Oct. 19, 1943. J. L. BREESE ET AL 2,331,958

BOOSTER FAN AND SUPPORT

Filed June 16, 1941 3 Sheets-Sheet 1

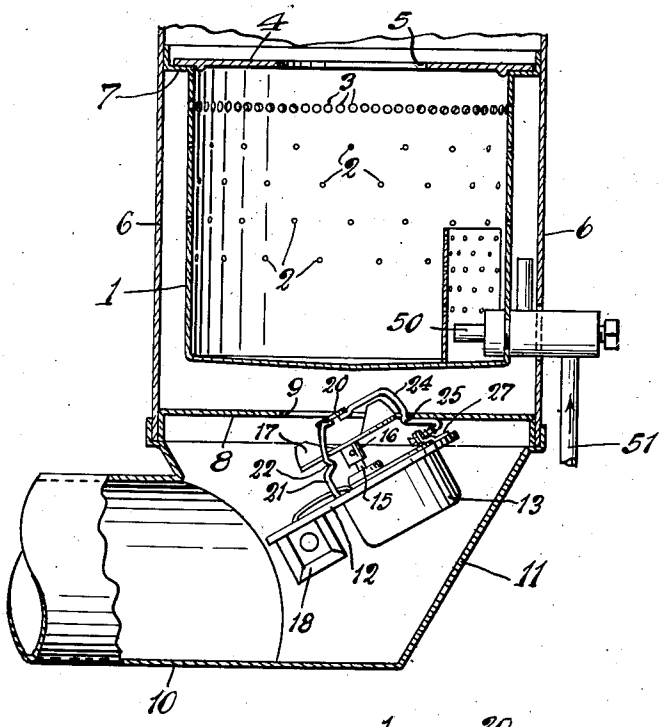


Fig. 1

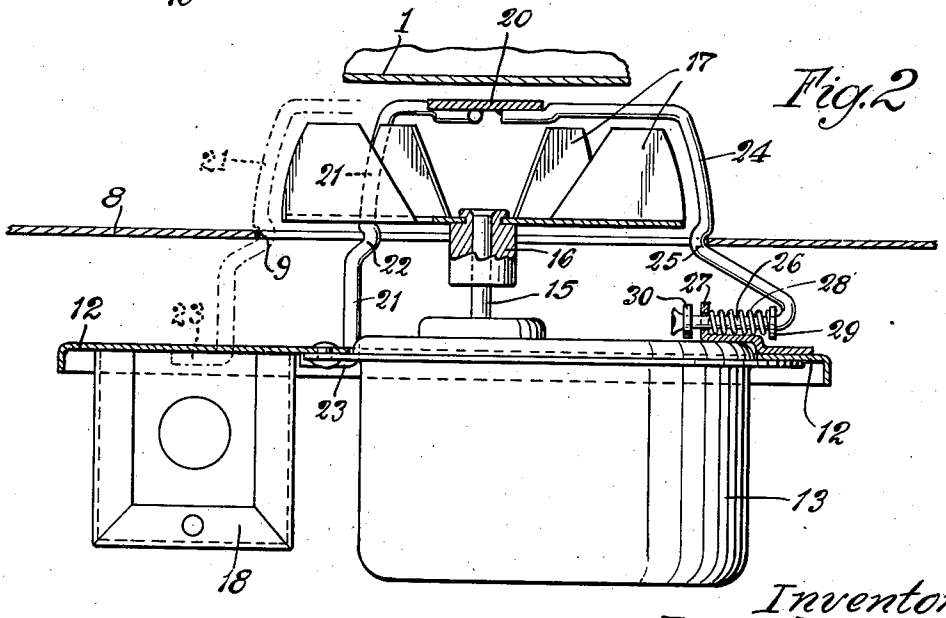


Fig. 2

Inventors
James L. Breese
Bruce Hayter
Stanley Perry.

by Parker & Carter
Attorneys

Oct. 19, 1943. J. L. BREESE ET AL 2,331,958

BOOSTER FAN AND SUPPORT

Filed June 16, 1941 3 Sheets-Sheet 2

Fig. 3

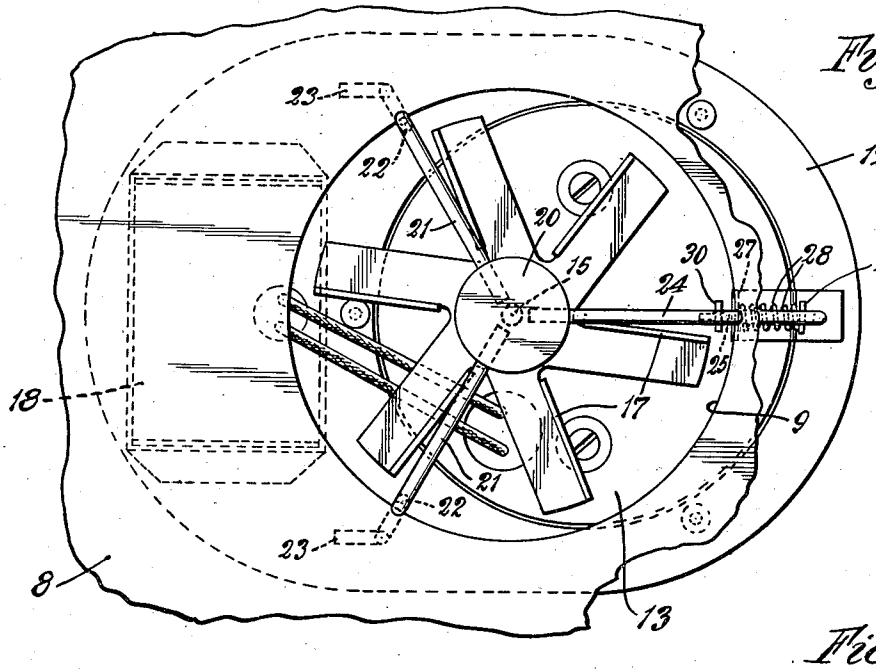


Fig. 4

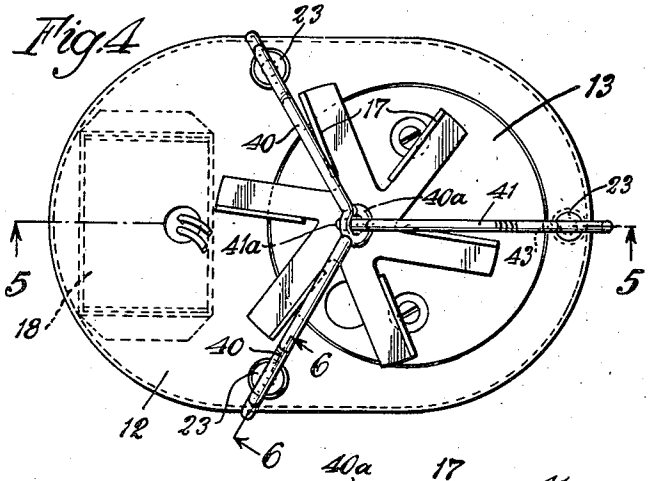


Fig. 6

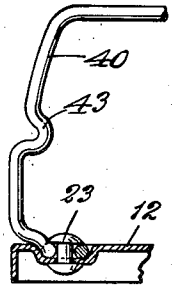
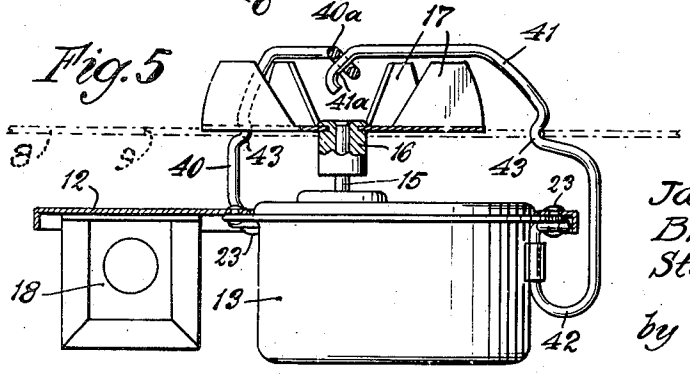


Fig. 5



Inventors
James L. Breese
Bruce Hayter
Stanley Perry.
by Parker & Carter
Attorneys

Oct. 19, 1943. J. L. BREESE ET AL 2,331,958

BOOSTER FAN AND SUPPORT

Filed June 16, 1941 3 Sheets-Sheet 3

Fig. 7

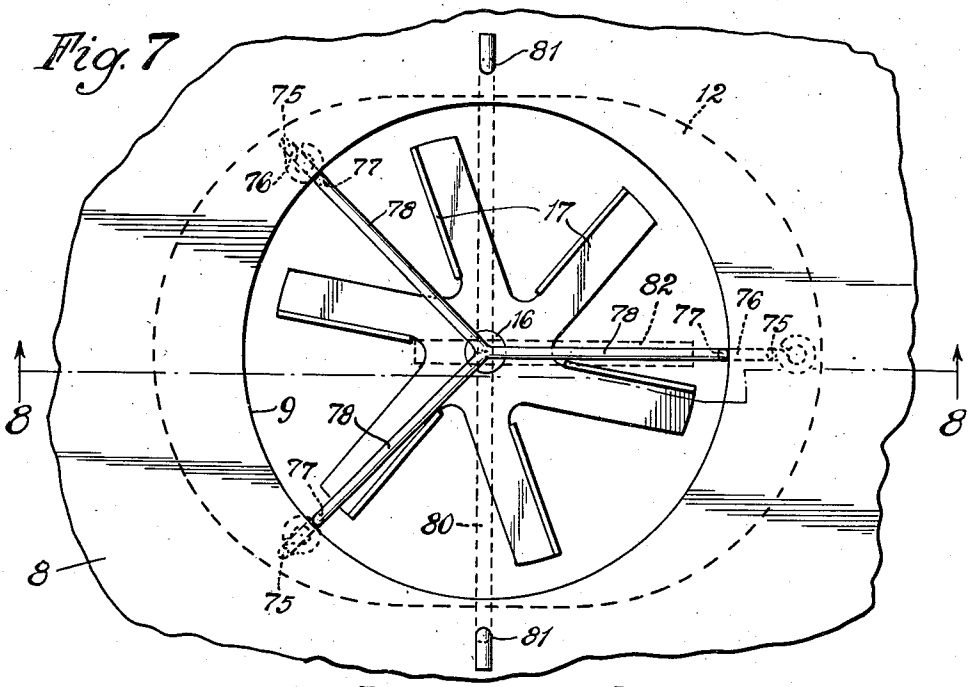
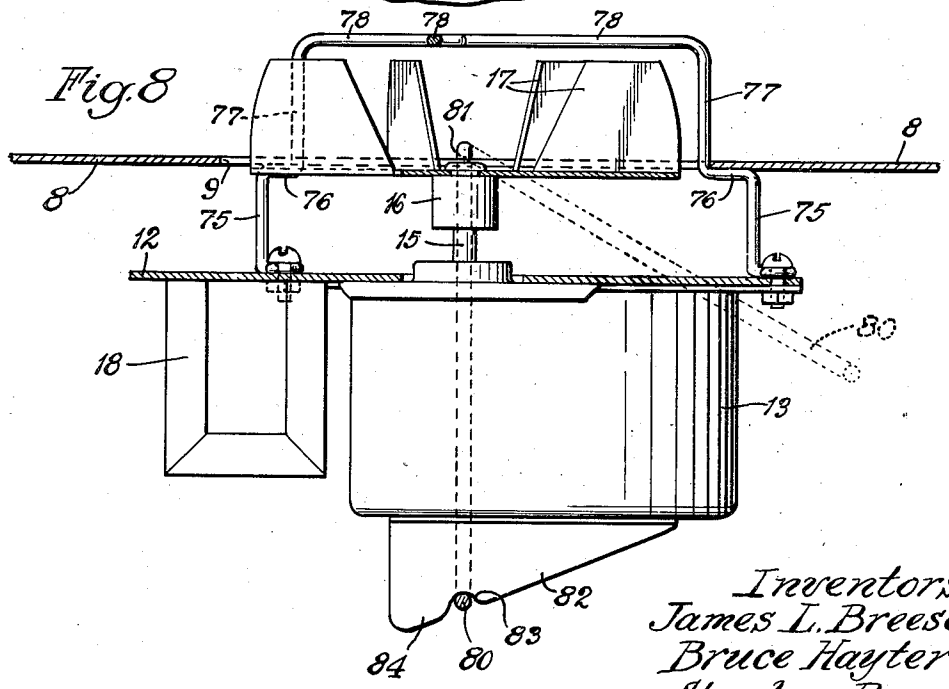


Fig. 8



Inventors
James L. Breese
Bruce Hayter
Stanley Perry
by Parker Harter
Attorneys.

Patented Oct. 19, 1943

2,331,958

UNITED STATES PATENT OFFICE

2,331,958

BOOSTER FAN AND SUPPORT

James L. Breese and Bruce Hayter, Santa Fe, N. Mex., and Stanley Perry, Chicago, Ill., assignors to Oil Devices, Santa Fe, N. Mex., a limited partnership of Illinois

Application June 16, 1941, Serial No. 398,292

13 Claims. (Cl. 230—117)

The invention relates to an improvement in booster motor mounting for burners, and has for a particular object the provision of an improved booster motor support for use with pot type burners.

Another purpose is the provision of such a booster motor and support therefor as may be readily inserted in and removed from a pot type burner, for example through an air inlet duct of restricted cross sectional area.

Another purpose is the provision of an improved supporting and spacing means whereby the booster motor and its fan are automatically properly positioned in relation to the burner pot.

Other purposes will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings wherein:

Fig. 1 is a vertical axial section with parts in side elevation;

Fig. 2 is a similar section on an enlarged scale, illustrating a booster motor and fan in position;

Fig. 3 is a plan view of the structure shown in Fig. 2;

Fig. 4 is a similar plan view on a slightly smaller scale, of a variant form of the device;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a section on the line 6—6 of Fig. 4;

Fig. 7 is a view similar to Fig. 3 of a variant form of the device; and

Fig. 8 is a section on the line 8—8 of Fig. 7.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 generally indicates a burner pot having a plurality of primary air inlets 2 located at various levels. Any suitable means may be employed for admitting secondary air, but we illustrate herein a top row of secondary air inlet apertures 3 of greater diameter and closer in spacing than the primary air inlet apertures 2. 4 is any suitable fire ring at the top of the pot having a central aperture 5. 6 is an outer air housing or drum surrounding the pot. The pot may, for example, be supported on a flange 7 inwardly extending from the drum 6. The drum is preferably substantially air tight, except for an aperture 9 in the drum bottom 8. The aperture 9 is aligned with the center of the bottom of the pot 1, and the bottom 8 is spaced sufficiently downwardly from the bottom of the pot 1 to permit the positioning therein of the fan structure below described.

An air inlet passage 10 may be employed, if desired, which may communicate with an enlarged portion 11 secured to the bottom of the drum 6. It will be understood that, so far as the securing means of the fan motor are concerned, the members 10 and 11 may be omitted, but such passages or their equivalent are frequently employed in connection with pot type burner installations in which booster fans are employed. One of the problems is the ready insertion and removal of booster motors and fans without the necessity of the removal of such air ducts as the ducts 10.

12 generally indicates a motor supporting plate, with which is associated a motor housing 13. The details of the motor do not form part of the present invention. It will be understood, however, that any suitable motor means, for example an alternating current motor, may be enclosed within the housing 13, and may be provided with an exterior fan shaft 15, which carries a hub 16. Extending outwardly from the hub 16 are any suitable generally radial fan blades 17. 18 is any suitable junction box, the details of which do not form part of the present invention. It may also be secured to the plate 12. The plate, motor, junction box and fan are of such overall dimensions as to permit their insertion through the end of the conduit 10. The operator may then thrust the assembly so formed up toward the aperture 9.

In order to provide more accurate positioning and securing of the motor and fan assembly in the aperture 9, the following structure is provided: Radiating from a central securing plate 20 are a plurality of wire fingers 21, notched as at 22 and secured at their lower ends, as at 23, to the plate 12. A third finger 24 is similarly notched, as at 25, and is provided with an inwardly extending offset 26, guided in any suitable eye or bearing 27 on the plate 12. A coil spring 28 is shown as surrounding the portion 26 and compressed between the bearing 27 and any suitable abutment or washer 29. 30 is a limit washer or stop adapted to limit the outward movement or flexure of the finger 24 in response to the thrust of the spring 26. The fingers 21 and 24 are so proportioned, and the notches 22 and 25 are so spaced, that the notches receive the edges of the aperture 9. The spring 26 permits the finger 24 to recede yieldingly toward the center of the fan, so that the fingers may be thrust up through the aperture 9. The outward bends of the fingers below the notches 22 limit the upward movement of the supporting assembly through the aperture 9 and serve as cams to withdraw the securing assembly downwardly in

response to the expansion of the spring 26, once the upper portion of the supporting assembly has been thrust up through the aperture 9.

In use the operator may first position the assembly as shown in Fig. 1, with the notch 25 abutting against the edge of the aperture 9. He then pivots the assembly until it is in the position of Fig. 2. The spring 26 and the flexure of the finger 24 permit the securing assembly to be snapped into the position in which it is shown in Fig. 2, and the spring thereafter keeps the finger 24 spread out in securing position. However, if the operator wishes to remove the assembly, all he has to do is to thrust inwardly against the assembly, which causes the notches of the arms 21 to clear the edge of the aperture 9. He can then tilt the assembly down into the position in which it is shown in Fig. 1 and withdraw it through the passage 10.

It will be understood that any changes in detail may be made. Illustrated for example, in Figs. 4 and following, is a form in which fingers 40 are provided, with a loop 40a, which interlocks with the free end 41a of the opposite finger 41, which has a bottom loop, as at 42, and performs the function of the spring 26 of Fig. 2. All three fingers have securing notches, as at 43. In each case the parts are so proportioned that, when the device or assembly is sprung into place, the fan shaft 15 is vertically aligned with the desired point in the bottom of the pot 1, preferably the center thereof.

With the fan vanes located in the space between the drum bottom 8 and the bottom of the pot 1, air is delivered radially outwardly and may rise in the space between the side wall of the pot 1 and the drum wall 6, thus providing the necessary air supply for combustion going on within the pot.

It will be understood that any suitable means for energizing the motor circuit may be employed, not herein shown. The motor may be operated either continuously or intermittently, depending upon the circuit used and the need of the particular installation. Any suitable pilot means may be employed for the pot, including a pilot nozzle 50, which serves also as means for delivering fuel at all stages of the fire. 51 is a liquid fuel line extending to a source of liquid fuel not herein shown. It will be understood that it may be controlled by any suitable valve means not herein shown.

It will be realized that, whereas we have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of the invention. We therefore wish our description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting us to our precise showing.

It will be understood, for example, that, whereas it may be advantageous to position the booster unit adjacent or in vertical alignment with the bottom of the pot, it is also practical to locate it elsewhere, for example at the inlet of or along the length of the passage 10.

Referring to the form of Figs. 7 and 8, 8 indicates any suitable drum bottom or skirt, or the like, with an aperture of the proper size 9. The motor and fan unit is identical with that shown in the other figures except that it employs a plurality of guard wires 75, which need not have a spring function and which have an inwardly offset portion 76 terminating in an upward projection 77, which may be connected by a member 78 to provide a firm structure. In the other forms the fan guard wires themselves serve as locking means for locking the unit in place. In the form of Figs. 7 and 8, however, we illustrate a bale 80 of wire or the like, which is pivoted as at 81 on the plate 8 and which may be swung into the latching position shown in full line in Fig. 8, at which time it engages a notch 83 in a latch element or cam 82 on the housing 13. The bale is preferably of spring stock and it is stretched by the cam portion of the member 82 sufficiently to have a firm locking action when it seats in the notch 83. It is prevented from traveling over center by the outward or downward projection 84. The use and operation of our invention are as follows:

We provide a booster unit in which a motor fan, fan guard and unit securing means are associated in such fashion that the unit may readily be applied or removed. Where it is desired to locate the unit adjacent the pot, it may be made of such size in relation to the duct 10, or the diameter of the duct 10 is so proportioned, that the unit may readily be thrust inwardly through the duct and snapped into place, as shown in Fig. 1. A wire clip is effective to secure the unit in position in any aperture, such as the aperture in the partition 8.

While we illustrate the unit as clipped in place in the central aperture of the partition 8, it will be understood, of course, that the device may be located at any point along the air duct 10 and may, for example, be conveniently clipped into position at the inlet end of the duct 10.

One of the purposes of the wire structure is the provision of a fan guard. The fan is of necessity a rather delicate part or instrument and must be protected. It will be observed that the fan guard is built on a radius rather than being on a vertical plane. In other words, the fan structure extends upwardly about the fan and then inwardly toward the axis of rotation of the fan at a level above the fan. This protects the fan from being damaged in the insertion of the unit and in practice the unit can be in a sense rolled into position without causing the delicate vanes of the fan to contact the edges of the aperture through which the fan is inserted.

It will be understood that in all forms of the device herein shown, the fan and motor unit can be mounted in any suitable abutment member or plate, which may for convenience be aligned with the bottom of the pot, but need not be so. In other words, any suitable air skirt or member located at any point below or adjacent the pot or in the line of delivery of air to the pot is sufficient. In the form of Figs. 1 to 6, the wire fan guards serve also as locking means for locking the motor and fan unit in position. In the forms of Figs. 7 and 8 we illustrate a mechanism in which the bale may be mounted on the air skirt or apertured plate, and the wire fan guards 75 serve merely as centering and positioning means and as abutments to limit the upward movement of the motor unit so that the fan will be located at the desired level.

We claim:

1. In a booster motor and fan assembly, a supporting plate, a motor housing, a motor mounted on said supporting plate, a fan shaft extending upwardly from said motor housing and plate, a fan on said fan shaft, and a supporting assembly adapted to support said motor and fan assembly in spaced relation to an aperture in a supporting

partition, including a plurality of notched fingers upwardly extending from said plate about said fan, one or more of said fingers being yieldingly movable inwardly toward the other fingers, whereby to permit the insertion of the supporting assembly in said aperture, the vanes of said fan being located above the notches of said fingers whereby, when the assembly is in position, the motor is located at one side of the supporting partition and the fan on the other.

2. In a booster motor and fan assembly, a supporting plate, a motor housing, a motor mounted on said supporting plate, a fan shaft extending upwardly from said motor housing and plate, a fan on said fan shaft, and a supporting assembly adapted to support said motor and fan assembly in spaced relation to an aperture in a supporting partition, including a plurality of notched fingers upwardly extending from said plate about said fan, and means for yieldingly urging one or more of said fingers outwardly against the edge of said aperture, the vanes of said fan being located above the notches of said fingers whereby, when the assembly is in position, the motor is located at one side of the supporting partition and the fan on the other.

3. In a booster fan unit for burners and means for removably supporting it in an aperture, a fan motor, a fan shaft extending from said motor, a fan on said shaft, and a combined fan guard and supporting means for the unit, including a plurality of guard members upwardly extending from said motor about said fan, the upper ends of said guard members extending generally radially inwardly toward the axis of the fan, said guard members having locking offsets adapted removably to engage the edges of any aperture in which the unit is positioned, said members being inwardly flexible, and means for urging them outwardly and for thereby maintaining said locking offsets in locking contact with the edges of any aperture in which the unit is positioned.

4. In a booster fan unit for burners and means for removably supporting it in an aperture, a fan motor, a fan shaft extending from said motor, a fan on said shaft, and a combined fan guard and supporting means for the unit, including a plurality of guard members upwardly extending from said motor about said fan, said guard members having locking offsets adapted removably to engage the edges of any aperture in which the unit is positioned, said members being inwardly flexible, and means for urging them outwardly and for thereby maintaining said locking offsets in locking contact with the edges of any aperture in which the unit is positioned.

5. In a booster fan unit for burner and means for removably supporting it in an aperture, a fan motor, a fan shaft extending from said motor, a fan on said shaft, a combined fan guard and centering means for the unit, including a plurality of guard members extending from said motor and about said fan, said guard members having limiting offsets adapted removably to engage the edges of any aperture in which the unit is positioned, and means for locking the unit in position with said limiting offsets in engagement with the edges of said aperture.

6. In a booster fan unit for burners and means for removably supporting it in an aperture, a fan motor, a fan shaft extending from said motor, a fan on said shaft, a combined fan guard and centering means for the unit, including a plurality of guard members extending from said motor and about said fan, said guard members having limiting offsets adapted removably to engage the edges of any aperture in which the unit is positioned, and means for locking the unit in position with said limiting offsets in engagement with the edges of said aperture, including a bale mounted adjacent said aperture.

7. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture.

8. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture, said positioning portions including offsets in said elements.

9. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture, said positioning portions including offsets in said elements, located adjacent the edges of the fan vanes nearest to the motor.

10. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture, said positioning portions including notches in said elements, said elements being in yielding association with each other whereby said notches are normally yieldingly thrust against the edges of the aperture.

11. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes

on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture, said elements including portions adapted to surround and serve as guard means for the fan vanes.

12. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture, and yielding means for holding said positioning portions in positioning and securing engagement with the walls of said aperture.

13. In a motor and fan assembly unit and means for removably supporting it in an aperture, a support, a motor mounted on said support, a fan shaft extending from said motor, fan vanes on said fan shaft, and securing means for securing said unit in an aperture, with the fan vanes located on the opposite side of said aperture from the motor support, which includes securing elements extending outwardly from said support and about said fan shaft and fan vanes, said elements having positioning portions adapted removably to engage the edges of such an aperture, and fix the relationship between the motor and fan unit and the walls of the aperture, said elements including a plurailty of wires secured at one end in relation to the motor and secured at their opposite ends to each other.

JAMES L. BREESE.
BRUCE HAYTER.
STANLEY PERRY.