

March 21, 1961

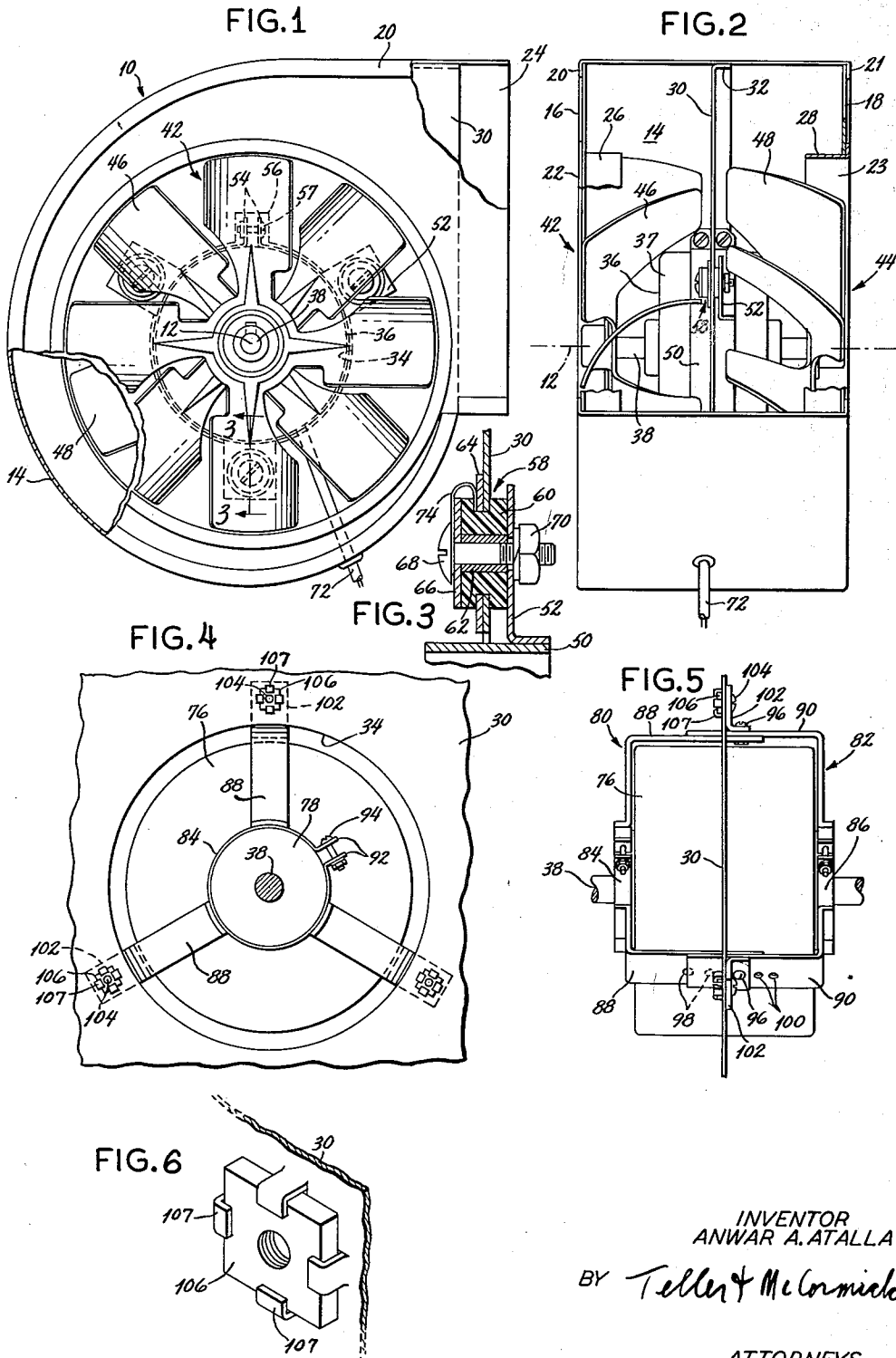
A. A. ATALLA

2,975,960

BLOWER UNIT AND MOTOR SUPPORTING MEANS FOR USE THEREIN

Filed May 19, 1958

2 Sheets-Sheet 1



INVENTOR
ANWAR A. ATALLA

BY *Teller & McCormick*

ATTORNEYS

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A. A. ATALLA

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2 Sheets-Sheet 2

FIG. 7

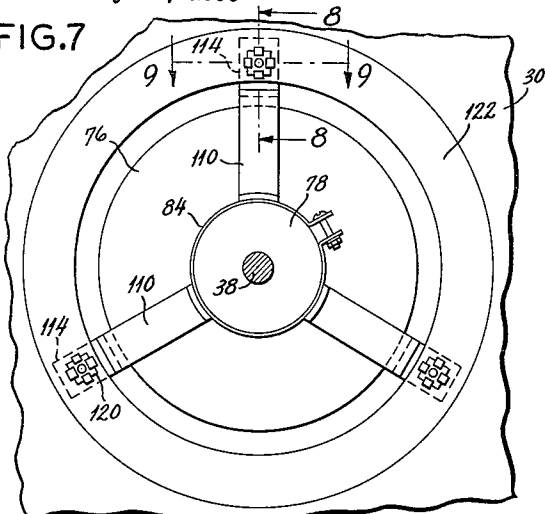


FIG. 8

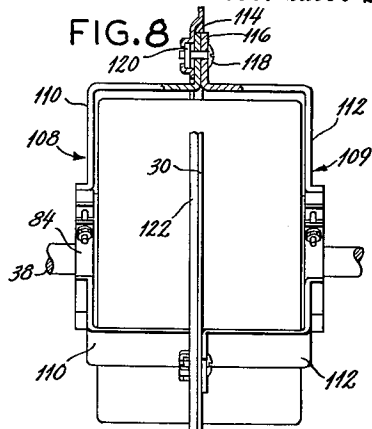


FIG. 9

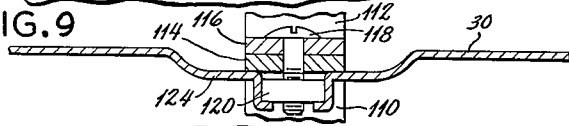


FIG. 10

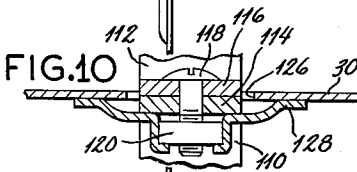


FIG. 11

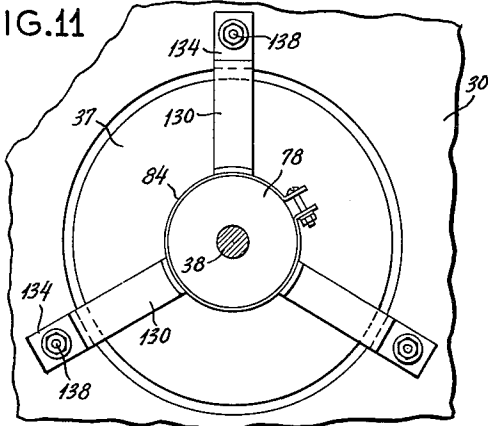


FIG. 12

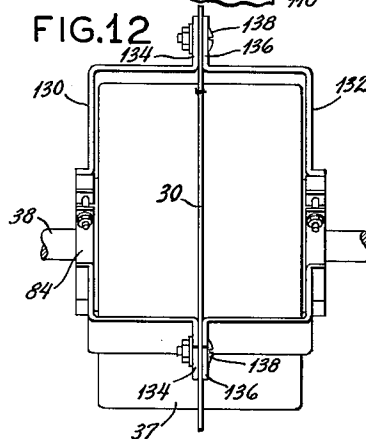


FIG. 13

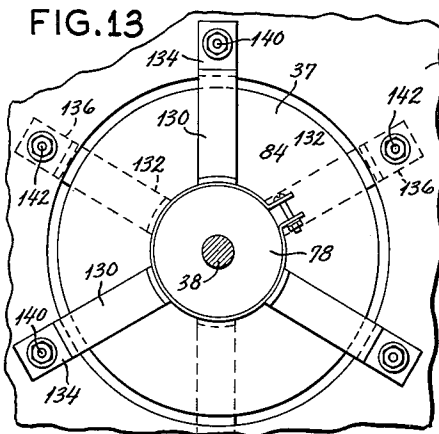
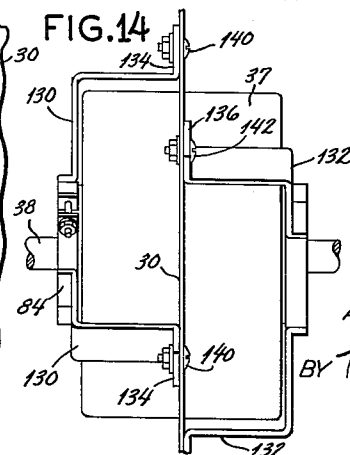


FIG. 14



INVENTOR
ANWAR A. ATALLA
BY Tellen & McCormick

ATTORNEYS

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2,975,960

BLOWER UNIT AND MOTOR SUPPORTING MEANS FOR USE THEREIN

Anwar A. Atalla, Torrington, Conn., assignor to The Torrington Manufacturing Company, Torrington, Conn., a corporation of Connecticut

Filed May 19, 1958, Ser. No. 736,212

13 Claims. (Cl. 230-117)

The invention relates to a blower unit of the type disclosed in the application of Anwar A. Atalla, Serial No. 696,537 filed November 4, 1957 and entitled "Blower Unit." Such a blower unit is adapted for use with warm air furnaces and with air conditioning installations and otherwise, said unit being of the type that includes a housing having opposite air intake openings and having an air discharge opening, that includes an electric motor carried by the housing, and that includes air impelling means located within the housing and driven by the motor and serving to draw air inwardly through the two intake openings and to discharge said air through the discharge opening.

The present invention relates particularly to the motor mounting means and associated parts for a blower unit of the stated type, and it does not relate specifically to the other novel features of the unit as disclosed and claimed in said prior application. The general object of the present invention is to provide a means for supporting or mounting the motor of the blower unit which means is separate from the motor and is connectible with a central partition within the housing and is so located that the motor is supported within an opening in the partition with its center of gravity in or near the plane of said partition.

A more specific object of the invention is to provide a cage which constitutes the motor mounting means and which is primarily adapted for use with a motor having cylindrical supporting elements adjacent the opposite ends of its casing. In accordance with this phase of the invention, said cage includes two longitudinally spaced rings respectively engaging said supporting elements of said motor and also includes circumaxially spaced struts extending longitudinally from each of said rings and toward the plane of said partition together with means adjacent said partition opening for connecting each of said struts to said partition.

Another more specific object of the invention is to provide a mounting means for the motor so constructed and arranged that said mounting means and said motor in fixed connected relationship with each other are adapted for assembly movement into the housing through one of the air intake openings. A connecting means is provided which enables the motor to be held in place after assembly, this connecting means being accessible and manipulable through the same opening that was used for motor assembly.

Another specific object of the invention is to provide in a blower unit, or for use therein, a motor mounting cage having two half-portions which are identical in construction, or substantially so, but which can nevertheless be so located as to hold the motor with its center of gravity in the plane of the central partition.

Another specific but alternative object of the invention is to provide in a blower unit, or for use therein, a motor mounting case having two initially separate half-portions, one of which may be connected with the central partition prior to the placing of the motor and the other

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of which can be connected to the central partition after the placing of the motor.

Other objects of the invention will be apparent from the following specification and claims.

The drawings show several embodiments of the invention and such embodiments will be described, but it will be understood that various changes may be made from the constructions disclosed, and that the drawings and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

Fig. 1 is a side view of a blower unit of the type to which the invention is applicable, certain parts being broken away to more clearly show other parts.

Fig. 2 is a right end view of the blower unit as shown in Fig. 1 with certain parts broken away and with other parts in vertical central section.

Fig. 3 is an enlarged fragmentary sectional view taken along the line 3-3 of Fig. 1.

Fig. 4 is a fragmentary sectional view looking toward the right in Fig. 5 and showing one embodiment of the invention.

Fig. 5 is a right view of the parts shown in Fig. 4.

Fig. 6 is an enlarged fragmentary perspective view of one of the retaining nuts shown in Fig. 4.

Fig. 7 is a view similar to Fig. 4, but showing an alternative embodiment of the invention.

Fig. 8 is a right elevational and sectional view of the parts shown in Fig. 7, the sectional portion of the view being taken along the line 8-8 of Fig. 7.

Fig. 9 is an enlarged fragmentary sectional view taken along the line 9-9 of Fig. 8, but showing an alternative detail.

Fig. 10 is a view similar to Fig. 9, but showing another alternative detail.

Fig. 11 is a view similar to Fig. 4, but showing another alternative embodiment of the invention.

Fig. 12 is a right view of the parts shown in Fig. 11.

Fig. 13 is a view similar to Fig. 4, but showing another alternative embodiment of the invention.

Fig. 14 is a right view of the parts shown in Fig. 13.

Reference is made to the said application Serial No. 696,537 for various details of construction not fully shown in drawings nor hereinafter fully described.

Referring to the drawings and more particularly to Figs. 1 to 3 thereof, the main housing of the blower unit is represented at 10, said housing preferably being formed of sheet metal. The shape of the housing can be widely varied, but it is shown as being of the scroll or involute type. When the housing is of the last type, there is a longitudinal axis 12 and the housing has a peripheral wall 14 which conforms to a surface generated by moving a line approximately in an involute path about said axis 12. The housing has similar opposite parallel front and rear side walls 16 and 18. As shown, the peripheral wall 14 has opposite flanges 20 and 21 which engage the peripheral portions of the side walls 16 and 18 and which are suitably connected therewith, as for instance, by spot welding. The side walls 16 and 18 are provided respectively with similar large intake openings 22 and 23 which openings are concentric with the axis 12. The housing has a relatively large peripheral discharge opening 24. Two generally cylindrical shrouds 26 and 28 are fitted within the discharge openings in the side walls, these shrouds being concentric with the axis 12. The major portions of the shrouds are cylindrical and said cylindrical portions are located to a major extent within the housing.

As will be more fully explained, the hereinafter described motor with its mounting means can be inserted in one axial direction or the other through one of the in-

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take openings 22 and 23. This may be the right opening 23 and the selected opening will be referred to as the "assembly opening."

A central panel or partition 30 is provided within the housing midway between and parallel with the side walls 16 and 18, this partition being formed of sheet metal and being suitably connected with the peripheral wall 14, as for instance by means of a flange 32. Said partition 30 extends nearly to the discharge opening 24 and said partition provides two substantially equal chambers within the housing 10.

The central partition 30 has an opening 34 therein concentric with the axis 12 and an electric motor 36 is located at said opening. The motor includes a casing 37 which is substantially smaller than said partition opening 34 and is located therein. The motor also includes a drive shaft 38 having portions projecting at both ends of the casing. By means of the hereinafter described mounting means, the motor is supported so that its casing 37 is symmetrically located in said partition opening 34 and said shaft 38 is concentric with said central axis 12.

Secured to the projecting end portions of the motor shaft 38 are two rotary air impellers respectively indicated as 42 and 44. The impellers are provided respectively with blades 46 and 48 uniformly spaced circumaxially. Portions of the blades of the two impellers are respectively within the shrouds 26 and 28 and said portions at their outer edges have reasonable running clearances with respect to the shrouds. Preferably and as shown, the two impellers 42 and 44 have the same number of blades and the said blades of the two impellers are in circumaxially staggered relationship with each other as shown in Figs. 1 and 2. The two impellers 42 and 44 rotate in the clockwise direction as viewed in Fig. 1, and the blades 46 and 48 are so pitched that they draw air in opposite directions and inwardly through the corresponding shrouds and intake openings and toward the motor 36 and toward the panel or partition 30.

A motor mounting means is provided which is fixedly connected with the motor and which includes elements projecting radially outwardly therefrom and located immediately adjacent the partition 30. Preferably the motor mounting means is self-contained and it includes an annular member or means completely surrounding a portion of said motor and fixedly but detachably connected therewith, and the motor mounting means preferably also has said outwardly projecting elements in circumaxially spaced relationship and all rigidly connected with said annular member or means independently of the motor and each directly connectible with the partition 30. Said motor and said mounting means in their fixedly connected relationship are smaller than the assembly opening 23 and are therefore adapted for assembly movement into said housing through the assembly opening and toward the partition 30. Devices as hereinafter fully described are provided which are operable after assembly and which serve to connect the spaced elements of the mounting means with the partition 30 so as to hold said mounting means and said motor in a fixed position with respect to the partition wherein the center of gravity of the motor is at least approximately in the plane of said partition.

The supporting means for the motor, as shown in Fig. 3, includes a supporting ring or strap 50 surrounding and fitting the casing 37 of the motor. Said ring or strap is located within said partition opening 34, but it preferably does not closely fit said opening. Said ring or strap 50 constitutes the before-mentioned annular member or means of the supporting means. Rigidly connected with said annular member or strap 50 independently of the motor are at least three clips or ears 52, 52 which extend radially outward beyond the periphery of said partition opening 34. These ears may be connected by welding

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or otherwise. Said ears 52, 52 are at the side of said partition 30 which faces toward said assembly opening 23. The ears are equally spaced circumaxially and they are connectible with the partition by means to be described.

The casing 37 of said motor 36 fits within the annular member or strap 50 so as to be detachably held thereby in the stated relationship with the panel or partition 30. The supporting strap 50 is split and it has two spaced ears 54, 54 as shown in Fig. 1, the opening 34 having a notch 56 to receive said ears. Bolts 57 extend through holes in the said ears, and by means of said bolts the ears 54, 54 can be drawn toward each other so as to firmly clamp the strap 50 against the periphery of the motor casing. Thus the strap firmly engages the motor casing 37 and serves to support said motor.

The before-mentioned connecting means for the motor mounting means preferably includes devices located in substantially fixed positions on the partition 30. As shown in Figs. 1 to 3, these devices are threaded bolts 68 which are held in fixed relationship to the partition 30. The connecting means also includes relatively movable devices respectively engageable with said fixed devices such as 68. As shown in said Figs. 1 to 3, the movable devices are threaded nuts 70 engageable with the bolts 68. Said devices or nuts 70 are accessible through the assembly opening such as 23 and they are manipulable through said opening so that they are engaged with said fixed devices or bolts 68 to hold said motor in place. This arrangement makes it possible to assemble and connect the motor from one side of the housing. If the devices such as 68 were not held in fixed relationship to the partition, it would be necessary for a second workman to reach through the opposite opening 22 in order to hold the bolts or devices 68 in place.

When the supporting means supports the motor resiliently, the ears 52, 52 are connected with the partition 30 by means of a plurality of resilient connections generally indicated at 58, 58. One ear 52 and one connection 58 are illustrated in detail in Fig. 3. In said resilient connection 58, a rubber grommet 60 is fitted within a hole in the partition 30 adjacent the opening 34, said grommet having a central bushing 62 therein. Preferably, in order to provide a larger bearing area for the grommet 60, a small plate 64 is welded or otherwise secured to the partition and has a hole for the grommet which has the same diameter as that in the partition. One side of the grommet engages the corresponding clip or ear 52. At the opposite side of the grommet is a washer 66. The before-mentioned bolt 68 extends through said bushing 62 and through a hole in the washer 66. The before described parts tightly fit each other so that the bolt 68 is firmly held against movement. Upon assembly, the bolt 68 extends through a hole in the ear 52.

The motor 36 and the motor mounting means, including the strap 50 and the ears 52, 52, may be connected or assembled with each other outside of the housing and this subassembly may be moved inwardly through the assembly opening 23. In so moving, the radially projecting elements 52, 52 move toward the partition and they engage said partition at the side thereof that faces the assembly opening. The subassembly is located with the bolts 68 extending through the holes or apertures in the ears 52. Then the nuts 70 are engaged with the bolts to hold the entire subassembly in place, said nuts being accessible through the assembly opening 23 and said nuts constituting devices operable after assembly for connecting the ears 52, 52 with the partition. By means of said connections 58, 58 and said nuts the motor mounting means and the motor are firmly but resiliently connected with the partition plate 30.

Preferably the holes in the ears 52 are somewhat larger than the bolts 68. Immediately after assembly the bolts 70 are preferably not finally tightened at the

outset, but are tightened only sufficiently to prevent free movement of the motor. Then the motor is checked for concentricity of its shaft with the intake openings 22 and 23. If any eccentricity is found, the larger sizes of said holes for the bolts permit the necessary correction to be made.

A conducting cable 72 for supplying current to the motor 36 extends upwardly through an insulating bushing in the lower portion of the peripheral housing wall 14 and then to the motor. As shown in Fig. 3, at least one electrical connecting wire 74 is engaged by the head of a corresponding one of the bolts 68 and said wire 74 is soldered or otherwise connected with the plate 64. This wire provides a grounding connection for the motor supporting strap 59 and for the casing 37 of the motor.

It will be apparent that motors differing in exterior size from the disclosed motor 36 can be readily accommodated by merely substituting a strap similar to the strap 50 but differing in size to accommodate the selected motor. The strap 50 can be smaller than that shown, and the space between the strap 50 and the periphery of the opening 34 permits larger straps to be substituted without any necessary change in the partition.

Figs. 4 to 6 show a motor mounting means embodying the invention, this means being adapted for supporting a motor having a casing 76 and having cylindrical supporting elements 78 adjacent the ends of the casing. In accordance with recognized practice, said supporting elements 78 of the motor are resiliently connected with the casing and other motor parts. The motor mounting means includes a cage which engages said supporting elements 78 of the motor and which is connected with the partition 30. This cage can be varied as to some of its features, but the cage shown in Figs. 4 and 5 is illustrative. The cage comprises two initially separate portions 80, 82 which are sometimes herein referred to as "half portions." The said half portions of the cage include two longitudinally spaced rings 84 and 86 which respectively surround and engage the supporting elements 78 of the motor, these rings collectively constituting an annular means surrounding and detachably connected with a portion of the motor. The half portions 80 and 82 of the cage also include circumaxially spaced struts 88, 88 and 90, 90, portions of which extend longitudinally from said rings and toward the plane of the partition 30. Each strut 88 or 90 extends radially outwardly from the corresponding ring and then longitudinally toward said partition plane, the two portions of each strut being so positioned as to clear the casing of the largest motor which the cage is adapted to hold. As shown, there are three struts connected with each ring, but the invention is not so limited. The struts connected respectively with the two rings are sometimes hereinafter referred to as "sets of struts."

Preferably and as shown, each ring 84 or 86 is formed of sheet metal and is of such size as to readily receive the corresponding motor supporting element 78. The ring is split and is provided with ears 92, 92 which can be drawn toward each other by a screw 94 so as to firmly clamp the ring against the corresponding supporting element 78. Preferably, the struts 88 and 90 are also formed of sheet metal, but they are preferably initially separate from said rings. The struts may be connected with the rings by welding or otherwise.

Means is provided adjacent the partition opening 34 for connecting each of said struts 88, 88 and 90, 90 to said partition 30 so as to support said cage with the motor positioned in the opening 34, as above stated, the motor being mounted with its center of gravity in the plane of said partition.

In the embodiment of the invention shown in Figs. 4 to 6, the several struts of each set are respectively in approximate longitudinal alignment with those of the other set so as to constitute pairs of struts. The two struts of each pair may be in engagement with each

other, although this is not always essential. When the two struts of each pair engage each other as shown in Figs. 4 and 5, means separate from the partition 30 may be provided for connecting the two struts of each pair with each other. As shown, screws or bolts 96, 96 are provided for this purpose. Said struts may be so constructed and arranged that they can be connected in longitudinally different relative positions in order to vary the spacing between the rings 84 and 86 and in order to thus enable the cage to accommodate motors of different lengths. As shown, each strut 88 of one set is provided with a plurality of uniformly spaced holes 98 and each strut 90 of the other set is provided with a plurality of similarly spaced holes 100. Said screws or bolts 96 extend through registering holes 98 and 100 in the struts of each pair to hold said struts in adjusted positions.

The means shown in Figs. 4 to 6 for connecting the struts to the partition includes a plurality of outwardly extending ears on the struts of the several pairs. Said ears are shown as being parts of L-shaped clips 102, 102, one clip being provided for each pair of struts. Each clip has a short longitudinal leg and a longer radial leg constituting the ear. Each clip 102 has an aperture in its longitudinal leg through which the corresponding screw or bolt 96 extends, the clip being thus rigidly connected with the struts of the corresponding pair. Each clip 102 has an aperture in its radial leg or ear and a screw or bolt 104 extends through the last said aperture and through a corresponding aperture in the partition 30.

In order that the motor and cage may be easily assembled, as a unit or subassembly, with said housing and said partition, threaded means are provided which are in permanent positions adjacent the last said partition apertures and which are adapted to receive and engage the bolts 104. Thus, the cage and motor may be entered as a subassembly through the right intake or assembly opening 23 and then said subassembly may be moved toward the left until the ears of the clips 102, 102 engage the partition 30. Finally, the bolts 104, 104 may be inserted toward the left and engaged with said permanent threaded means on the partition.

Said permanent threaded means may comprise nuts 106, one of which is shown in Fig. 6. Each of these nuts 106 is held in place on the partition by fingers 107, 107 formed integrally with the partition and bent outwardly therefrom. With the nut 106 in place, the fingers 107, 107 are bent around the edges of the nut to hold it. The fingers 107 loosely engage the nuts 106 so that said nuts are movable within narrow limits. The several screws or bolts 104 when engaged with the nuts serve to hold the motor cage and the motor in the required positions. Immediately after assembly the bolts 104 are preferably not finally tightened at the outset, but are tightened only sufficiently to prevent free movement of the motor. Then the motor is checked for concentricity as fully explained in connection with Figs. 1 to 3.

It will be observed that the several holes 98, 100 in the struts of each pair are so located in relation to the dimensions of the clips 102 that the rings 84 and 86 are uniformly spaced from the central plane of the partition 30 when the clips 102 engage one face of the partition as shown in Fig. 5. This enables the cage to hold the motor with its center of gravity in or approximately in the plane of the partition.

The motor mounting cage shown in Figs. 7 and 8 is generally similar to that shown in Figs. 4 to 6, but it differs in omitting any provision for relative adjustment between the struts of the two sets. Said motor mounting cage comprises two separate half portions 108 and 109 which may be identical in construction. The struts of the cage portions 108 and 109 are indicated at 110 and 112 and these struts are or may be similar to the struts 88 and 90 as concerns their connection with the rings 84 and 86. The struts 110 and 112 are provided with out-

wardly bent ears 114 and 116 and the struts of each pair are in engagement with each other at the said ears. The two ears of each pair of struts have registering apertures and a companion aperture is formed in the partition 30. Screws or bolts 118 extend through the said apertures to hold the cage and the motor in the required position. Captive nuts 120, 120 may be provided similar to the nut 106 shown in Fig. 6. As stated, the two half portions of the cage may be exactly alike. In order that the two rings 84 and 86 may be equally spaced from the central plane of the partition 30, at least a portion of the partition 30 is offset to permit the two ears 114 and 116 to be positioned at opposite sides of the said central plane. As shown in Figs. 7 and 8, an annular portion 122 of the partition 30 is offset and the ear 114 engages this offset portion.

Instead of an annular offset 122 in the partition, there may be a plurality of smaller offsets 124, one for each pair of ears. One such offset is shown in Fig. 9.

Fig. 10 shows a detail alternative to that shown in Fig. 9. The partition 30 has a notch 126 to receive the ears 114 and 116 on the struts, and there is provided a plate 128, separate from the partition and spanning the notch. This plate provides the necessary offset for holding said ears.

With the construction shown in Figs. 7 and 8, or in Fig. 9 or Fig. 10, the two portions of the motor supporting cage can be assembled with the motor in a location at the outside of the housing 10, but the two struts 110 and 112 of each pair are not directly connected with each other independently of the partition. However, the ears 114 and 116 of each pair are substantially in contact and they are held in substantially fixed relationship with each other by reason of the engagement of the rings 54 and 56 with the supporting elements 78 of the motor. Thus, the motor mounting cage and the motor constitute a unit or subassembly which can be moved into the housing through one of the air intake openings, in this case, the intake opening 23 at the right as viewed in Fig. 2. With the last-mentioned subassembly in position, it can be connected by means of the bolts 118, 118 which engage the nuts 120, 120.

The motor mounting cage shown in Figs. 11 and 12 is generally similar to those shown in Figs. 6 and 8, but it differs in that there is no provision for any direct engagement between the struts of the two sets. The alternative struts are indicated at 130 and 132 and these are or may be similar to the before-described struts. The struts 130 and 132 have outwardly bent ears 134 and 136 similar to the ears 114 and 116 but said ears 134 and 136 are so located that they engage the partition 30 at opposite sides thereof. Said struts 130 and 132 are not in direct engagement with each other. The two ears of each pair of struts have registering apertures and a companion aperture is formed in the partition 30. Screws or bolts 138 extend through apertures in the ears and in the partition to hold the cage and the motor in the required position.

When the cage is constructed as shown in Figs. 11 and 12, the two portions of the motor supporting cage cannot be assembled with the motor in a location at the outside of the housing 10. One half portion of the cage such as that at the right, with or without the motor, must be first put in place through the corresponding intake opening and then the other half portion of the cage, without or with the motor, must be put in place through the opposite intake opening. Finally both half portions of the cage are secured in place by the same screws 138, 138.

The motor mounting cage shown in Figs. 13 and 14 is very similar to that shown in Figs. 11 and 12, but it differs in the provision of means for the attachment of each half portion to the partition independently of the other half portion. The two half portions of the cage are rela-

tively turned so that the several struts are out of register with each other. The struts 130 are connected with the partition 30 at one side thereof by screws 140, and the struts 132 are connected with the partition 30 at the opposite side thereof by separate screws 142.

Either half portion of the cage, with or without the motor, can be put in place first and can be connected to the partition. Then the other half portion of the cage, without or with the motor, is put in place, said second half portion of the cage being connected to the partition separately from the first half portion.

The invention claimed is:

1. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, one of said openings being adapted for motor assembly therethrough, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends which last said opening is smaller than the assembly opening, an electric motor including a casing substantially smaller than said partition opening and located therein and also including a drive shaft concentric with said central axis and having projecting end portions which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a separate motor mounting cage including two longitudinally spaced rings respectively fixedly connected with said supporting elements of said motor which cage has two separate half portions each of which includes one of said rings and each of which also includes circumaxially spaced struts extending longitudinally from the corresponding ring and toward the plane of said partition, said mounting cage further including elements extending radially outwardly from the struts and each having a face parallel with the partition at a position spaced outwardly from the partition opening and at the side of the partition facing the assembly opening, said motor and said mounting cage in their fixedly connected relationship with each other being smaller than said assembly opening and therefore adapted to be assembled in an axial direction through said assembly opening to bring said faces of the radially extending elements closely adjacent the partition, and means operable after assembly and accessible and operable through the assembly opening for connecting said radially extending elements with said partition.

2. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends, an electric motor including a casing smaller than said partition opening and located therein symmetrically with respect to the plane of said partition which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom toward the plane of said partition which struts of each set are respectively in approximate longitudinal alignment with those of the other set to constitute pairs of struts, said mounting cage further including elements extending radially outwardly

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connecting the struts of each of said pairs to a partition such as that aforesaid so as to support said case and an engaged motor in a central position with said motor supporting elements equally spaced from the plane of said partition.

9. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, one of said openings being adapted for motor assembly therethrough, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends which last said opening is smaller than the assembly opening, an electric motor including a casing substantially smaller than said partition opening and located therein symmetrically with respect to the plane of said partition, which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including circumaxially spaced struts extending longitudinally from each of said rings and toward the plane of said partition which struts are provided with outwardly bent ears at their inner ends which ears have their outer portions spaced outwardly from the partition opening, the motor and the cage when connected with each other being smaller than said assembly opening and therefore adapted to be assembled through said assembly opening, and connecting means including devices located in substantially fixed positions on the partition adjacent and spaced outwardly from said opening therein and further including relatively movable devices respectively engageable with the said fixed devices after assembly of said motor and mounting cage through said assembly opening, said relatively movable devices being engageable with the radially projecting elements of the mounting cage and said devices being accessible through said assembly opening and being manipulable therethrough so that they are engaged with said fixed devices to hold said motor mounting cage and said motor in place.

10. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, one of said openings being adapted for motor assembly therethrough, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends, an electric motor including a casing substantially smaller than said partition opening and located therein symmetrically with respect to the plane of said partition which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom toward the plane of said partition, the several struts of each set being respectively in approximate longitudinal alignment with those of the other set to constitute pairs of struts and all of said struts being provided with outwardly bent ears at their inner ends which ears have their outer portions spaced outwardly from the partition opening, the motor and the cage when connected with

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each other being smaller than said assembly opening and therefore adapted to be assembled through said assembly opening, and connecting means including devices located in substantially fixed positions on the partition adjacent and spaced outwardly from said opening therein and further including relatively movable devices respectively engageable with the said fixed devices after assembly of said motor and mounting cage through said assembly opening, said relatively movable devices being engageable with the radially projecting elements of the mounting cage and said devices being accessible through said assembly opening and being manipulable therethrough so that they are engaged with said fixed devices to hold said motor mounting cage and said motor in place.

11. A blower unit as set forth in claim 10, wherein portions of the central partition are offset so that the said ears of each pair are at opposite sides of the central plane of the partition.

12. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends, an electric motor located in said partition opening and including a casing symmetrically positioned with respect to the plane of said partition which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom toward the plane of said partition, the several struts of each set being respectively in approximate longitudinal alignment with those of the other set to constitute pairs of struts and the said struts being provided with outwardly bent ears at their inner ends and the two ears on the struts of each pair being at opposite sides of said partition, and means adjacent said partition opening for connecting the ears of said struts to said partition so as to support said cage with the motor positioned as before stated and with its center of gravity at least approximately in the plane of said partition.

13. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends, an electric motor located in said partition opening and including a casing symmetrically positioned with respect to the plane of said partition which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom toward the plane of said partition, a first means adjacent said partition opening for connecting the struts of one set to said partition, and separate second means adjacent said partition opening for connecting the struts of the other set to said partition, the two said connecting means serving to support

from the struts of each pair and connectible with the partition at positions spaced outwardly from the partition of opening and at the side of the partition facing the assembly opening, and means adjacent said partition opening for connecting the several outwardly extending elements of said cage to said partition.

3. A motor mounting cage for use with a motor having longitudinally spaced supporting elements, said cage including two longitudinally spaced rings having a common axis and respectively engageable with longitudinally spaced supporting elements such as aforesaid and said cage also including two similar sets of structurally separate circumaxially spaced struts extending longitudinally from each of said rings and toward a central plane between them, elements extending radially outwardly from the struts and engageable with a partition at said central plane, and means for connecting each of said radially extending elements to a partition such as that aforesaid, the last said means being so located that they support said cage and an engaged motor in a central position with said motor supporting elements equally spaced from said central plane.

4. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends, an electric motor including a casing substantially smaller than said partition opening and located therein symmetrically with respect to the plane of said partition which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom toward the plane of said partition which struts of each set are respectively in direct engagement with those of the other set to constitute pairs of struts, said mounting cage further including elements extending radially outwardly from the struts of each pair and connectible with the partition at positions spaced outwardly from the partition of opening and at the side of the partition facing the assembly opening, and means adjacent said partition opening for connecting the several outwardly extending elements of said cage to said partition.

5. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, one of said openings being adapted for motor assembly therethrough, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends which opening is smaller than the assembly opening, said partition having a plurality of holes therein adjacent said large opening, nuts at the side of the partition opposite said assembly opening and in register with the last said holes, means on the partition for holding said nuts and permitting transverse adjustment thereof, an electric motor including a casing located in said partition opening and a drive shaft concentric with said central axis and having projecting end portions which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally

spaced rings respectively engaging said supporting elements of said motor and also including circumaxially spaced struts extending longitudinally from each of said rings and toward the plane of said partition and further including apertured ears rigidly connected with said struts which ears extend radially outwardly beyond the periphery of said partition opening and are at the side of said partition facing said assembly opening, said struts and ears being arranged in pairs with the ears of each pair engaging each other, said motor and cage in their fixedly connected relationship being smaller than said partition opening and therefore adapted to be assembled in an axial direction through said assembly opening so that one of the ears of each of the several pairs is engageable with the partition at the side thereof facing said assembly opening with the apertures in the ears registering with said holes in said partition, longitudinal bolts extending through the apertures in the ears and the holes in the partition and engaging said nuts for holding said cage and said motor in place.

6. In a blower unit, the combination of a housing including parallel side walls respectively having circular intake openings concentric with a common central axis, a thin partition in said housing parallel with and midway between said side walls and having a relatively large opening through which said central axis extends, an electric motor located in said partition opening and including a casing symmetrically positioned with respect to the plane of said partition which motor also includes a drive shaft concentric with said central axis and having projecting end portions and which motor further includes two cylindrical supporting elements adjacent the opposite ends of the casing, two air impellers secured respectively to the projecting portions of said motor shaft and respectively adjacent said intake openings, a motor mounting cage including two longitudinally spaced rings respectively engaging said supporting elements of said motor and also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom toward the plane of said partition, the several struts of each set being respectively in approximate longitudinal alignment with those of the other set to constitute pairs of struts, means separate from the partition for connecting the struts of each pair with each other so that said mounting cage and said motor constitute a unit which can be moved into the housing through one of the air intake openings, and means adjacent said partition opening for connecting the struts of each pair to said partition so as to support said cage with the motor positioned as before stated and with its center of gravity at least approximately in the plane of said partition.

7. A blower unit as set forth in claim 6, wherein the means for connecting the struts of each pair with each other is constructed and arranged to enable them to be so connected in longitudinally different relative positions to accommodate motors of different lengths, and wherein said means for connecting said pairs of struts to said partition is constructed and arranged to enable said rings to be equally spaced longitudinally from the plane of said partition notwithstanding different relative positions of said struts.

8. A motor mounting cage for use in a blower unit including a housing having an interior partition with a relatively large opening therein, said cage including two longitudinally spaced rings having a common axis and respectively engageable with the longitudinally spaced supporting elements of an electric motor and said cage also including two similar sets of circumaxially spaced struts connected respectively with said rings and extending longitudinally therefrom and toward a central plane between them, the several struts of each set being respectively in approximate longitudinal alignment with those of the other set to constitute pairs, and means for

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said cage with the motor positioned as before stated and with its center of gravity at least approximately in the plane of said partition.

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