

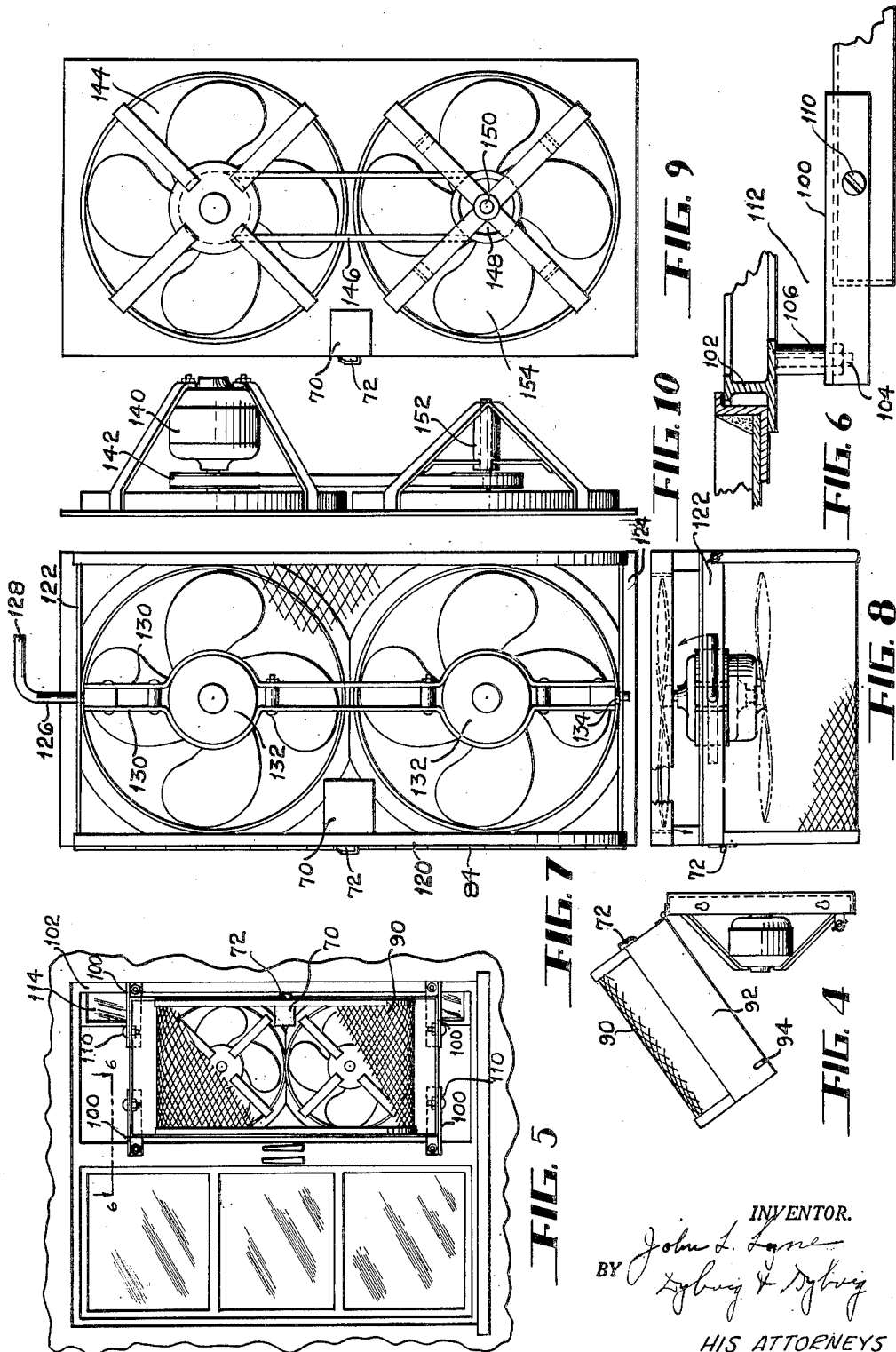
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VENTILATOR

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2 SHEETS—SHEET 2



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VENTILATOR

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1 Claim. (Cl. 230—259)

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This invention relates to a ventilator and more particularly to a ventilator used in moving air into or out of a room through a window opening or the like, although not necessarily so limited.

Various types of window ventilators utilizing an electric motor and a fan driven by the motor for moving the air have been used in the past. In order to move a large quantity of air by the use of a single fan, it is necessary either to use a large opening or to propel the air at a high velocity. If a large opening is used, it requires a large window. The window construction may be such that a large opening is not available, or, if it is available, it is impractical to use a large size fan, especially in view of the fact that the opening must be either round or square. If the air is to be propelled at a high velocity, a high speed fan is used. If a small high speed fan is used, such a fan is noisy and therefore objectionable.

An object of this invention is to provide a dual type fan assembly, wherein a large quantity of air may move through a long, narrow opening, which opening may be horizontally disposed or vertically disposed.

Another object of this invention is to provide a fan assembly protected by a grill or guard assembly, wherein the grill or the guard assembly is pivotally mounted so that it may be adjusted to expose the fan blades and the motor or motors, as the case may be, to facilitate cleaning, painting or repairing of the movable parts, without removing the fan assembly from the position in which it is mounted.

Another object of this invention is to move a large quantity of air without creating excessive air turbulence noise by causing the air to move through two openings at a lower velocity to thereby reduce air turbulence noise.

Another object of this invention is to provide a dual fan adapted to propel air through a long, narrow opening wherein one or both of the fans are motor driven. If two motors are used, then the fan blades are attached directly to the shafts of the motors. If only one motor is used, the other fan is belt driven from the same motor, so that if one motor is used in driving two fans, it is obvious that nonsynchronous operation of the two motors is eliminated, thereby reducing the noise level that may be caused by two motors that do not run in synchronism. Other means may be used to accomplish the same result.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

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In the drawings, Figure 1 is an inside elevational view of a dual fan, with parts broken away.

Figure 2 is a top plan view of the preferred embodiment shown in Figure 1, with parts broken away and the window shown in cross section.

Figure 3 is an enlarged fragmentary, cross sectional view, taken substantially on the line 3—3 of Figure 1.

Figure 4 is an end elevational view of the fan assembly removed from the window, showing the guard partially open.

Figure 5 is another adaptation of the dual ventilator, as used in a casement window.

Figure 6 is an enlarged, fragmentary, cross sectional view, taken substantially on the line 6—6 of Figure 5.

Figure 7 discloses a modification, having portions of the guard broken away.

Figure 8 is a top plan view of the modification disclosed in Figure 7, with parts broken away.

Figure 9 discloses another modification wherein one motor is used for driving two fans without the guard assembly.

Figure 10 is a side elevational view of the modification disclosed in Figure 9.

Referring to the drawings, the reference character 10 indicates the side frame member of a window provided with a wooden sash 12, illustrative of the conventional double hung sash type of window. By raising the window 12, an opening is formed in which may be hung a fan assembly that will now be described.

This fan assembly includes the main frame member 20 made from sheet metal and provided with a horizontally disposed flange 22 along the top thereof, as viewed in Figures 1 and 2, and a like flange 24 extending along the bottom thereof. The flanges 22 and 24 reinforce the upper and lower margins of the sheet metal member 20.

Member 20 is provided with a pair of annular openings 26. Member 20 is narrower than the width of the window. Laterally disposed panel members 40, one on either end, are each provided with a vertically disposed flange 42 and a pair of horizontally disposed flanges 44, having portions overlapping the flanges 22 and 24. The top flange 44 of each panel member 40 is attached to the horizontally disposed flange 22 by means of a screw or bolt 46. The lower flange 44 is attached to the flange 24 by a like screw or bolt 46. The panel members 40 permit the fan assembly to be used in various widths of window openings, in that the panel members overlap member 20 to permit adjustment.

A pair of electric fans 50, provided with fan blades 52, driven by the electric motors 54, are

mounted so as to propel air through the openings 26. The motors 54 are mounted upon a plurality of diagonally disposed, radially extending brackets 58, there being four for each motor, as clearly seen in Figure 1. Each of the brackets 58 is welded or otherwise secured to a flange 60 of a ring 62 attached to member 20 by suitable rivets or bolts 64. The fan blades 52 are preferably mounted within the respective flanges 60, to thereby effectively propel air through the opening.

A speed control coil 70, provided with a control knob 72, is used in controlling the speed of both of the fans simultaneously.

A pivotally mounted guard 80 is used in providing a guard for the fan 50, so as to provide protection. This guard 80 includes a top member 82, as viewed in Figures 1 and 2, connected by a "piano" hinge 84 to the upper flange 22. A member 86, similar to member 82, extends along the bottom. Members 82 and 86 are provided with reinforcing marginal flanges 88, supporting a suitable mesh or screen 90 having the ends attached to vertically disposed strips 92, as viewed in Figures 1 and 2. Each of the strips 92 is provided with a slot 94 near the bottom thereof, as best seen in Figure 4. The slots 94 receive screws 96, shown in Figure 1, threadedly engaging the arms of angle brackets 98, which brackets are held in position by the bolts 64, so as to hold the guard assembly in fixed position over the fan blades.

Members 82 and 86 cooperate with the screen 90 to form a housing-like guard assembly, so that this housing-like guard assembly provides an enclosure for the fan motors and the supports therefor. In the event the fans are reversed so as to direct air in the opposite direction, the housing-like guard assembly also provides a housing for the fan blades.

As is well known to those skilled in the art, fan blades and electric motors used in propelling air become dirty, especially if the air is contaminated with smoke, soot or greasy matter. In order to facilitate cleaning of the fan, it is merely necessary to loosen the screws 96 and raise the guard into the position shown in Figure 4, when the fan blades, motor and other parts may be cleaned. Likewise, the guard assembly may be raised to permit oiling of the motors and repairing of the parts if required.

The fan assembly described thus far has been shown as used in a comparatively wide, horizontally disposed window opening. This fan assembly may also be used in connection with vertically disposed openings that are quite narrow and high, as for example, openings in casement windows. Such a mounting has been disclosed in Figures 5 and 6.

A plurality of angle brackets 100 selected from a variety of lengths of angle brackets are secured to the window frame 102 by flat headed bolts 104 and spaced from the frame members 102 by spacers 106. These angle brackets are used in supporting the fan assembly in a vertical position, as shown in Figures 5 and 6. The angle brackets 100 are secured to the fan assembly by screws 110. The fan assembly is arranged in spaced relation from the frame of the window so as to provide a space 112. This space 112 provides clearance for window appurtenances, such as the window handle, shade, shutter, screen, and the like. No appurtenances have been shown. By this arrangement, it may readily be seen that the pivotally mounted closure 114 for the window opening may be opened to permit the circulation

of air through one section of a casement window. By adjusting the panels 40 shown in Figure 5, by selecting the proper length brackets 100, and by selecting spacer 106 of the proper length, the fan can be mounted in various sizes of window openings and the spacing of the ventilator from the window may be chosen so as to meet the specific requirements. For example, some casement windows are provided with closure handles projecting into the room. If so, long spacers are selected to provide clearance for the handles to permit the closure being closed without removing the fan assembly.

In the preferred embodiment the fans are mounted for propelling the air in one direction only. For example, the fans may be mounted so as to exhaust air from a room. At times this arrangement is satisfactory. At other times it may not be practical to propel the air in one direction only. For example, if the fan is mounted in a south window and arranged to propel the air outwardly, the fan may be ineffective in the event the wind is from the south or from a southwardly direction. That being the case, it would be preferable to turn the fan assembly so as to draw the air inwardly from the south or to move the fan assembly to a window on the north, if one is available. Instead of attempting to move the fan to a more desirable location in the event of an adverse wind, the fans and the motors may be reversed, as shown in the modification shown in Figures 7 and 8.

In the modification disclosed in Figures 7 and 8, the frame assembly 120 is similar to that disclosed in the preferred embodiment, but has added thereto transversely disposed frame members 122 and 124 which have been illustrated as angle irons. These frame members 122 and 124 pivotally support a fan-supporting assembly including a shaft 126 terminating in a handle portion 128. The shaft 126 supports a pair of strap iron frame members 130 having mounted therein the electric motors 132. The ends of members 130 are fixedly attached to a pivot 134 mounted in an aperture in the angle iron frame member 124. It can readily be seen that by opening the guard substantially identical to the guard shown in the preferred embodiment, and rotating the handle portion 128 through 180°, the fan blades and the motor may be reversed from the full line position shown in Figure 8 to the dot-dash position shown in the same figure, thereby reversing the direction of the air propelled through the window opening. Pivot member 134 is preferably hollow, so that the electric cord or cable used in energizing the fans extends through this pivot member. Furthermore, the fan is preferably so arranged that the handle portion 128 can be rotated only through 180°, so that upon the handle portion being rotated from one position to the other, the electric cord will not be continuously twisted in one direction as the operation is repeated.

In the use of certain types of motors, an objectionable noise may develop due to the fact that the two motors may not rotate in synchronism. In order to eliminate this difficulty, one of the fans may be driven by a motor and the other by a suitable driving mechanism, as for example, by a belt like that shown in Figures 9 and 10. In Figures 9 and 10 the guard has not been shown for the sake of clearness. A motor 140 supports a pulley 142 and the fan blades 144. The pulley 142 drives a V-belt 146 passing over a pulley 148 mounted upon a shaft 150 journaled in suitable

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bearings 152 and having keyed thereto the propeller or fan blades 154 that rotate in synchronism with the fan blades 144. By this arrangement, one motor may be used instead of two. The motor may be somewhat larger for effective results than if two motors were used.

A guard assembly like that shown in the preferred embodiment is also used in connection with each of the modifications. The guard assembly has been omitted from the drawings of the modifications for the sake of clearness. However, the pivotally mounted guard assembly forms a part of the invention of each of the modifications.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claim.

Having thus described my invention, I claim:

In a fan assembly for use in a window opening, the combination including a rectangular frame member formed from angle bars extending across the ends of the frame member and other angle bars extending along the sides of the frame member, a pair of circular frames mounted in the first mentioned frame member, a pair of

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motors, brackets attached to the circular frames for supporting the motors in the center of the circular frames but to one side thereof, fans driven by the motors, and a guard assembly, said guard assembly including a pair of laterally disposed sheet metal side members, one side margin and both end margins of said sheet metal members being provided with flanges, a screen extending between the sheet metal members and positioned against the flanges, a hinge connecting one of the sheet metal members of the guard assembly to one side of the first mentioned frame member, and means extending from the first mentioned frame member to the margins of the window opening for supporting the fan assembly in a window.

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