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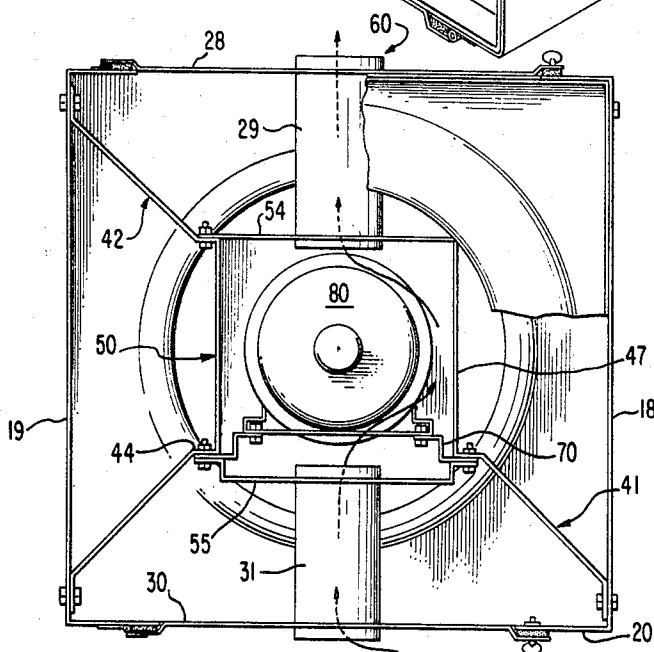
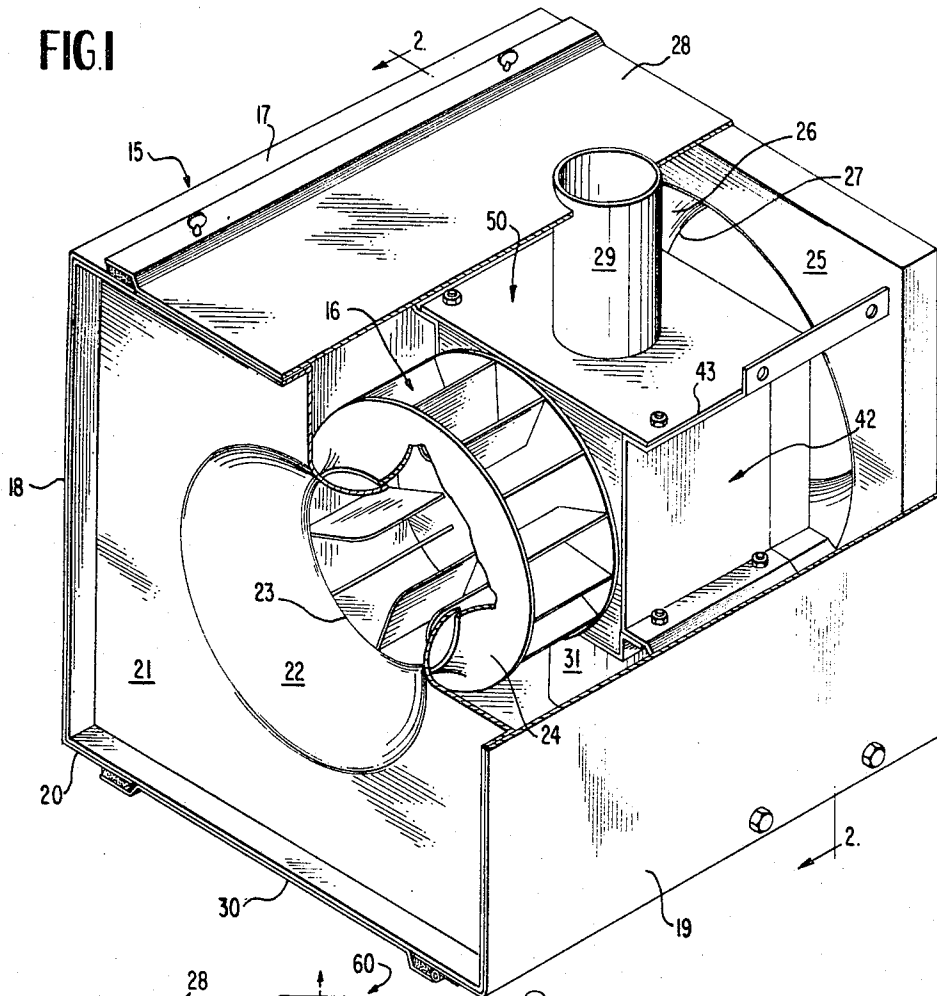
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INLINE CENTRIFUGAL FAN

Filed Dec. 6, 1966

2 Sheets-Sheet 1



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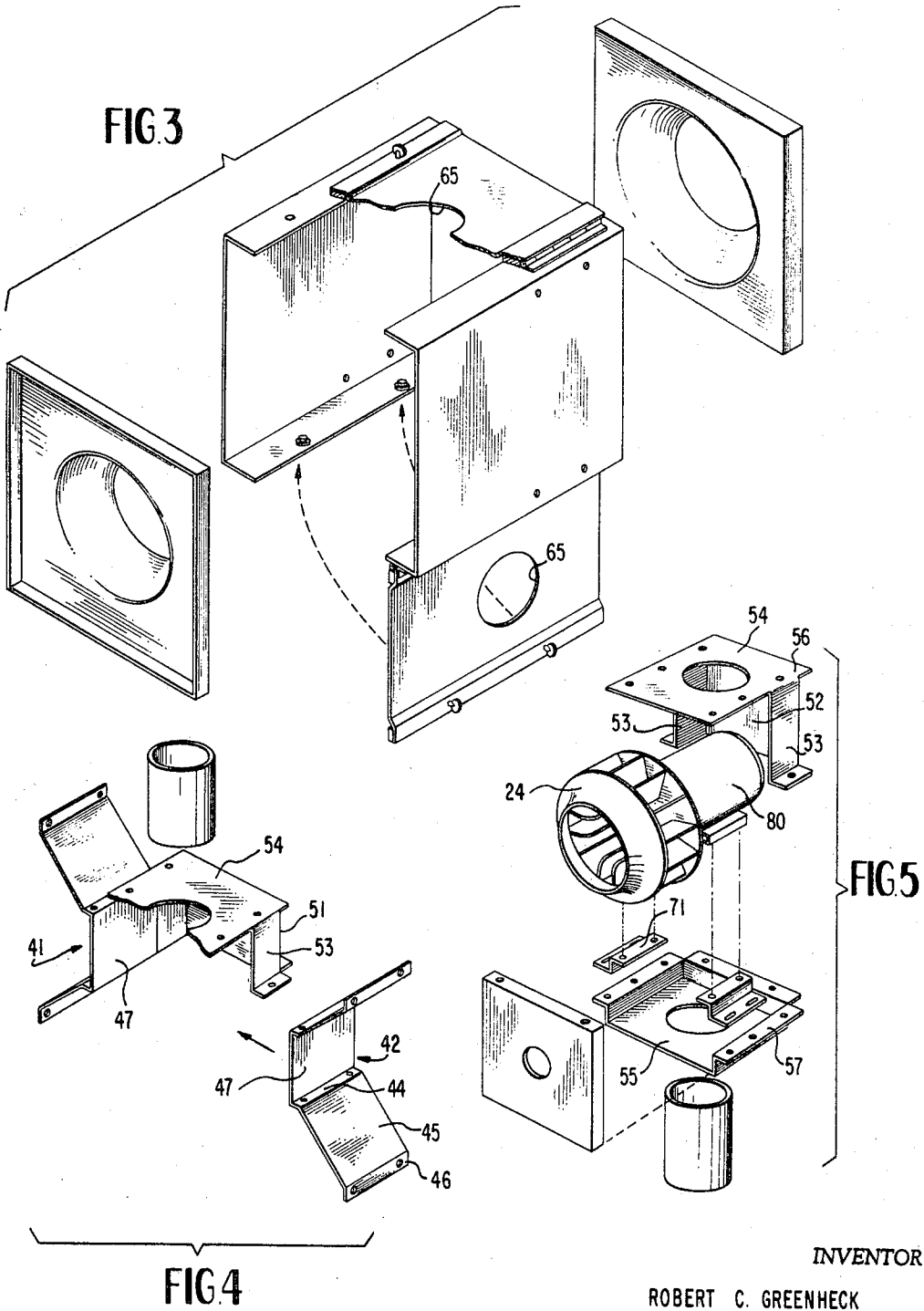
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INLINE CENTRIFUGAL FAN

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6 Claims. (Cl. 230-117)

ABSTRACT OF THE DISCLOSURE

A box-like inline centrifugal fan casing having a rectangular housing with inlet and outlet throats, with U-shaped brackets for the internal structure.

This invention relates to an inline centrifugal fan and its casing having an outer housing which is rectangular in cross section to facilitate installation with standard rectangular ducts now employed in building construction.

The inline fan of the instant invention is particularly valuable since it can be easily installed in line with standard rectangular ducts by merely connecting the longitudinal ends of the fan to the rectangular ducts. Presently, specially constructed intermediate adapter units are required to connect the square or rectangular ducts to the presently used circular inline fan casings. The savings in manufacturing costs and installation costs are significant.

Another advantage of the instant invention is the easy access to the motor blower unit through a top or bottom closure member. The unit may be easily withdrawn downwardly from the inner mounting means by the removal of mounting bolts. Preferably, the motor of the motor blower unit is isolated from the longitudinally extending annular flow path by an inner housing. For motor cooling purposes, a ventilating means or chimney system is provided between the surrounding atmosphere and the inner housing.

Smooth air flow through the casing with a minimum of power loss is enhanced considerably by the mounting means; the wide radiating vanes or legs of the mounting means extend substantially radially from the inner housing to the outer housing and define separate longitudinally extending inline paths for smooth air flow.

In describing this invention, a horizontal position of the inline fan has been used with the access opening for removal being identified as in the top and/or bottom. It will be understood that the fan can be installed in many other spatial orientations and that the horizontal position shown and described merely facilitates an explanation of the invention.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, appended claims and drawings wherein:

FIGURE 1 is a perspective view of the fan unit with outer walls partially cut away;

FIGURE 2 is a cross sectional view taken on line 2-2 of FIGURE 1;

FIGURE 3 is an exploded perspective view of the outer housing;

FIGURE 4 is an exploded perspective view of the side brackets and other elements of the inner housing; and

FIGURE 5 is an exploded perspective view of the motor blower unit and elements of the inner housing.

Referring now to FIGURES 1-3, it will be seen that the fan casing 15 is box-like and houses an inline centrifugal motor blower unit 16. The outer housing 15 includes the top 17, two sides 18 and 19, bottom 20, an inlet end 21 which has a conical walled opening 22 terminating in an inlet throat 23 telescoped within the fan blade 24, and

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an outlet end 25 having a larger but similar conical walled opening 26 terminating in an outwardly extending outlet throat 27. The longitudinal central axis of the throats extends through the central axis of the motor blower unit 16.

The top 17 has a hinged access door or closure member 28 which is not connected to the top chimney tube 29; similarly, the bottom 20 has a bottom access door or closure member 30 which is not connected to the bottom chimney tube 31.

Mounting means 40 are provided by the side brackets 41, 42 which are substantially U-shaped with each leg 43 thereof having in series (FIGURES 2 and 4) an inner horizontal section 44, an intermediate diverging diagonal section or vane 45, and an outer terminal section 46 which, in the embodiment shown, extends vertically for bolted connection with its respective side 18 or 19. The bight side panels 47 of the U-shaped brackets are utilized as a portion of the side walls of an inner housing generally identified by numeral 50. The down stream end of the inner housing 50 is enclosed by the right angle shaped rear end closing member 51 which includes the end panel 52, side extension panels 53, 53 and the top plate 54. It will be noted that the top plate 54 and the bottom plate or dish 55 having overhanging flanges 56 and 57 respectively to enable the bolted connections shown to form the inner housing 50.

A chimney means 60 is provided for producing an air flow from the atmosphere through the inner housing 50 for motor cooling. Preferably, the chimney means 60 includes a top chimney tube 29 and a bottom chimney tube 31, each being rigidly connected as by welding to its respective top plate 54 and bottom plate 55 of the inner housing 50. In this fashion, the hinged top closure member 28 and hinged bottom closure member 30 may be manipulated without affecting the chimney placement, holes 65 being formed in closures 28 and 29 for the tubes.

The motor blower unit 16 is adjustably mounted within the inner housing 50 through longitudinal extending side adapters 70 having their outer portions 71 bolted in sandwiched relationship between the flanges 57 of the bottom plate 55 and the horizontal sections 44 of the brackets 41, 42. The adapters 70 are of less longitudinal length than the inside longitudinal dimension of the inner housing 50 to enable cooling air flow therearound.

As seen in FIGURE 1, the inline centrifugal fan includes the fan blade 24 which extends up-stream from the motor 80 with its terminal end arcuately or concavely reduced in diameter and extending beyond and surrounding the inlet throat 23.

It will be understood that vibration damping means may be installed at various connection points to reduce noise and vibration. Further, electrical connections can be arranged in any suitable fashion. In the embodiment shown, the electrical cable from the motor can extend through the bottom chimney tube 31 for connection to a junction box (not shown) mounted on the casing bottom 20.

The advantages flowing from the instant rectangular (a word which includes square) design are many. The unique mounting means 40 enables easy installation of the motor blower unit 16 after the casing or outer housing 15 has been installed in the standard rectangular duct work found in buildings today in the heating and air conditioning systems.

The fan unit is designed not only for ease of installation but also for low manufacturing costs. The elements are singularly uncomplicated and easily combine into the final assembled unit.

While the invention has been described with reference to a certain embodiment, it is to be considered illustrative rather than limiting, and it is intended to cover all further

embodiments that fall within the spirit and scope of the appended claims.

I claim:

1. A box-like inline centrifugal fan casing comprising an outer housing having a top, two sides, a bottom, an inlet end having a conical walled opening terminating in an inlet throat, an outlet end having a conical walled opening terminating in an outlet throat in longitudinal alignment with said inlet throat, said outer housing being rectangular in transverse cross section throughout its longitudinal length to conform with standard rectangular ducts; and mounting means within and connected to said housing for mounting a motor blower unit therewithin, said mounting means including side brackets, a top plate, and a bottom plate, each bracket being substantially U-shaped with each leg thereof having an inner horizontal section, an intermediate diverging diagonal section and an outer terminal section, said terminal section being connected to said outer housing, said top plate and bottom plate being connected to their respective horizontal sections, said mounting means defining with said outer housing a longitudinal annular flow path past said motor blower unit, said bottom including a closure member sized to permit passage of said motor blower unit to facilitate installation and servicing.

2. A box-like inline centrifugal fan casing as defined in claim 1 and including an inner housing for isolating the motor of the motor blower unit from the annular flow path, said inner housing including wall elements which in combination with said top plate, bottom plate and two brackets provide an inner housing completely isolating said motor from the annular flow path; and ventilating means for enabling outside air flow through the inner housing for cooling the isolated motor.

3. A box-like inline centrifugal fan casing as defined in claim 2 and wherein said ventilating means includes a lower chimney tube extending from said bottom to said bottom plate, and an upper chimney tube extending from said top plate to said top.

4. A box-like inline centrifugal fan casing as defined in claim 3 and including adjustable side adapters mounted on said bottom plate for connecting said motor with said bottom plate, each adapter having a longitudinal length shorter than the inner housing to enable cooling air flow through the chimney tubes and inner housing.

5. An inline centrifugal fan comprising a motor blower unit and a box-like casing; said casing comprising an outer housing having a top, two sides, a bottom, an inlet end having a conical walled opening terminating in an inlet throat, an outlet end having a conical walled opening terminating in an outlet throat in longitudinal alignment with said inlet throat, said outer housing being rectangular in transverse cross section throughout its longitudinal length to conform with standard rectangular ducts; mounting means including side brackets, a top plate, and a bottom plate, each bracket being substantially U-shaped and having vertical bight side panels and legs, each leg having an inner horizontal section, an intermediate diverging diagonal section and an outer terminal section, said terminal section being connected to said housing, said top plate and bottom plate being connected to their respective horizontal sections, adjustable side adapters adjustably connected to the top of said bottom plate, the motor of said motor blower unit mounted on said side adapters with the blower having centrifugal fan blades extending toward and surrounding said inlet throat, a forward end closing member between said fan and motor and a rear end closing member connected to said top plate and bottom plate to define with the bight side panels of the U-shaped side brackets an inner housing for isolating the motor from an annular flow path therearound.

6. An inline centrifugal fan as defined in claim 5 and including a lower chimney tube extending from said bottom to said bottom plate and an upper chimney tube extending from said top plate to said top, and a closure member mounted on said outer housing sized to permit passage of said motor blower unit to facilitate installation and servicing.

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