



June 14, 1955

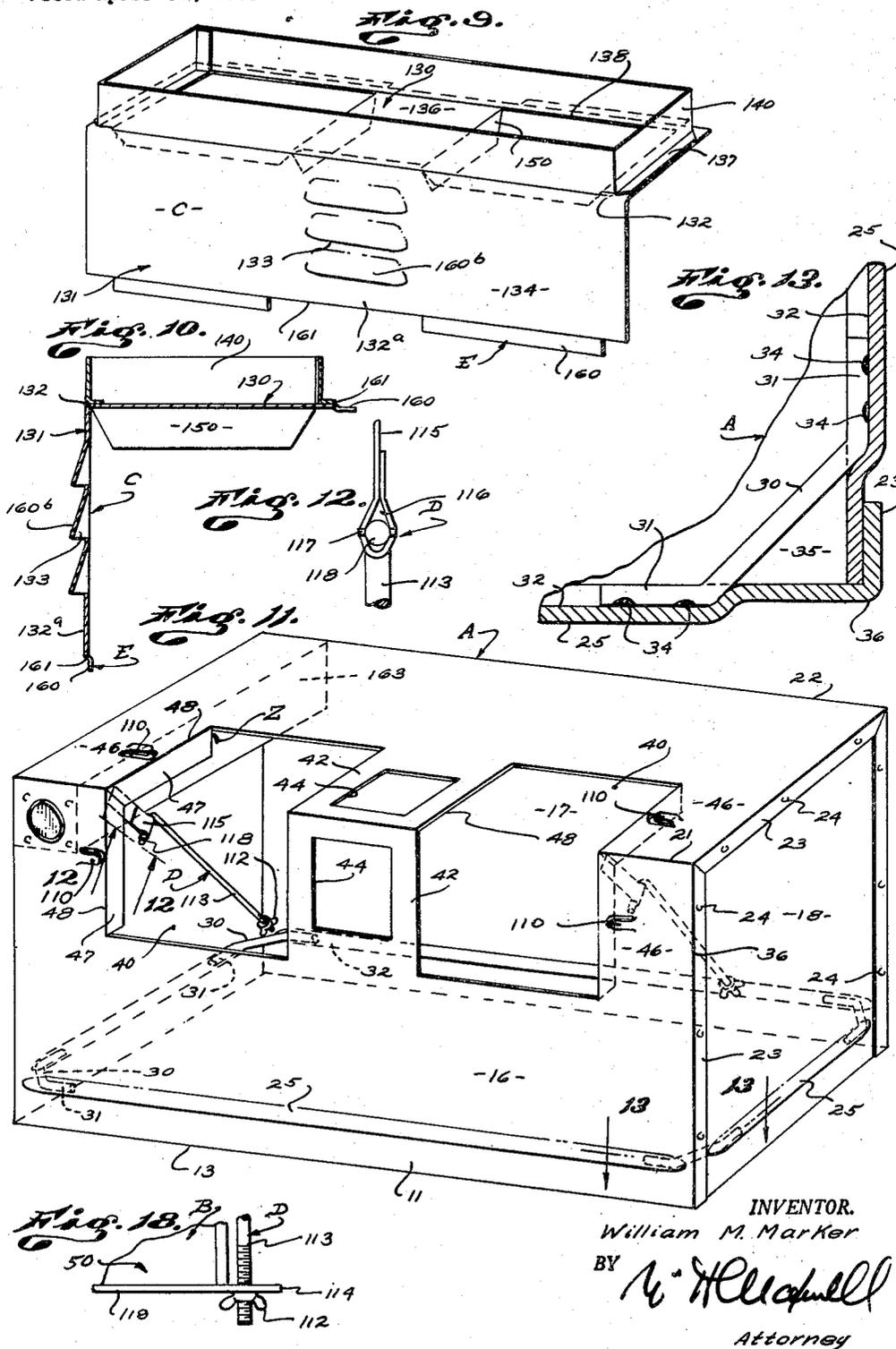
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2,710,573

AIR HANDLING APPARATUS

Filed April 30, 1951

3 Sheets-Sheet 2



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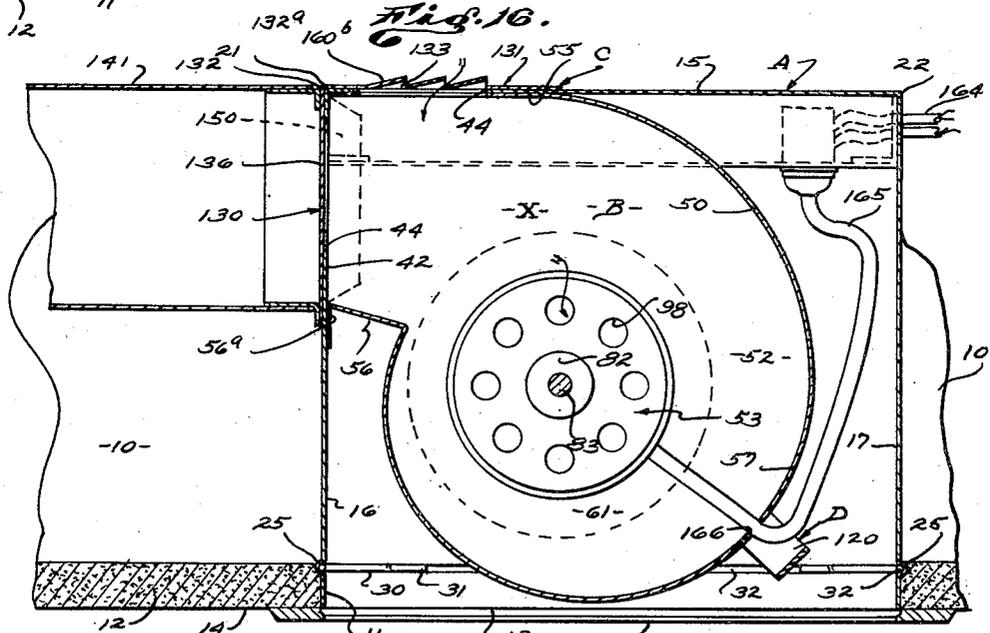
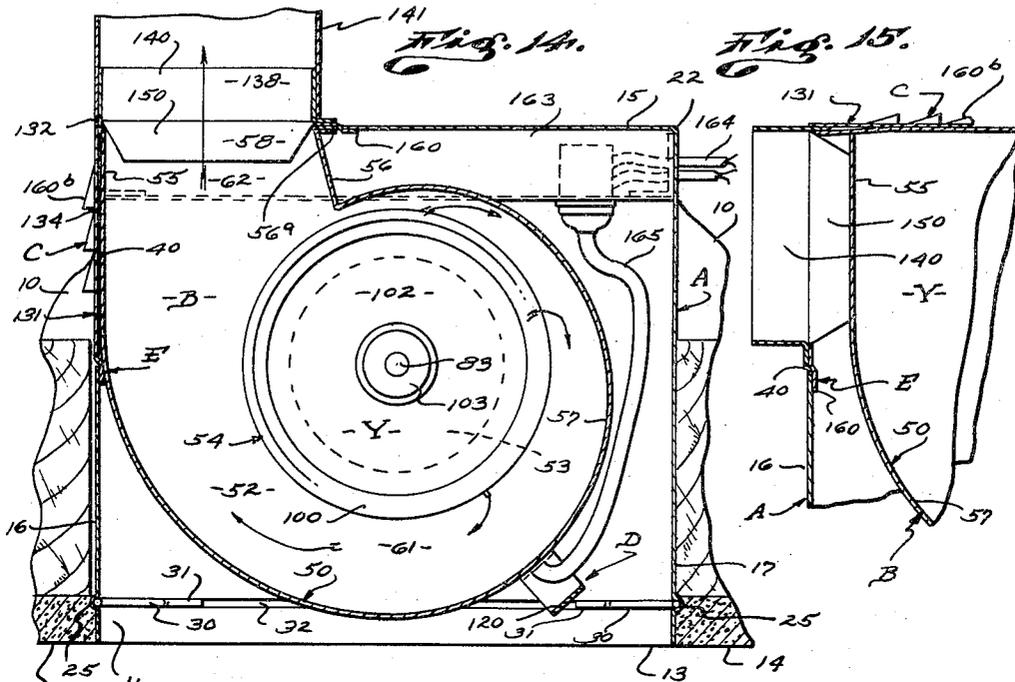
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3 Sheets-Sheet 3



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**AIR HANDLING APPARATUS**

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Application April 30, 1951, Serial No. 223,758

7 Claims. (Cl. 98-43)

This invention relates to air handling apparatus and it is more specifically concerned with a device in the nature of a fan or blower that can be used to advantage for the handling or circulating of air, for instance, in ventilating a room or like compartment of a building, or the like. It is a general object of the invention to provide apparatus of the general character referred to in the form of a simple, compact, inexpensive unit that is highly efficient and dependable in operation and which can be installed and adapted to varying conditions without the exercise of great skill or care and without reconstruction of any of the parts.

Kitchens and like rooms such as occur in buildings or houses frequently require, or are made more suitable for occupancy, if ventilated by means of a fan or blower that draws air out of the room. This particular type of apparatus is now commonly used in kitchens and the like, and with constructions commonly provided there is often difficulty in obtaining a proper, convenient installation.

It is a general object of this invention to provide apparatus of the general character referred to which is in the form of a unit that can be advantageously incorporated in a building, as, for instance, in a ceiling or a wall, and which is such that it can be easily and quickly varied or adapted to meet varying conditions. In a typical installation of the apparatus provided by the present invention it can be applied to a ceiling and adapted to deliver air perpendicular to the ceiling, or parallel therewith, as vent conditions may require.

Another object of the invention is to provide a case defining a motor compartment separate from fan carrying compartments and ventilated so that the motor therein is maintained free of grease or dirt carried by air handled by the structure.

Another object of this invention is to provide apparatus of the general character referred to characterized by a single motor operating two fans or air circulating elements, which motor is mounted through an improved construction so that it is cushioned against the transmission of both vibration and sound.

Another object of the invention is to provide apparatus of the character referred to characterized by three main elements, a case, a blower, and an adapter, all of which are of simple, inexpensive construction and are such that they can be installed, assembled, and converted to meet varying conditions by few simple operations and without the exercise of unusual skill or ingenuity.

It is another object of the invention to provide apparatus of the general character referred to including a case of simple, practical, inexpensive construction, in which few simple elements are involved, and these are so related and assembled as to form a rigid, permanent case that is highly efficient in the handling of air and which is such that it will conveniently receive a blower in various positions, according to the installation of the blower.

A further object of the invention is to provide a struc-

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ture of the character referred to having a case that can be permanently installed in a building, or the like, while the blower is readily removable from the case for cleaning, repairs or other service.

5 The apparatus embodying the present invention is characterized by but three main elements or sections, namely, a case, a blower, and an adapter. In addition to these principal elements there is a fastening means that releasably retains or secures the blower in the case.

10 The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

15 Fig. 1 is a side elevation of apparatus embodying the present invention showing the adapter positioned so that the apparatus delivers air vertically and showing a portion of the structure broken away. Fig. 2 is an end elevation of the blower element showing it separate from the other parts. Fig. 3 is an end elevation of the adapter showing it separate from the other parts. Fig. 4 is an end elevation of the case showing it separate from the other parts. Fig. 5 is a perspective view of the blower showing it separate from the other parts. Fig. 6 is a longitudinal detailed sectional view of the blower taken as indicated by line 6-6 on Fig. 2. Fig. 7 is an enlarged detailed sectional view of a part of the blower taken as indicated by line 7-7 on Fig. 6. Fig. 8 is an enlarged detailed section of the blower taken as indicated by line 8-8 on Fig. 6. Fig. 9 is a perspective view of the adapter showing it separate from the other parts. Fig. 10 is a detailed transverse sectional view of the adapter. Fig. 11 is a perspective view of the case showing it without the adapter and blower. Fig. 12 is an enlarged detailed sectional view taken as indicated by line 12-12 on Fig. 11. Fig. 13 is an enlarged detailed sectional view taken substantially as indicated by line 13-13 on Fig. 11. Fig. 14 is an enlarged detailed transverse sectional view showing a typical installation of the apparatus with the blower and adapter positioned so that air is delivered vertically. Fig. 15 is a fragmentary view illustrating the manner in which the blower is checked from being installed in the case when the adapter is positioned as shown in Fig. 14 and an attempt is made to install the blower in other than the proper position. Fig. 16 is a view similar to Fig. 14 showing the adapter and blower installed so that air is delivered horizontally. Fig. 17 is an enlarged detailed view illustrating a portion of the structure shown in Fig. 16 of the drawings. Fig. 18 is a view of a portion of the structure showing the holding of the blower in the case.

The apparatus or unit provided by the present invention can be used in many situations where it is desired to handle or circulate air or the like. However, since the structure is particularly practical for use in an ordinary building or house, as, for instance, for handling air from a kitchen or the like, it will be referred to in that connection. Furthermore, the apparatus that I have provided can be installed in various manners or in various building elements, for instance, in a vertical wall or in a ceiling. In most instances the structure is installed in a ceiling and therefore it will be described as installed in that manner and the various portions of the structure will be described or referred to as related to a ceiling or on the assumption that the structure is mounted in a ceiling, in which case the inlet of the structure receives air vertically or from or through the bottom of the structure.

The structure that I have provided involves, generally, three main elements, a case A, a blower B, and an adapter C. Various other elements or features of construction are included in combination with the parts just named. For example, a fastening means D is provided for securing the blower in the case, a retaining means

E releasably retains the adapter in operating position in connection with the case, etc.

The case A is an elongate, box-like unit, rectangular in cross-sectional configuration, and it is adapted to be set or fixed in an element of a building, for example, in a ceiling, where it may be received between adjacent rafters 10 to have its lower end portion or neck 11 engaged through the plaster 12 of the ceiling so that the lowermost end 13 of the case is flush with the face 14 of the plaster.

The case involves a plurality of walls which, for purpose of reference or identification, may be designated as a top wall 15, a front wall 16, a back wall 17, and end walls 18. The case may be formed as a unit for casting, however, it is preferably formed entirely of sheet metal or the like and the various walls thereof are permanently fixed or joined together in the box-like form clearly illustrated in Fig. 11 of the drawings. The case being formed of the walls 15 to 18, inclusive, as above described, is without a bottom and is therefore open at its lower end or bottom.

The top wall 15 of the case is preferably a flat, plain, horizontally disposed element. The top may be stiffened by ribs pressed or formed therein and extending longitudinally thereof, and suitably spaced from the other features of the top that will be hereinafter described.

In accordance with the present invention, the back side 17 of the case is a plain, flat, vertically disposed part that is imperforate or without openings, and the ends 18 which are flat, vertically disposed parts parallel with each other, are likewise plain and imperforate or without openings.

The front side 16 of the case is a flat, plain, vertically disposed part and in the preferred form of the invention it is provided with an elongate stiffening rib 25 suitably spaced from other features, such as will be hereinafter described.

In the preferred form of the invention, a single sheet of material is employed in forming the top, front side and back side, so that the top and front side are integrally joined at the upper forward corner 21 while the top and rear side are integrally joined at the upper rear corner 22. The ends 18 are formed separately from the other parts and in the preferred construction suitable flanged connections are provided between the ends, the top and the two sides. In the case illustrated flanges 23 are provided on and project inward from the ends of the top and from the ends of the sides to overlap the ends 18 and the flanges are secured to the ends 18, as by welding 24, or the like.

In the preferred form of the invention outwardly projecting ribs 25 are provided on the sides and ends of the case to occur in a plane parallel with and spaced somewhat above the bottom end 13 of the case. These outwardly projecting ribs 25 combine to extend substantially entirely around the case at the exterior thereof and serve to stiffen the lower end portion of the case and to form a plaster ring functioning as illustrated in Figs. 14 and 16 of the drawings.

In accordance with the invention braces are provided in the corners of the case at the lower end portion of the case and in the preferred construction a corner piece is provided at each corner of the case and each corner piece has a center portion 30 that extends diagonally in the corner of the case and has end portions 31 that seat in the channels 32 that occur in the ends and sides of the case as a result of formation of the ribs 25. The end portions 31 of the corner braces may be secured to the ends and sides of the case as by welding 34 or the like. It is to be observed that the corner braces are formed of simple rods or strips so that they leave openings 35 between the diagonal parts 30 and the vertical corners 36 of the case, and thus have practically no influence whatever upon the flow of air in the case.

When the case is installed as illustrated in Figs. 14

and 16 of the drawings, the open lower end 13 of the case is flush with the face 14 of the wall and, in practice, it is preferred that a suitable grid or perforated cover plate 38 be applied either to the lower end of the case or to the wall to provide a slightly cover for the structure that is incorporated in the wall.

In accordance with the present invention, two outlet openings 40, preferably rectangular in form, are provided in the top wall 15 of the case, and these openings are spaced apart lengthwise of the case to leave a middle or central portion of the case in the form of a bridge 42. The bridge 42 is of substantial extent lengthwise of the case. In fact, it is co-extensive with the motor compartment hereinafter described. The outlet openings 40 adjoin or extend inward from the upper forward corner 21 of the case to a point about midway or just short of midway between the front and rear corners 21 and 22. The bridge 42 left between the openings 40 is apertured or perforated. For instance, in the case illustrated in the drawings, it is formed with a single substantially central opening 44. The opening 44 being central of the bridge, it is spaced from the edges of the openings 40 and also from the corner 21 of the case. The openings 40 are spaced a substantial distance inward from the ends of the case, leaving the top with end portions 46 of substantial extent lengthwise of the case. In the preferred form of the invention flanges 47 project inward from the edges 48 of the openings 40 that occur at the end portions 46 and serve to locate the blower lengthwise in the case, as will be hereinafter described. The flanges 47 are preferably simple, flat, inwardly projecting parts parallel with each other and parallel with the planes in which the ends 18 of the case occur.

The front side 16 of the case is provided with two like longitudinally spaced openings 40 corresponding in size, shape and arrangement with the openings 40 in the top 15. The openings 40 in the front 16 extend downward in the front wall from the corner 21 to a point substantially midway between the top and bottom of the case or just short thereof, and they are spaced apart lengthwise of the case, leaving a bridge portion 42 at the middle of the wall 16. The bridge 42 in wall 16 is co-extensive with the bridge 42 in wall 15, and has an aperture or opening 44 corresponding in size, shape and arrangement with the opening 44 in the bridge provided in wall 15. The openings 40 in wall 16 are spaced from the ends of the case, leaving end portions 46 corresponding to the end portions 46 of wall 15, and blower positioning flanges 47 project inwardly from the portions 46 of wall 16, all as clearly illustrated in Fig. 11 of the drawings.

The blower B, as provided by the present invention, involves, generally, a housing made up of a scroll sheet 50, end plates 51 and partitions 52. The blower further includes a motor 53 and fans or blower wheels 54 operated by the motor in compartments established in the housing.

The scroll sheet of the blower housing is formed so that it has end portions 55 and 56 which are flat, spaced apart, and which may be substantially parallel with each other. Joined to and extending between the end parts 55 and 56 there is a curved or convoluted intermediate portion 57 of the scroll sheet, as clearly shown in Figs. 2, 5, 14 and 16 of the drawings. The spaced flat end parts 55 and 56 are so disposed with reference to the convolute intermediate part 57 as to establish outlet ducts 58 which are substantially tangential of the chamber formed by the convolute portion 57, and it may be said that the portions 55 and 56, together with parts of the end plates and partitions that occur at these portions, form the outlet duct or ducts of the blower.

The end plates are preferably simple, flat plates, shaped to correspond to the opening or space defined by the scroll sheet, in which case each end plate has a central portion 59 that fits within the convolute portion 57 of the scroll sheet and a tangentially projecting portion 60

that fits between the ends parts 55 and 56 of the scroll sheet.

The partitions 52 are plates that correspond in form or shape with the end plates to seat in or between the parts of the scroll sheets in the same manner as to do the end plates. Each partition has a central disc-like portion 61 and a projection or tangential portion 62 that occurs between the end portions 55 and 56 of the scroll sheet.

The end plates 51 are located at and are confined to the ends of the blower, the blower being elongate in form, as shown in Fig. 5. The partitions 52 are located intermediate the end plates and are spaced apart lengthwise of the blower so that the blower has a central motor compartment X and two like end blower compartments Y. Furthermore, the overall length of the blower B is considerably less than that of the case A and when the blower is in place it is centrally located lengthwise in the case so that intake compartments Z are established within the case at and immediately beyond each end of the blower.

In accordance with the preferred form of the invention the end plates are located or positioned at the ends of the scroll sheet and the partitions 52 are located in the desired manner intermediate the ends of the case by having their edge portions 65 entered in channels 66 pressed or otherwise formed in the scroll sheet so that the scroll sheet is provided with outwardly projecting rib-like parts 67. These ribs or this channeling of the scroll sheet lends certain stability or rigidity to the blower housing and the channels 66 make proper and accurate location of the end plates and partitions a certainty.

A suitable fastening means is provided for securing the parts of the blower housing together or assembled, as shown throughout the drawings, and in practice it is preferred that welding be employed for joining or connecting the housing parts. In the case illustrated end flanges 70 are provided at the end edges of the scroll sheet to project inwardly and thus overlie or overlap the end plates 51, and furthermore, tabs 71 are provided on the projecting portions 60 and 62 of the end plates and partitions, respectively, to engage the inner sides of flanges 70 and the tabs 71 may be suitably connected or fixed to the parts engaged thereby, as by welding 73. With the construction that I have provided it is practical to assemble or establish the elements of the housing hereinabove described as a permanent unit by arranging the end plates 51 and the partitions 52 within the scroll sheet, as by wrapping the scroll sheet around the edges of the ends and partitions, and while the scroll sheet is held tight around the ends and partitions the fastening or welding is established, thus completing the housing assembly by means of a very simple, inexpensive, and easily executed assembly operation.

The motor 53 of the blower may be of the form or type commonly employed in devices of this character, in which case it has a case 80 with ends 81, bosses 82 projecting from the ends 81, and a shaft with end portions 83 projecting from or beyond the bosses. The case of the motor has openings (not shown) in the ends 81 and openings 84 in the periphery of the case, so that cooling or circulating air can be passed through the case.

The blower includes a suitable mounting means for supporting the motor 53 in the motor compartment X with the shaft portions 83 in the blower compartments Y. In accordance with the invention the mounting means involves pads 88 of suitable material. In practice the pads may be formed of felt, rubber, or any other suitable composition or combination of materials. The pads are held or carried by or at the inner sides of the partitions 52 and they engage the ends 81 of the motor. In the preferred construction the partitions have cup portions 89 opening or facing inwardly of the motor compartment to carry the pads, and the end portions of the motor 81 may be entered somewhat into these cup portions of the

partitions. The cup portions of the partitions have central openings 90 which pass or accommodate the bosses 82 at the ends of the motor and in practice it is preferred that the pads extend into the openings 90 so that the motor case is completely cushioned or insulated from the partitions. By suitably locating the cup portions 89 of the partitions the motor 53 is located in the most advantageous manner with reference to the convolute portion of the scroll sheet, as is shown throughout the drawings.

In accordance with the present invention the cupped portion 89 of one of the partitions, at least, is separable or detachable from the other portion or from the balance thereof, and is normally held or secured in place by releasable fasteners such as screws 95. In the preferred construction but one partition has a detachable cup portion and the screws 95 holding that cup portion are accessible from the blower chamber Y adjacent that partition. This arrangement of parts is clearly illustrated in Fig. 6 of the drawings. It is through this construction and arrangement that the motor can be assembled into the housing after the housing has been permanently assembled separate from the said detachable cup portion of one partition.

In accordance with the preferred form of the invention the cup portions of the partitions and the pads or cushions 88 have registering openings 98 which register with the openings in the ends of the motor case 53 so that the motor compartment X is in communication with the blower compartments Y so that an adequate amount of cooling air circulates at the motor.

The fans or blower wheels of the blower are fixed on the shaft portions 83 in the blower compartments Y and in the case illustrated they are centrifugal type blower wheels and each has a cylindrical body portion 100 with suitable air handling blades or fans 101. A disc-shaped plate 102 closes the inner end of the body 100 and carries a hub 103 which is fixed on the motor shaft 83.

The outer ends of the blower wheels are open and occur immediately inside the end plates 51 of the blower housing. The end plates 51 have openings 105 registering with and somewhat larger than the inlet ends of the blower wheels. In the preferred construction, air guide collars 105<sup>a</sup> are provided at or fixed to the end plates 51 to efficiently direct air into the open or inlet ends of the blower wheels, as clearly illustrated in Fig. 6 of the drawings. The blower B, as provided by the present invention and as shown in Fig. 5 of the drawings, is insertable into the case A, which is shown in Fig. 11 of the drawings, through the open bottom or lower end of the case, and it can be used in the case in either one or two different positions, that is, with the outlet duct or portions of the blower case, as defined by the parts 55, 56, 60 and 62, facing or in register with either the openings 40 in the top 15 or the openings 40 in the front side 16. In the preferred form of the invention a lip or flange 56<sup>a</sup> is provided on or projects from the outlet duct portion of the blower, for instance, from the end portion 56 of the scroll sheet, and bears against the panel of the adapter opposed to the outlet duct.

The fastening means D is provided for securing or fixing the blower in the case in either of these positions, and in the form of the invention shown in the drawings the fastening means D involves, generally, a pair of tie rods 113 anchored in the case A and engaging projections 114 at the ends of the blower, the rods being releasably held in engagement with the projections by clamps or nuts 112 threaded on the rods and engaging the projections. In the preferred form of the invention, the rods are anchored or held in the case A at or adjacent the corner 21 and lengthwise of the case to occur adjacent the ends of the blower when the blower is in place in the case. In the construction illustrated, flaps 115 are anchored to the case, as, for instance, to the flanges 47 and have somewhat flattened eyes 116 formed in them, as shown in Fig. 12. The rods have their anchored ends 118 turned to project

laterally so that they can be inward in the eyes 116 and the tip portions of the ends 118 are formed or flattened to have projections 117 which normally prevent displacement of the ends 118 from the eyes 116. The construction is such that when the rods are positioned substantially parallel with the case, the projections 117 can be passed through the eyes permitting the rods to be engaged or disengaged from the flaps 115.

The projections 114 at the ends of the blower are preferably projecting end portions of a strap 119 secured to the exterior of the blower housing 50. The projecting ends of the strap are bifurcated to receive the rods and the clamps or nuts 112 threaded onto the rods to engage the bifurcated projecting ends 114 in the manner illustrated in Fig. 18. It is preferred that the middle or center portion 120 of the strap 119 be formed or shaped so that it is spaced from the blower housing 50 to form a handle. The handle 120 thus formed is thus conveniently located so that a person placing the blower in or removing the blower from the housing, in either position of the blower relative to the housing, can conveniently hold the blower with one hand engaged with the handle while the other hand is employed to operate the clamps 112.

The adapter C, best illustrated in Fig. 9 of the drawings, is an elongate element, L-shaped in cross-sectional configuration, and is characterized by two substantially flat panel portions 130 and 131. The panel portions 130 and 131 are preferably formed of a single body of sheet metal and are therefore integrally joined at a corner 132, and they project at right angles to each other. The panel portion 130 of the adapter is characterized by a central portion 132<sup>a</sup> that is apertured or provided with openings 133 and it has end portions 134 that are imperforate. The panel portion 130 is characterized by a central portion 136 which is imperforate and it has end portions 137 each of which has a large aperture or opening 138 therein.

The adapter is applicable to the upper forward corner of the case and it is of such length that it can be applied to the upper forward corner of the case so that the panels 130 and 131 completely cover or occupy the portions of the top 15 and front side 16 of the case where the openings 40 occur, and at the same time covering the bridge portions 43 of the top and front side. The adapter can be applied to the case in either one of two different positions, as shown in Figs. 14 and 16 of the drawings. In one position of the adapter the panel 131 occurs at or over the upper portion of the front side 16 of the case so that the openings 40 in the front side 16 are both completely covered or sealed by the imperforate end portions 134 of panel 131 while the openings 131 in the middle portion 132 of panel 131 are open to or are in register with the opening 44 in the bridge 42 of the side 16. When the adapter is thus positioned the panel 130 engages over a portion of the top 15 of the case so that the opening 44 in the bridge portion 42 of the top 15 is closed or sealed, while the openings 138 in panel 131 are in register with the openings 40 in the top 15.

In the reversed position of the adapter the central portion 132 of panel 131 engages over the bridge 42 of the top 15 so that the openings 133 are in register with the opening 44 in that bridge, while the end portions 134 of panel 131 completely cover or seal the openings 40 in the top 15. At this time the panel 130 is at the front 16 so that the central portion 136 closes the opening 44 in bridge 42 of front 16, while the openings 138 register with the openings 40 in the front 16.

In the preferred form of the invention the adapter is provided with a collar or coupling part 140 to facilitate connection of a vent duct 141 of the like with the adapter in a manner such as is shown in Figs. 14 and 16 of the drawings. The coupling collar 140 is provided on the panel 130 and projects from the outer side thereof and is preferably such as to extend around the marginal or edge

portion of panel 130 so that it encompasses both of the openings 138 provided in panel 130.

In the preferred form of the invention one or more stops 150 projects inwardly from panel 130. In the case illustrated I show two stops 150 projecting inwardly from the edges of the middle portion 136 of panel 131. The stops are such that when the blower is positioned in the case so that its outlet portion or duct faces and is in proper register with the openings 138 of the adapter, the stops project freely into the outlet of the blower, whereas, if an attempt is made to place the blower in the case so that its outlet would deliver air to or in register with the imperforate end portions 134 of panel 131, then the stops 150 are engaged by the outlet or discharge portion of the blower and interfere with its complete insertion and, consequently, indicate to a person installing the blower that it is not properly engaged. Such an interference with improper insertion of the blower is illustrated in Fig. 15 of the drawings.

A suitable retaining means such as means E is provided for releasably securing the adapter C in either of the positions above described. In the form of the invention illustrated the retaining means E involves ears 160 formed on and projecting from the outer edges 161 and 162 of the panels 131 and 130, respectively, which ears are insertable, upon limited flexure of the adapter, through the openings 40 in the top and front side to engage beneath these parts, as will be apparent from consideration of the drawings. A lock measure is provided for holding the adapter in place and preferably involves tabs 110 struck from or projecting at the exterior of the case and adapted to be bent over into holding engagement with the adapter after the adapter has been installed as desired.

It is to be understood that the structure includes suitable provision for energizing the motor 53. In a typical situation, a suitable junction box 163 is provided or suitably located in the case A and receives power lines 164 from the exterior of the case. A flexible lead 165 carries suitable wires from the junction box to the motor 53. The lead 165 may be passed into the motor compartment X through a suitable opening 166 in the scroll sheet of the blower housing. It is to be understood that the lead 165 may be provided so that it is of such length as to allow the blower to be freely rotated between the two positions shown in Figs. 14 and 16.

In installing the structure that I have provided the case A can be positioned in the building structure at the location where it is to be employed, and the plaster ring established by the ribs 25 aids in properly locating the case in the building structure. When it is ascertained which way the air is to be delivered from the case the adapter is applied to the case, or, if desired, the adapter can be applied in the proper manner prior to the case being installed in the building. It will be apparent from the foregoing description, however, that the adapter can be applied to the case so that it opens or delivers air either vertically or horizontally, as conditions may require. In Fig. 14 the adapter is shown delivering air vertically, and in Fig. 16 it is shown delivering air horizontally and between the rafters 10.

In final assembly the blower is installed in the case with its outlet in register with the openings 138 of the adapter and the fastening means D is made secure so that the blower is fastened in the case and is confined between the flanges 47 so that air entering the bottom of the case freely circulates up through the end chambers Z, enters the blower chambers or compartments Y and is circulated out of the structure through the openings 138 of the adapter.

As the structure operates a certain amount of air circulates through the motor by reason of entering opening 44 into chamber X to enter the openings 84 in the motor and to pass out of the motor through openings 98 into chambers Y. The opening 44 may be suitably shielded by louver-like parts 160<sup>b</sup> if so desired.

It is to be observed from the drawings that the clamps 112 of means D are located at the lowermost portion of the blower where they are readily accessible through the open lower end of the case, making it simple and convenient to remove, replace, or re-install the blower, if necessary.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. In combination, a box-like case open at the bottom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, an elongate blower having a housing with end inlet openings spaced inwardly from the ends of the case, an outlet duct registering with the openings of one of said pairs of openings and an outlet opening registering with the aperture, a motor in the housing and air circulating elements operated by the motor causing air to enter the inlet openings and discharge through the outlet duct, and an adapter having panels at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet duct of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate portion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings.

2. In combination, a box-like case open at the bottom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, an elongated blower having a housing with end inlet openings spaced inwardly from the ends of the case, an outlet duct registering with the openings of one of said pairs of openings and an outlet opening registering with the aperture, a motor in the housing and air circulating elements operated by the motor causing air to enter the inlet openings and discharge through the outlet duct, a fastening means releasably retaining the blower in the case and adapted to urge the blower upward and forward in the case, the fastening means including a rod anchored to the upper forward portion of the case in each end portion of the case, the rods being located adjacent the ends of the housing of the blower and clamp members holding the rods engaged with the housing and accessible through the bottom of the case, and an adapter having panels at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet duct of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate portion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings.

3. In combination, a box-like case open at the bottom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, an elongate blower

having a housing with end inlet openings spaced inwardly from the ends of the case, an outlet duct registering with the openings of one of said pairs of openings and an outlet opening registering with the aperture, a motor in the housing and air circulating elements operated by the motor causing air to enter the inlet openings and discharge through the outlet duct, a fastening means releasably retaining the blower in the case, and an adapter having panels at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet duct of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate portion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings, the fastening means including, rods anchored to the upper forward corner of the case and the end portions thereof, a strap fixed to the housing at the lower rear portion thereof and having ends projecting from the ends of the housing, and clamps threaded on the rods and releasably engaging the ends of the strap.

4. In combination, a box-like case open at the bottom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, an elongate blower having a housing with end inlet openings spaced inwardly from the ends of the case, a pair of outlet ducts registering with the openings and an outlet opening registering with the aperture, a motor in the housing and air circulating elements operated by the motor causing air to enter the inlet openings and discharge through the outlet duct, an adapter having panels at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet duct of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate portion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings, and a stop on the adapter projecting into the case and engaged in the outlet ducts of the blower locating the blower in position where the outlet duct registers with the openings in the first mentioned panel.

5. In combination, a box-like case open at the bottom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, flanges fixed to the case and projecting into the interior of the case, an elongate blower engaged with and positioned longitudinally in the case by the flanges and having a housing with end inlet openings spaced inwardly from the ends of the case, a pair of outlet ducts registering with the openings and an outlet opening registering with the aperture, a motor in the housing and air circulating elements operated by the motor causing air to enter the inlet openings and discharge through the outlet duct, a unitary adapter having panels fixed at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet duct of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate por-

tion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings, and a pair of stops on the adapter projecting into the case and engaged in the outlet ducts of the blower locating the blower in position where the outlet duct registers with the openings in the first mentioned panel.

6. In combination, a box-like case open at the bottom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, an elongate blower having apertured end plates, spaced partitions between the end plates and a scroll sheet extending from one end of the blower to the other and engaged around the plates and partitions in engagement with the edges thereof establishing a central motor chamber and two like end chambers, a motor, pads carried by the partition at the opposed sides thereof and supporting the motor in the motor chamber, and blower wheels in the end chambers and operated by the motor, an outlet opening in the scroll sheet registering with the aperture, the plates, partitions and sheet establishing a housing with a pair of outlet ducts, and an adapter having panels at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet ducts of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate portion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings.

7. In combination, a box-like case open at the bot-

tom and having a top, a front, a back and ends, there being a pair of spaced openings in the top leaving a bridge therebetween, and there being a pair of spaced openings in the front leaving a bridge therebetween, each of said bridges having an aperture therein, an elongate blower having apertured end plates, spaced apertured partitions between the end plates, one having a detachable central portion, and a scroll sheet extending from one end to the other of the blower and extending around the plates and partitions in engagement with the edges thereof establishing a central motor chamber and two like end chambers, a motor, apertured pads carried by the central portions of the partitions and supporting the motor in the motor chamber, and blower wheels in the end chambers and operated by the motor, an outlet opening in the scroll sheet registering with the aperture, the plates, partitions and sheet establishing a housing with a pair of outlet ducts, the motor having a casing with openings in register with those in the pads and partitions and with openings in communication with the motor chamber, and an adapter having panels at right angles to each other each such as to engage over one of said pairs of openings and the bridge therebetween, one panel being at the pair of openings registering with the outlet ducts of the blower and having spaced openings registering with the openings of the last mentioned pair of openings and having an imperforate portion covering the aperture of the bridge between the openings of said last mentioned pair of openings, and the other panel being at and covering the other pair of openings and having an apertured portion registering with the aperture in the bridge between the openings of said other pair of openings.

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