sound deadening members interposed between said means and the adjacent tube sections and sound deadening means interposed between the meeting ends of the several sections.

2. In combination in a blower for musical instruments a casing comprising a plurality of tubular sections, each section having an outer sheet metal tube and an inner sheet metal tube, a spacing filler intermediate said tubes, at each end, a packing of sound deadening material filling the space between the tubes and the spacing fillers and means intermediate the adjacent spacing fillers for deadening vibrations of the tube sections.

3. In combination in a blower, a sectional casing consisting of a plurality of tubes, each having an outer and inner metallic wall with spacing rings at either end and a sound deadening material intermediate the walls and spacing rings, sound deadening washers intermediate the sections, heads at opposite ends of said casing and rods extending between the heads and having cooperating thumb nuts for clamping said heads and casing sections in axial alinement.

4. In combination in a blower for musical instruments a tubular casing comprising a series of tube sections arranged end to end, each section having an inner and an outer sheet metal wall with a filling of sound deadening material intermediate them, sound insulating washers intermediate the adjacent ends of the tubular sections, a blower shaft concentrically arranged with reference to said casing and provided with a series of fans, each arranged in a compartment, and said shaft insulated from the casing by a sound deadening member, each compartment head consisting of an annular disk having a flange and arranged to be inserted in the tubular casing, sound insulators intermediate the heads and casing, and means for driving the fan shaft.

5. In combination in a blower for musical instruments, a tubular casing composed of sections, each having an outer and inner metallic tube with an intermediate filling of

sound deadening material and each section insulated from the adjacent section by a sound deadening washer, a series of heads of annular form, each provided with an extended flange adapted to fit within said casing, each of said heads having formed integrally therewith deflector wings, a sound insulating ring intermediate the flanges of the heads and the casing, a fan shaft arranged concentrically with reference to said heads and casing, fan blowers arranged upon said fan shaft intermediate the heads, a bearing support for said shaft, a sound deadening member interposed between said support and the casing and means for driving said fan shaft.

6. In combination in a blower for musical instruments having a tubular casing composed of sections, each having an outer and inner metallic tube with an intermediate filling of sound deadening material and each insulated from the other by a sound deadening material, heads arranged at opposite ends of the sectional casing insulated therefrom with sound deadening material, means for holding the heads and tube sections in alinement, a fan shaft arranged within the casing and motor for driving said shaft and a generator operatively connected with said motor shaft and secured to one of the insulated heads.

7. In combination in a blower, a tubular casing composed of sections, each having an outer and inner metallic tube with an intermediate filling of sound deadening material, a series of heads of annular form each provided with a flange adapted to fit within said casing, each of said heads having formed integrally therewith deflector wings, a sound insulating ring intermediate the flange and casing, the fan shaft arranged concentrically of said heads and casing, fan blowers arranged upon said fan shaft intermediate the heads and means for driving said fan shaft.

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Witnesses:

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