

Dec. 30, 1941.

W. M. MARKER ET AL

2,268,046

BLOWER

Filed Aug. 2, 1940

2 Sheets-Sheet 1

Fig. 1.

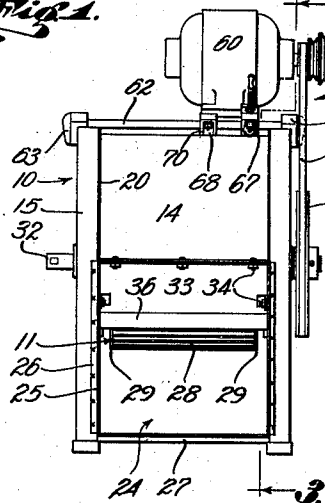


Fig. 2.

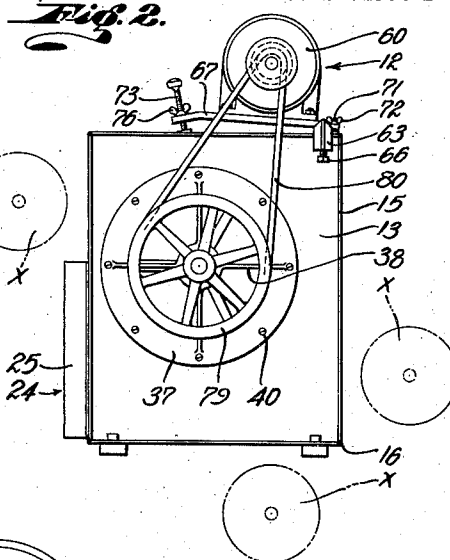


Fig. 3.

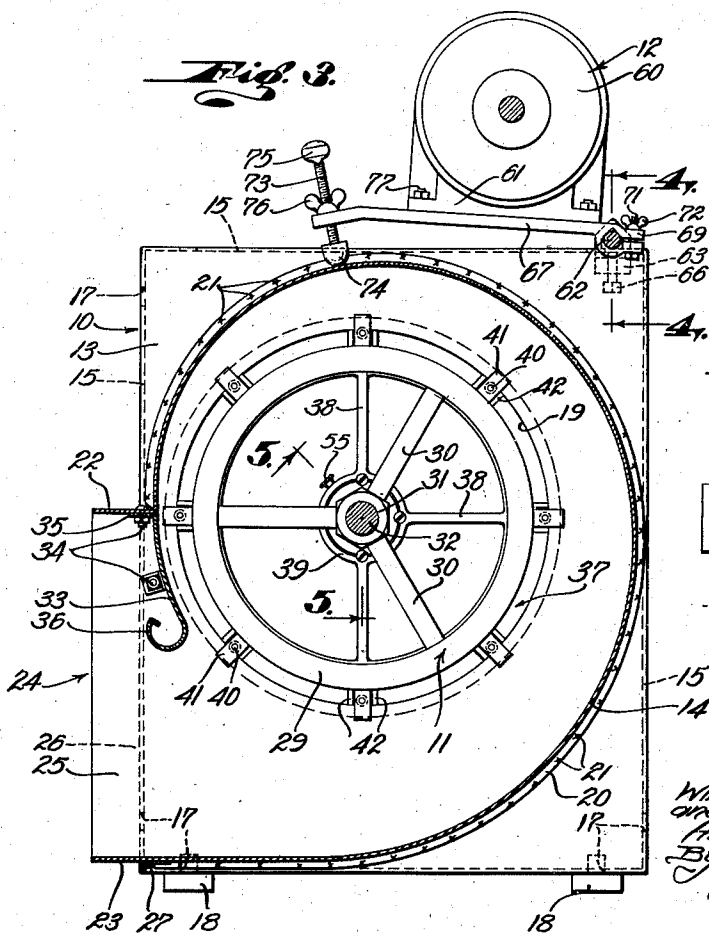


Fig. 4.

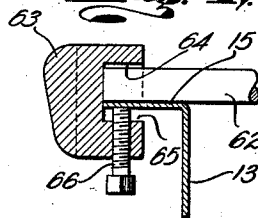
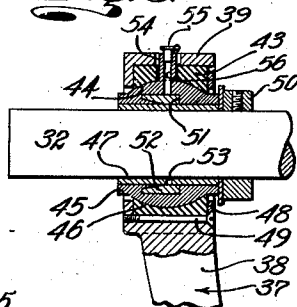


Fig. 5.



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2 Sheets-Sheet 2

Fig. 6.

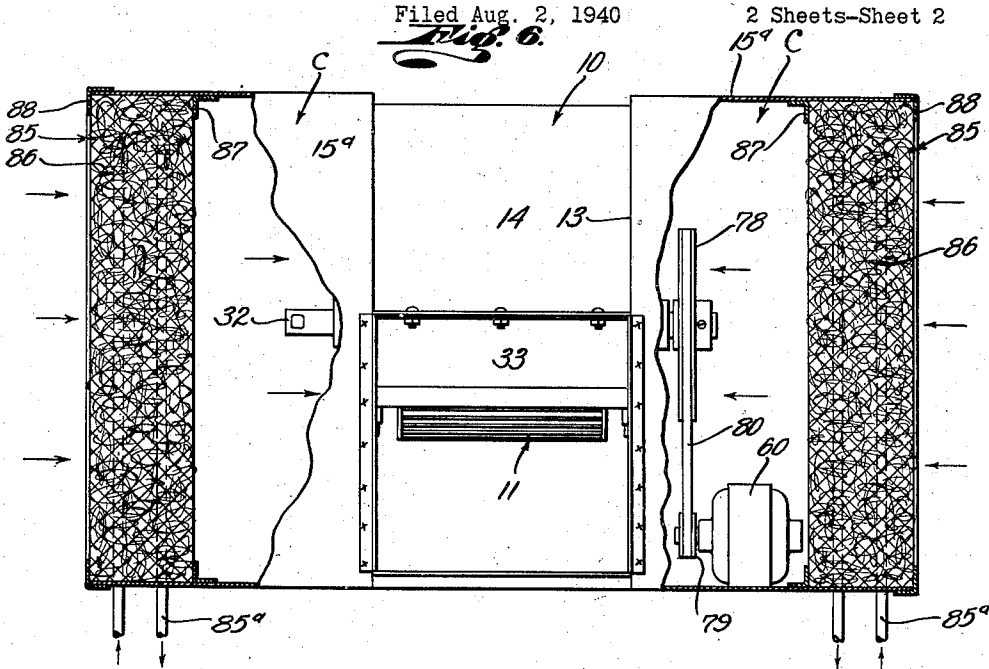
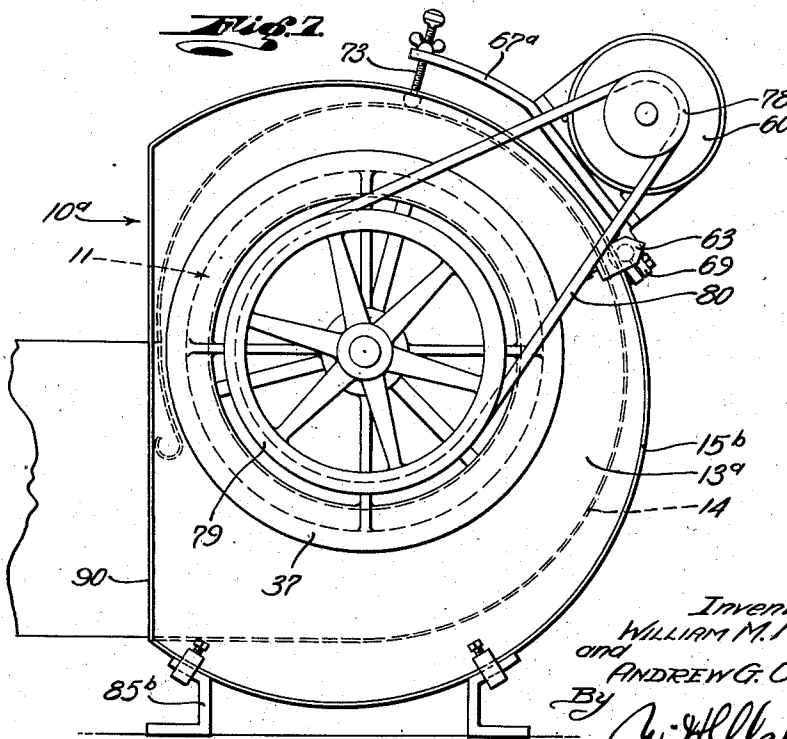


Fig. 7.



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UNITED STATES PATENT OFFICE

2,268,046

BLOWER

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Application August 2, 1940, Serial No. 349,386

15 Claims. (Cl. 230—117)

This invention relates to air handling apparatus and relates more particularly to blowers. A general object of this invention is to provide a quiet, inexpensive, easily installed blower for use in ventilating, air conditioning, heating, cooling, etc.

Another object of this invention is to provide a blower of novel and simplified construction which is characterized by its rigidity, strength, and low cost.

Another object of this invention is to provide a blower of the character referred to that is easily installed in practically any situation, and that is readily lubricated and serviced following installation.

Another and important object of the invention is to provide a blower of the character referred to which embodies a housing that is simple and inexpensive to manufacture, that is strong and very rigid, promoting quiet blower operation, and that is formed to facilitate installation with the air outlet in any desired position. In the manufacture of the conventional centrifugal type blower housings it has been necessary to employ expensive dies to shape the parts and to resort to hand cutting operations. In most conventional centrifugal type blower housings it has been found necessary to form a seamed joint in the volute or scroll sheet which weakens the structure so that it is easily racked, buckled, or waved, unless surrounded by a heavy, expensive, frame. The majority of conventional blower housings are formed so that the blower is limited in its mode and position of installation. The improved blower housing of the present invention is constructed without resorting to the use of expensive dies, or to hand cutting operations, and the volute sheet is a simple, one-piece member without seams. The end plates of the housing provided by this invention are integrally joined with the volute sheet providing a one-piece structure, and the end plates are flanged to give the structure great rigidity. The shape of these end sheets is such that the blower may be readily mounted with the blower discharge faced in any required direction.

Another object of this invention is to provide a blower of the character referred to embodying a novel motor mounting means that permits the arrangement of the motor in any desired position and which makes the motor conveniently accessible for servicing with the blower arranged to have the discharge facing in any direction.

Another object of this invention is to provide a blower of the character referred to in which

the wheel-driving motor may be easily adjusted to tension the belt and to align the pulleys with the housing arranged in any required position.

Another object of this invention is to provide a blower of the character referred to embodying quiet, long-wearing, self-aligning bearings for the wheel shaft carried by novel inlet fittings equipped to permit the easy lubrication of the bearings and capable of ready adjustment to bring the lubricant parts to upright or substantially upright positions with the blower housing arranged in any desired position.

Another object of this invention is to provide a blower of the character referred to in which the aforementioned flanges on the housing end plates may be extended to form inlet duct portions or to form housings or containers for filters, filtering and cooling packs, or the like.

A further object of this invention is to provide a blower of the character referred to that may be light in weight and constructed of light gauge material and yet possess great strength and rigidity, to fully resist racking, buckling, vibrating, etc.

The various objects and features of our invention will be fully understood from the following detailed description of typical preferred forms and applications of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is an elevation view of the discharge side of the blower provided by this invention. Fig. 2 is an elevation view of an inlet side of the blower. Fig. 3 is an enlarged, vertical, detailed sectional view taken substantially as indicated by line 3—3 on Fig. 1. Fig. 4 is an enlarged fragmentary vertical detailed sectional view of a portion of the motor mounting taken as indicated by line 4—4 on Fig. 3. Fig. 5 is an enlarged fragmentary vertical detailed sectional view illustrating one of the bearings, being a view taken as indicated by line 5—5 on Fig. 3. Fig. 6 is an elevation view of the discharge side of a blower of the invention formed to embody filter packs or cooling packs with the inlet portions in vertical cross section to illustrate said packs, and Fig. 7 is an end view of another form of the invention.

The embodiment of the invention illustrated in Figs. 1 to 5, inclusive, of the drawings may be said to comprise, generally, a housing 10, a blower wheel 11 rotatably supported in the housing 10, and an adjustable motor drive 12 for the wheel 11.

The casing or housing 10 forms the body and general supporting structure of the device. The

construction of the housing 10 is an important feature of the invention. The improved housing 10 comprises three principal parts, namely, two spaced end plates 13 and a scroll plate or scroll sheet 14. The end plates 13 are generally flat members of sheet stock or sheet metal of suitable thickness. The end plates 13 are alike in size and shape and are arranged in spaced parallel opposed relation. In the form of the invention being described the end plates 13 are substantially square or rectangular in face view, it being understood that the end plates of the housing may be of other shapes, if desired. In accordance with the invention the end plates 13 have marginal or edge flanges 15. The flanges 15 are continuous and extend throughout the several edges of the plates 13. While the width of the flanges 15 may vary with different installation requirements, it is preferred to make the flanges quite wide. Further, it is preferred to have the flanges 15 project outwardly at right angles to the planes or faces of the plates 13. It is to be understood that the flanges 15 are integral parts of the plates 13 bent or formed on the plates by an edger, or the like. The flanges 15 are integrally joined at the corners of the plates 13 by welds 16 so that they form continuous rims on the margins of the plates.

Each flange 15 has spaced openings 17. In practice there may be an opening 17 provided in each flange 15 adjacent its opposite ends. The openings 17 are provided to receive the stems of mounting buttons or pads 18 of rubber, or other yielding, deadening material. The mounting pads 18 are removably inserted in the openings 17. The pads 18 are only required on the lower flanges 15. However, if the housing 10 is turned or changed in position to have other flanges 15 at its lower side the pads 18 are removed and inserted in the openings 17 in the last mentioned flanges. Thus the flanges 15, equipped with the pads 18, form universal mountings for the housing 10 and provide for the installation, of the housing in any desired position. Each plate 13 is provided with an opening 19 of substantial size for the reception of the air inlet fittings to be later described. The inlet openings 19 are aligned and may be of the same diameter. It will be observed that the end plates 13 just described are simple, inexpensively formed elements.

The scroll sheet 14 forms the side wall element of the housing 10, being installed between the end plates 13. In accordance with the invention the sheet 14 may be formed from a single, continuous strip of sheet metal having straight, generally parallel longitudinal edges. These edges of the sheet 14 are provided with out-turned rims or flanges 20. The flanges 20 are preferably continuous and turned out at right angles to the surface of the sheet 14. The scroll sheet 14 is arranged between the spaced plates 13 to have its flanges 20 engage the inner surfaces of the plates. The sheet 14 is given a longitudinal scroll or volute form by bending it longitudinally either before or after the formation of the flanges 20. The flanges 20 may be readily formed on the sheet 14 by a suitable edging tool or flanging tool. The sheet 14 may be positioned between the spaced end plates 13 so that the common axis of the openings 19 forms the focus or center of curvature of the scroll. As best illustrated in Fig. 3 of the drawings the scroll sheet 14 is arranged to have its innermost end substantially midway between the ends of the flanges 15 at one

side of the structure and to have its outer end at or adjacent a corner of the structure. When the scroll sheet 14 has been shaped and arranged in position its flanges 20 are spot-welded to the inner sides of the plates 13, as shown at 21, or are otherwise integrally joined with the end plates. The welding of the sheet 14 of course maintains the scroll curvature and integrally joins the scroll sheet with the plates 13 so that the scroll sheet forms a strong tie between the plates 13. The scroll sheet 14 serves to integrally connect the end plates 13 along a line adjacent the flanged margins of the plates providing an assembly or structure of the greatest strength.

The inner and outer end parts 22 and 23 of the scroll sheet 14 are continued or extended to project from between the plates 13 to form the upper and lower walls of the blower outlet 24. These extended parts 22 and 23 of the sheet 14 are devoid of edge flanges. Members 25 having flanges 26 welded to the adjacent end plate flanges 15 extend between the upper and lower parts 22 and 23 of the air outlet. These members 25 form the side walls of the outlet or outlet fitting. It is to be understood that any required or selected air duct or air duct fitting may be applied to the outlet structure just described. The lower or outer wall 23 of the outlet structure may be reinforced by a flanged or curved part 27 welded to the sheet 14 and extending between the spaced side plates 13. It will be seen that the scroll sheet 14 is easily shaped and assembled between the end plates 13. The scroll sheet 14 is a continuous, one-piece element devoid of seams and is rigidly and integrally joined with the end plates 13 so that it is not subject to vibrating, working, or racking.

The wheel 11 is a centrifugal type blower wheel or impeller arranged to rotate within the volute chamber of the housing 10. The rotor or wheel 11 comprises an annular or cylindrical series of blades or vanes 28 carried by spaced end rings 29. The end rings 29 are supported by spokes 30 extending inwardly to a central hub 31. The hub 31 of the blower wheel 11 is fixed to a shaft 32 which extends horizontally or longitudinally through the housing to have its end portions protrude at the air inlets. The blower wheel 11 is proportioned so that it may be passed inwardly through the discharge or air outlet 24 to its position within the volute chamber. It is preferred to provide a cut-off piece 33 at the discharge or outlet 24 to increase the efficiency of the blower. The cut-off piece 33 is shaped or curved to form a continuation of the curved inner end of the scroll sheet 14 and extends horizontally or transversely between the end plates 13. Bolts 34 passed through openings in the adjacent housing parts and through openings in lugs or flanges 35 on the cut-off piece 33 may secure the cut-off piece in position. The edge of the cut-off piece 33 is preferably curled back as at 36. Following the insertion and mounting of the wheel 11 the cut-off piece 33 may be secured in the housing 10 to extend the scroll sheet 14.

Novel and very effective bearing means are provided for rotatably supporting the blower shaft 32 at the air inlets. Inlet fittings 37 are provided at the inlet openings 19. The fittings 37 may be annular castings or structures designed to lie against the outer sides of the end plates 13 in concentric relation with the openings 19. The fittings 37 include spaced spokes 38 extending inwardly to hubs 39 which surround the shaft 32. Effective means are provided for

securing the fittings 37 to the plates 13 for adjustment or turning. Multiplicities of screws or bolts 40 pass through spaced openings in the fittings 37 and extend inwardly through the outer parts of openings 19. Nuts or blocks 41 have threaded openings receiving the bolts 40 and are arranged to clamp against the inner surfaces of the plates 13. Raised ridges 42 are provided on the inner sides of the fittings 37 at the blocks 41 to hold the blocks against turning. The outer ends of the ridges 42 are engageable with the walls of the openings 19 to hold the fittings 37 in concentric relation with the openings 19. When the bolts 40 are tightened the blocks 41 clamp against the inner sides of the plates 13 at pluralities of spaced points to rigidly secure the fittings 37 to the plates 13. When the bolts 40 are loosened the fittings 37 may be adjusted or turned to the required positions, the cooperation of the ridges 42 with the walls of the openings 19 serving to guide the fittings during this adjustment.

Silent, long-wearing and self-aligning bearings are provided in the hubs 39 to rotatably support the blower wheel shaft 32. The hubs 39 are tubular and are recessed from their inner ends to receive the bearings. The bearings comprise annular blocks or rings 43 seated in the recessed hubs 39. In accordance with the invention the rings 43 are yielding to effectively absorb and dampen vibrations and to make the bearings silent. The rings 43 are formed of rubber, rubber composition, synthetic rubber, or similar material that is yielding, resilient and vibration absorbing. The interiors of the yielding rings 43 are shaped to have spherically concaved surfaces 44. Rings 45 of metal or other rigid, unyielding material are arranged within the yielding rings 43. The rings 45 have annular raised parts presenting convex surfaces 46 conforming to the spherically curved surfaces 44 of the yielding rings 43. The engagement of the surfaces 46 with the surfaces 44 is such that the rings 45 may have limited rocking movement with respect to the rings 43 to compensate for minor misalignments of the bearing parts, the shaft 31, etc. Bushings 47 of bronze, or the like, are pressed in the rings 45 and engage about the shaft 32. As illustrated in the drawings the rings 45 and the bushings 47 may be extended to have their outer ends protrude from the hubs 39. Retaining plates or rings 48 are arranged at the outer ends of the bearings and are attached to the hubs 39 by screws 49 to hold the bearings in the hubs. The retaining rings 48 may directly engage against the yielding rings 43 and surround the protruding parts of the rings 45 with considerable clearance. Stop collars 50 are fixed to the shaft 32 at the bearing rings 45 to hold the shaft against endwise movement.

The bearing means just described promote the quiet operation of the blower, operating to effectively absorb vibration of the wheel 11 and shaft 32 and to prevent such vibration from being transmitted to the housing 10. The yielding mounting rings 43 of the bearings support the inner bearing elements in the hubs 39 in such a manner that minor misalignments of the shaft 32 and the other parts are automatically compensated for.

Means are provided for lubricating the bearing means. The inner bearing rings 45 have internal grooves or cavities 51 containing felt 52 or other absorbent material. Ports 53 in the bushings 47 lead inwardly from the cavities 52.

Radially projecting bosses or lugs 54 are provided on the rings 45 and project outwardly through openings in the yielding rings 43 and the hubs 39. Lubricant cups 55 or other appropriate lubricant receiving means are provided on the outer parts of the lugs 54. Lubricant delivered to the cups 55 passes inwardly through ports 56 in the lugs 54 and rings 45 to saturate the felt 52 in the cavities 51. The ports 53 deliver the lubricant to the interiors of the bushings 47 to lubricate the bushings.

It is desirable to maintain the lubricant cups 55 in upright or substantially upright positions. The inlet fittings 37 mounted on the plates 13 as described above may be adjusted to bring the lubricant cups 55 to upright or substantially upright positions with the housing 10 installed in any position possible. In the event the housing 10 is positioned or installed so that the lubricant cups 55 are not upright the screws or bolts 40 may be loosened so that the fittings 37 may be adjusted or turned to bring the cups 55 to upright or substantially upright positions. The bolts 40 may then be tightened to secure the fittings 37 in their adjusted positions. The bearing supporting fittings 37 may be easily adjusted to bring the lubricant cups 55 to upright positions with any installation.

When it is desired to employ bearings of types or constructions different from those described, the fittings 37 can be suitably modified. It will be obvious, for example, that if ball bearings are used the mountings will have to be made to properly accommodate them.

The drive 12 for the blower wheel 11 is characterized by its complete range of adjustment which permits the installation of the blower with the outlet 24 arranged in any position and which provides for the location of the drive at either end of the blower. The drive 12 includes an electric motor 60 of suitable type and rating. The motor 60 is equipped with the usual mounting base 61. The means for mounting the motor 60 on the housing 10 includes a rod 62 adapted to be arranged at any selected or required side of the housing 10 to extend between and overlie its flanges 15. The rod 62 may be a simple, elongate cylindrical member, and is of such length that its ends are adjacent the edges of the flanges 15 at opposite ends of the housing 10. Lugs or clamps 63 are provided at the opposite ends of the rod 62. The clamps 63 have sockets 64 receiving the end portions of the rod 62. The upper walls of the sockets 64 are V-shaped or upwardly convergent to better grip the rod 62. The clamps 63 are substantially C-shaped having gaps or notches 65 in their inner sides which join the sockets 64. The notches 65 are adapted to receive the edge portions of the housing flanges 15 with considerable clearance. Set screws or clamp screws 66 are threaded through openings in the lower parts of the clamps 63 and are adapted to engage up against the lower sides of the flanges 15. The screws 66 are operable to clamp the rod 62 between the walls of the sockets 64 and the upper sides of the flanges 15 and are operable to secure the clamps 63 to the flanges. When the screws 66 are loosened the rod 62, carrying the lugs or clamps 63, may be shifted along the flanges 15.

The motor mounting means further includes brackets 67 and 68 arranged on the rod 62 to mount the motor 60. The bracket 67 is an elongate member provided at one end with a split clamp portion 69 for receiving the rod 62.

The bracket 68 is shorter than the bracket 67 and is provided at one end with a split clamping portion 70 which likewise receives the rod 62. Screws 71 are passed through openings in the split portions 69 and 70 and have wing nuts 72, which may be tightened to secure the brackets 67 and 68 to the rod 62. The outer end of the long bracket 67 carries a supporting and adjusting screw 73. The screw 73 is threaded through an opening in the bracket 67 and its inner end carries a tip 74 of rubber, or the like, adapted to engage the scroll sheet 14. A handle or head 75 may be provided on the outer end of the screw 73. A wing nut 76 is provided on the screw 73 and is engageable with the bracket 67 to secure the screw in any adjusted position. Studs or bolts 77 secure the motor base 61 to the brackets 67 and 68. There may be two bolts 77 securing the base 61 to the bracket 67 and a single bolt securing the motor base to the bracket 68 so that the motor 60 has three point attachment to the bracket assembly. The outer end of the motor shaft carries a pulley 78 and a pulley 79 is fixed to either protruding end portion of the wheel shaft 32. A belt 80 operates over the pulleys 78 and 79 so that the motor 60 drives the impeller wheel 11. The pulley 78 is preferably of the cone type or stepped type, as illustrated.

When the position of the housing 10 has been determined the rod 62 is arranged at the upper side of the housing and the clamps 63 are arranged at the ends of the rod to tentatively secure the rod in place. The brackets 67 and 68 are arranged on the rod 62 before the rod is attached to the housing 10. The rod 62, with its clamps 63, may be moved along the flanges 15 at the upper side of the housing 10 to bring the motor mounting means to the desired position. With the motor 60 attached to the brackets 67 and 68 the brackets may be slid along the rod 62 to accurately align the pulleys 78 and 79, and the rod, carrying its clamps 63, may be moved along the flange 15 to tentatively adjust or tension the belt 80. The screws 66 and the wing nuts 72 may be tightened to secure the parts in the adjusted positions. The screw 73 may be employed to give the belt 80 its final adjustment and may be set in the adjusted position by means of the wing nut 76.

The broken line circles X in Fig. 2 of the drawings illustrate some of the possible positions of the motor 60 at the several sides of the housing 10 as may be required by the position of the housing and installation space conditions. The adjustable motor mounting means, described above, provides for the mounting of the motor 60 at any side of the housing 10 and permits the accurate alignment of the pulleys 78 and 79 and proper adjustment of the belt 80. Further, the motor mounting means is such that the drive 12 may be provided at either end of the housing 10. The pulley 79 may be secured to either end of the shaft 32 and the motor 60 may be arranged to have its pulley 78 at either end of the housing. Thus, the flanges 15 of the end plates 13 and the motor mounting means make it possible to mount the motor 60 at any side of the housing 10, as required, and at either end of the housing.

It is believed that the operation of the blower structure illustrated in Figs. 1 to 5, inclusive, of the drawings will be fully understood from the foregoing detailed description. The housing 10, with the wheel 11 mounted therein, may be installed to have its outlet or discharge 24 face in any direction. With the housing 10 arranged in

the required position the motor 60 may be secured to the housing by the fully adjustable mounting means described above in detail. As described above, the inlet fittings 37 may be adjusted to bring the lubricant cups 55 to upright positions with the housing in any position. The housing 10 is very rigid and unyielding and is subject to practically no vibration. The flanged end plates 13 integrally connected by the scroll sheet 14 gives great rigidity to the structure. The shaft 32 of the wheel 11 is mounted in the housing 10 by the self-aligning, vibration-absorbing bearings so that little or no vibration reaches the housing structure. The shaft bearings, including the yielding rings 43, are self-aligning and effectively support the shaft. It is to be understood that suitable ducts may be provided for the inlets and the outlet 24.

Fig. 6 of the drawings illustrates a form of the invention in which the marginal flanges 15^a of the end plates 13 are extended outwardly to form ducts or casings C at the blower inlets. The flanges 15^a may be integral parts of the plates 13 and correspond to the flanges 15 described above. The flanges 15^a are preferably welded together at the corners of the structure by the welds 16. The extended flanges 15^a may be provided at either one or both ends of the housing 10. In the case illustrated, the flanges 15^a are provided at both ends of the housing 10 to form what I have termed casings C. The structure of the housing 10, the wheel 11, the bearing means for the shaft 32, etc. may be the same as in the construction shown in Figs. 1 to 5, inclusive.

The flange extensions or casings C may be employed for any selected purpose. The invention contemplates the arrangement of filtering packs, cooling and filtering packs, etc. in the casings C. In the drawings I have shown a filtering pack 85 arranged in each casing C. The filter packs 85 may be of any selected type, for example, they may comprise fillings 86 of excelsior, fibrous material, metal wool, glass wool, or the like, contained in wire mesh containers. Angle members 87 may be secured in the casings C as by welding, or the like, to hold the filter packs 85 against inward movement. Angle members 88 may be applied to the outer ends of the casings C to hold the packs 85 against outward movement. If desired, ducts 85^a may be arranged at or in the vicinity of the packs, or may be used when the packs are not employed to carry a heating or cooling medium to either heat or cool the air. In this form of the invention the motor 60 for driving the wheel 11 may be suitably mounted in either casing C. The motor 60 may be mounted on the lower wall of one of the casings C and the belt 80 may operate over the pulleys 78 and 79 as in the previously described structure. It will be observed that the construction of Fig. 6 provides a simple housing embodying two end plates whose flanges 15^a are extended to provide suitable housings or casings C at the inlets. The flanges 15^a, in addition to strengthening the general structure and facilitating the mounting of the blower, constitute ducts or casings at the blower inlets.

Fig. 7 of the drawings illustrates a form of the invention in which the end plates 13^a of the housing 10^a are generally disc-shaped having cylindrically curved edges except at the outlet side of the housing where they have straight edges. The scroll sheet 14, the wheel 11, the wheel mounting means and the wheel drive 12 may be the same as in the structure illustrated in Figs.

1 to 5, inclusive. The end plates 13^a of the housing 10^a have marginal flanges 15^b. The flanges 15^b are preferably continuous and have straight portions 90 at the outlet side of the housing 10^a. The flanges 15^b have the same function as the flanges 15, serving to strengthen and lend rigidity to the plates 13^a and to facilitate the mounting of the motor 60.

The motor 60 is mounted on the flanges 15^b by the rod 62, the clamps 63, the brackets 67 and 68 and the screw 73, all as described above. The lugs or clamps 63 may be slightly modified to better grip the cylindrically curved flanges 15^b and the long bracket 67^a may be curved, in part, to follow the curvature of the flanges 15^b. It will be seen that when the screws 66 are loosened the clamps 63 may be moved along the flanges 15^b to bring the motor 60 to any position, as required. The axis of rotation of the blower wheel 11 may be offset from the axis of curvature of the flanges 15^b so that the movement of the motor 60 along the flanges tensions or adjusts the belt 80. Where the installation conditions require a substantial adjustment of the motor 60 along the flanges 15^b the belt 80 may be engaged on the different steps of the cone pulley 76 to compensate for this adjustment.

The construction of Fig. 7 has the same features as the construction of Figs. 1 to 5, inclusive, and is characterized by the disc-like end plates 13^a having the cylindrically curved flanges 15^b and by the adjustment of the motor mounting means along these cylindrical flanges. In practice the structure may be provided with suitable feet or mountings 85^b. We have shown them clamped to the flanges 15^b.

Having described only typical preferred forms and applications of our invention, we do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to ourselves any variations or modifications that may appear to those skilled in the art or fall within the scope of the following claims:

Having described our invention, we claim:

1. In a blower housing of the character described, a pair of spaced polygonal sheet metal end plates having inlet openings, a volutely curved sheet metal member between the end plates defining a blower chamber, means rigidly joining the member and end plates, and marginal flanges on the several edges of the end plates joined together and lending rigidity to the structure and forming mounting means for the housing at its several sides.

2. In a blower housing of the character described, a pair of spaced polygonal sheet metal end plates, a scroll sheet between the end plates and joined with the inner sides of the plates to define a blower chamber, and continuous flanges extending along the several marginal edges of the end plates to lend rigidity to the housing structure and to form mounting means for the housing at its several sides.

3. A blower of the character described comprising a housing including spaced polygonal sheet metal end plates, a scroll sheet between the plates, means joining the scroll sheet with the plates leaving projecting margins on the plates, and flanges on the outer edges of the plates, the plates and scroll sheet defining a blower chamber, a blower wheel supported by the housing to rotate in the chamber, and means for rotating the wheel including a motor mounted on said flanges.

4. A blower of the character described comprising a housing including spaced polygonal sheet

metal end plates, a scroll sheet fixed between the plates so that the plates have parts projecting outwardly beyond the scroll sheet and flanges on the outer edges of said parts of the plates, the plates and scroll sheet defining a blower chamber, a blower wheel supported by the housing to rotate in the chamber, and means for rotating the wheel including a motor, a drive between the motor and wheel, and means for mounting the motor on said flanges for adjustment therealong to adjust the drive.

5. A blower of the character described comprising spaced polygonal end plates, a volutely curved sheet fixed between the plates, and positioned so that the plates have parts projecting outwardly beyond the sheet and marginal flanges on said projecting parts of the plates, the plates and member defining a blower chamber, a blower wheel supported to rotate in the chamber, and means for rotating the wheel including a motor, a drive between the motor and wheel, and means for mounting the motor on said flanges for adjustment therealong to adjust the drive, the last named means comprising a motor supporting rod adapted to extend between the flanges of the spaced plates, clamp units on the rod movable along the flanges, and means for releasably securing the clamp units to the flanges to attach the rod thereto.

6. A blower of the character described comprising spaced polygonal sheet metal end plates, a scroll member fixed between the plates to leave parts of the plates project outwardly therefrom, flanges on the outer edges of said parts, the plates and member defining a blower chamber, a blower wheel supported to rotate in the chamber, and means for rotating the wheel including a motor, a belt and pulley drive between the motor and wheel, a rod extending between and attachable to the flanges of the spaced plates, bracket means supporting the motor shiftable along the rod to permit aligning of the pulleys of the drive, and means for securing the bracket means in adjusted position.

7. A blower of the character described comprising spaced polygonal sheet metal end plates, a scroll member fixed between the plates to leave parts of the plates project outwardly beyond the member, flanges on the outer edges of said parts, the plates and member defining a blower chamber, a blower wheel supported to rotate in the chamber, and means for rotating the wheel including a motor, a belt and pulley drive between the motor and wheel, a rod extending between and attachable to the flanges of the spaced plates, bracket means supporting the motor shiftable along the rod to permit aligning of the pulleys of the drive and pivotable on the rod to adjust the tension of the belt, and releasable means for holding the bracket means in the adjusted position.

8. In a blower of the character described comprising a housing having spaced end plates and a scroll member fixed between the plates to leave parts of the plates projecting outwardly beyond the member, flanges on the outer edges of the plates, the plates and member defining a blower chamber, a blower wheel supported by the housing to rotate in the chamber, and means for rotating the wheel including a motor, a belt and pulley drive between the motor and wheel, a rod extending between and attachable to the flanges of the spaced plates, bracket means supporting the motor and pivotable on the rod, and screw means reacting between the housing and bracket for piv-

oting the bracket means to adjust the tension of the belt of said drive.

9. In a blower of the character described, a housing comprising a pair of spaced polygonal sheet metal end plates, a scroll sheet fixed between the inner sides of the plates to leave parts of the plates projecting outwardly beyond the scroll sheet, the end plates and scroll sheet defining a blower chamber, at least one of the end plates having an opening forming the inlet for said chamber and the scroll sheet being formed to define an outlet for the chamber at a side of the housing, and flanges on the outer edges of said parts, a blower wheel rotatable in the chamber, a motor for driving the wheel, supporting means for the motor attachable to the flanges at any side of the housing as required by the installation space conditions and the direction of the outlet, and a drive between the motor and wheel.

10. In a blower of the character described, a housing comprising a pair of spaced polygonal sheet metal end plates, a scroll sheet fixed to the inner sides of the plates to leave parts of the plates projecting outwardly beyond the scroll sheet, the end plates and scroll sheet defining a blower chamber, at least one of the end plates having an opening forming the inlet for said chamber and the scroll sheet being formed to define an outlet for the chamber at a side of the housing, and flanges on the outer edges of said parts, a blower wheel rotatable in the chamber, a motor for driving the wheel, supporting means for the motor attachable to the flanges at any side of the housing as required by the installation space conditions and the direction of the outlet, the supporting means including a rod adapted to be arranged at a selected side of the housing to extend between said flanges, means carried by the rod for supporting the motor, and means for securing the rod to the flanges at the selected or required side of the housing, and a drive between the motor and wheel.

11. In a blower of the character described, a housing comprising a pair of spaced polygonal sheet metal end plates, a scroll sheet between the end plates and joined with the inner sides of the plates, the end plates and scroll sheet defining a blower chamber, at least one of the end plates having an opening forming the inlet for said chamber and the scroll sheet being formed to define an outlet for the chamber at a side of the housing, and flanges on the outer edges of the end plates, a blower wheel rotatable in the chamber, a motor for driving the wheel, supporting means for the motor attachable to the flanges at any side of the housing as required by the installation space conditions and the direction of the outlet, a drive between the motor and wheel, and means rotatably supporting the wheel comprising a wheel shaft, a fitting at the inlet, bearing means on the fitting for carrying the shaft and having a lubricant receiver, and means turnably supporting the fitting at the inlet whereby the lubricant receiver may be brought to an upright position with the housing in different positions.

12. In a blower of the character described, a housing comprising a pair of spaced sheet metal end plates, a volutely curved sheet metal member between the end plates, means rigidly joining the member and end plates, the end plates and member defining a blower chamber and the end plates having openings forming inlets for the chamber, a blower wheel in said chamber, a motor driving said wheel, and flanges on the outer edges of the end plates extended axially outward relative to the blower chamber and inlets a substantial distance to form passages or casings at the inlets, one of which casings houses the motor.

13. In a blower of the character described to be carried on a support, a casing comprising spaced end plates having inlet openings, a scroll member fixed between the end plates along lines removed from the marginal edges of the end plates, the end plates and scroll member forming a structure defining a blower chamber the outlet of which is at one side of said structure, a blower wheel supported by said structure within said chamber, the marginal edges of the end plates forming a part to rest the structure on the support whereby the carrier can be mounted so the outlet faces in various directions relative to the support, and a motor adjustably supported by the marginal edges of the end plates to drive the blower wheel.

14. In a blower of the character described to be carried on a support, a casing comprising spaced end plates having inlet openings, a scroll member fixed between the end plates along lines removed from the marginal edges of the end plates, the end plates and scroll member forming a structure defining a blower chamber the outlet of which is at one side of said structure, a blower wheel supported by said structure within said chamber, the marginal edges of the end plates forming a part to rest the structure on the support whereby the carrier can be mounted so the outlet faces in various directions relative to the support, a motor adjustably supported by the marginal edges of the end plates, and a flexible drive from the motor to the blower wheel, the blower wheel and said marginal edges being related so that movement of the motor along said edges varies the spacing of the motor and blower wheel.

15. In a blower of the character described to be mounted on a support, a pair of spaced end plates having inlet openings, a scroll member fixed between the end plates along lines removed from the marginal edges of the end plates, a blower wheel mounted in the structure formed by the end plates and scroll member, a motor for driving the wheel, the marginal edges of the end plates engaging the support so said structure is carried thereby, and said edges also supporting the motor, and a flexible drive from the motor to the wheel, the motor being shiftable on the edges of the plates to adjust the drive.

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