

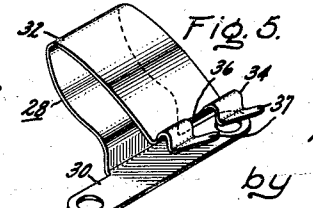
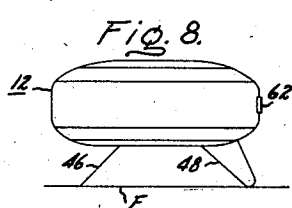
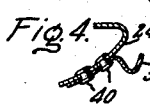
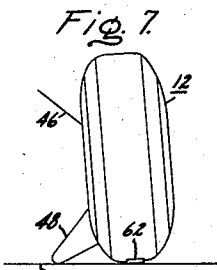
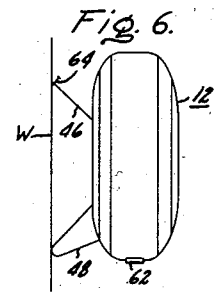
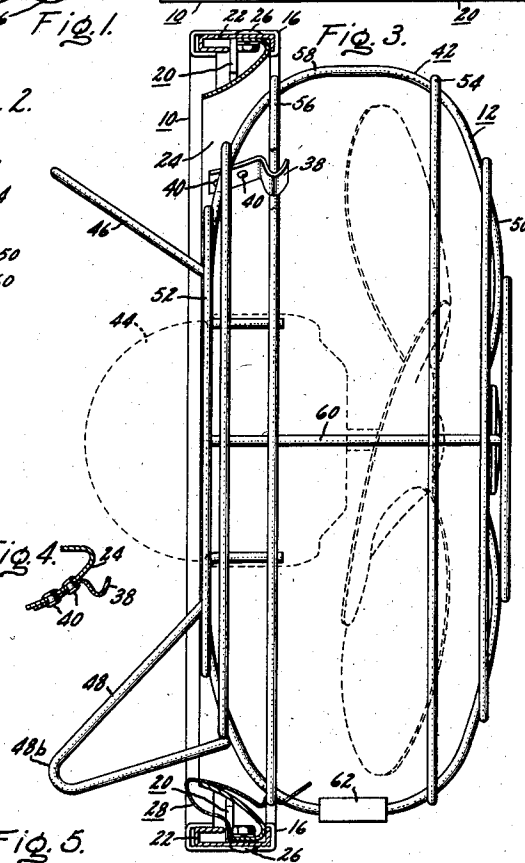
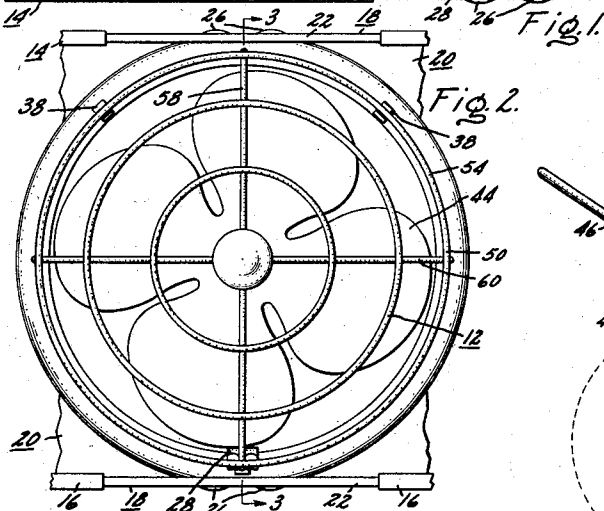
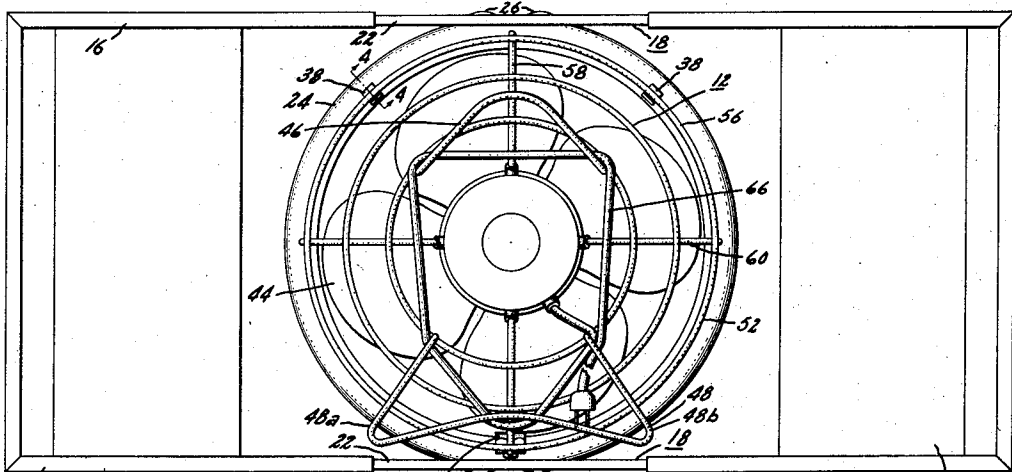
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2,862,657

MULTIPLE PURPOSE VENTILATOR AND AIR CIRCULATOR

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2,862,657

MULTIPLE PURPOSE VENTILATOR AND AIR CIRCULATOR

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2 Claims. (Cl. 230-273)

This invention relates to ventilators and air circulators in general, and more particularly to an electrically driven fan which may be used either as a window mounted ventilator or as a portable, multiple purpose, air circulator.

There are so many different types of air circulating and ventilating needs in the average contemporary domestic or business quarters that the fan art strives constantly to develop devices that will serve multiple purposes. In the ventilating field, it is axiomatic that window ventilators should be capable of selectively functioning as either an exhaust or an intake fan. In the air circulator field, it is highly desirable that air circulators be capable of functioning as either a wall, table or floor air circulator. Many attempts have been made to develop multiple purpose fans, however, to our knowledge, no fan has ever been developed which may be selectively used to function as either an air intake window ventilator, an exhaust window ventilator, a wall air circulator, a table air circulator or a floor air circulator.

It is an object of this invention to provide a fan which may be associated with a window mounting structure in such a manner as to be selectively used to function as either an exhaust ventilator or an intake ventilator, and which is readily detachable from the mounting structure and adapted to be used independently as a portable air circulator within a room as either a wall, table or floor air circulator.

It is another object of the invention to provide in a window ventilator an improved mounting means for supporting the fan.

It is still another object of the invention to provide an improved guard structure for a fan, which permits the fan to be mounted on a window mounting structure to function as either an exhaust or intake ventilator, and which also includes means for utilizing the fan as either a wall, table or floor air circulator when it is detached from the window mounting structure and used independently thereof.

Some of the objects of this invention are accomplished in one form by providing in a window ventilator mounting means on a window mounting structure which cooperates with the guard of a detachable fan assembly to permit the fan assembly to be selectively mounted to function as either an exhaust or intake ventilator.

Other objects of this invention are accomplished in one form by the provision of means on the guard of a fan assembly for selectively utilizing the fan assembly as either a wall, table or floor air circulator.

Other objects and further details of that which we believe to be novel and our invention will be clear from the following description and claims taken with the accompanying drawings wherein:

Figure 1 is an elevation view of a window ventilator incorporating our invention showing a fan assembly mounted on a window mounting structure for use as an exhaust fan.

Figure 2 is a fragmentary elevation view similar to

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Figure 1 with the exception that the fan assembly is mounted for use as an intake fan.

Figure 3 is a sectional view taken on line 3-3 of Fig. 2 with the exceptions that the fan and motor unit is dotted and the view is drawn on a larger scale.

Figure 4 is a sectional view taken on line 4-4 of Fig. 1.

Figure 5 is a perspective view of a mounting clip.

Figures 6, 7 and 8 are schematic views showing respectively the use of the fan assembly as a wall, table and floor fan.

Referring to the drawings, it will be observed that the improved device comprises two main parts: a window mounting structure 10, and a fan assembly 12. The window mounting structure comprises the frame 14, the panel 20 and the orifice ring 24. The frame 14 may be made of end sections 16, and central section 18 so as to be adjustable to fit various size windows. The panel 20 may also be made in sections so as to permit its adjustment to correspond to the size of the frame 14. The manner of accomplishing adjustment, i. e., expansion and contraction of the frame and the panel, is not described in detail for it forms no specific part of our invention.

The frame central section 18 comprises a pair of C-shaped rails 22. Orifice ring 24 is rigidly affixed to the rails 22 by fastening means 26. As can best be seen in Figures 1 and 3, the orifice ring is secured to the rails at aligned upper and lower points. The lower connection differs from the upper one in that the lower fastening means 26, in addition to fastening the orifice ring to the lower rail, rigidly mounts a resilient spring clip 28 (see Fig. 3).

As can best be seen in Fig. 5, the spring clip 28 is a bent member which comprises mounting portion 30, arcuately curved portion 32, seat forming portion 34, and forked guiding portion 36 which forms two guiding fingers 37. Spring clip 28 is made of a resilient material such as a springy metal.

On the top of orifice ring 24 are mounted two spaced hangers 38, which are secured to the orifice ring by conventional fastening means 40. It should be observed that the hangers 38 and the clip 28 are spaced approximately equidistant about the orifice ring, and it will subsequently be realized that the orifice ring 24, the hangers 38 and the spring clip 28 comprise the mounting means on the mounting structure for detachably supporting the fan assembly 12.

The fan assembly 12 generally comprises the guard 42, which is made up of a plurality of formed wires, the fan-motor unit 44 and independent fan assembly supporting means in the form of bent wires 46 and 48.

The guard 42 comprises essentially a plurality of wire rings disposed into two axial groups: a forward group 50, and a rearward group 52. As can be clearly seen in Figure 3, each of these groups comprises a plurality of spaced co-axially mounted wire rings. One purpose of these rings is to afford a protective cover for the fan blades of the fan-motor unit 44. It is significant to note that the largest ring 54 of the forward group 50 and the largest ring 56 of the rearward group 52 are of the same diameter. Both groups are maintained as a structural entity by two criss-crossed joining wires 58 and 60, which are generally oval in configuration. As illustrated, joining wire 58 is vertically disposed, and the joining wire 60 is horizontally disposed. The joining wires are connected to the wire rings wherever a connection can conveniently be made, as by welding or the like.

The bent wires 46 and 48 are secured to the rearward portion of the fan assembly by direct connection to either or both the rings in the rearward group and the vertical joining member 58, as by welding or the like. If preferred, a single bent wire may be substituted for the two bent wires. Bent wire 46 forms a single foot which may

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also be used as a hanging means or a carrying handle, and bent wire 48 forms two feet 48a and 48b. To the lower portion of the vertical joining wire 58 is secured a somewhat cylindrical, resilient member 62 which acts as a support when the fan assembly is used as a table fan.

The fan-motor unit 44 may be conventional, therefore, its details will not be described. It should be realized, however, that the motor is electrically powered and, therefore, has an electrical cord 66, and further, that it need not be an electrically reversible motor because of the mechanical reversibility afforded by the invention.

The foregoing comprises a detailed structural description of the two main parts of the improved device, namely, the window mounting structure 10 and the fan assembly 12. The manner in which these two main elements cooperate in order to selectively effect either an exhaust or an intake window ventilator or the manner in which the fan assembly is used independently to selectively effect a multiple purpose air circulator follows.

As has been previously mentioned, the fan assembly 12 is detachable from the window mounting structure 10, and when it is detached therefrom, it may be used as either a wall, table or floor air circulator. Figure 6 shows schematically the use of the fan assembly 12 as a wall fan. In order to effect a wall fan, it is simply necessary to attach a hook or nail 64 to the wall W and support the detached fan assembly 12 by the single foot formed by wire 46 on the nail or hook 64. The double feet formed by wire 48 rest against the wall by virtue of the weight of the fan assembly 12.

To utilize the detached fan assembly 12 as a table fan it is simply necessary to place it on the surface S and support it on the double feet 48a and 48b formed by member 48, and on the resilient support 62 (see Fig. 7).

To utilize the detached fan assembly as a floor fan, the fan assembly 12 is supported on all three of its feet, i. e., the feet formed by the single foot forming member 46 and the double feet forming member 48, on the floor F as shown in Fig. 8.

It should, therefore, be apparent that when detached from the window mounting structure, the fan assembly 12 comprises a multiple purpose air circulator having many uses within a room.

In order to effect an intake ventilator the fan assembly 12 is brought into proximity with the window mounting structure 10, which has previously been secured in a conventional window frame. The feet forming members are in the van of the fan assembly and are passed through the orifice ring 24, and the large guard ring 56 of the rearward group 52 is hooked over both hangers 38. The lower portion of the fan assembly is then swung toward the orifice ring by pivoting the fan assembly on the hangers. The adjacent portion of the vertical joining wire 58 is slipped between the fingers 37 formed by the forked guiding portion 36 of the spring clip 28; this aligns the fan assembly with the orifice ring, therefore, the joining wire 58, during mounting, comprises an aligning member. The application of a little force on the bottom of the fan assembly in a direction toward the orifice ring, causes the ring 56 to slip over the forked portion 36 of the spring clip and snap into the seat formed by portion 34. It should be observed that the ring 56 passes radially beyond the fingers formed by the forked portion 36 during mounting of the fan assembly and is latched in position when seated. During this operation, the resilience of the spring clip 28 permits mounting without undue strain.

When fully mounted, the parts are disposed as illustrated in Figs. 2 and 3. After mounting, the resilience of the spring clip 28 maintains the fan assembly resiliently, but securely, in position relative to the orifice ring 24.

When mounted as just described, it is assumed that due to the direction of rotation and pitch of the fan blades, both of which are fixed, a stream of air will be directed into the room (toward the right as viewed in Fig. 3 or

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toward the viewer as viewed in Fig. 2) and the device will thereby function as an intake ventilator.

In order to utilize the fan assembly 12 to function as an exhaust ventilator, it is necessary to mount the fan assembly in the reversed position relative to the window mounting structure to that just described for mounting it to function as an intake ventilator. Instead of having the fan blade face into the room, it faces out of the room in order to direct a stream of air out of the room into the atmosphere. The steps for mounting the fan assembly on the window mounting structure are essentially the same as those for mounting the fan assembly to function as an intake ventilator, with the exception that the feet forming members 46 and 48 will now be mounted interiorly of the ventilator and, therefore, will not be passed through the orifice ring during mounting. Due to the fact that the guard ring 54 of the forward group 50 of rings on the fan guard 42 is of the same diameter as the guard ring 56, it will be readily seen that it may be utilized in mounting the fan assembly to function as an exhaust ventilator. This is effected simply by hooking guard ring 56 over the hangers 38, aligning the fan assembly with the orifice ring 24, and seating its lower portion on the spring clip 28.

Figure 1 illustrates the fan assembly fully mounted to function as an exhaust ventilator in a conventional type window and, therefore, the longest dimension of the ventilator is horizontally disposed. It will there be observed that the feet forming members 46 and 48 are mounted interiorly of the ventilator, that is, on the room side thereof. This is a convenient storing position for the fan assembly when it is not in use, for the reason that the feet forming members form a handy electrical cord storage means. As can be seen in Fig. 1, the electrical cord 66 may be looped around the feet forming members when the ventilator is not in use.

If it is desired to utilize the ventilator in a casement window of the tall, narrow, vertical type found in many apartment buildings, as opposed to the conventional type window mounting illustrated in Fig. 1, due to the referred to approximate equal spacing of the two hangers 38 and clip 28, this may be accomplished. When this type of mounting is desired, the window mounting structure 10 is mounted in the window with its longer dimension in a vertical plane; then, the mounting structure is disposed in a position rotated 90° from that shown in Fig. 1. In this position, which may, for example, be simulated by rotating the drawing 90° clockwise, the clip 28 is disposed on the left-hand side of the mounting structure on a horizontal centerline, and the hangers 38 are generally disposed in vertical alignment, one being above the other. The fan assembly 12 may be mounted on the mounting structure 10 by utilizing the horizontal joining wire 60 and the clip 28 to align the assembly, after one of the mounting rings (54 or 56) has been hooked onto the hangers 28. In this position, the upper hanger bears most of the load. Naturally, the mounting structure may be rotated in either direction when mounting in a vertical casement, hence the clip 28 may be on either the left or right-hand side of the mounting structure after the latter is fully mounted. Note that the fan assembly 12, when mounted in a vertical casement window, may be oriented in the same manner as when it is mounted in a conventional window, that is, the carrying handle 46 may still be on top of the orifice ring and may be used during the steps of mounting.

Regarding the spacing of the clip and hangers, they have been characterized as being spaced approximately equi-distant about the orifice ring, the clip being on the bottom of the orifice ring when mounted as in Fig. 1. Some variation in spacing is permissible, in fact, these parts are not illustrated as being spaced precisely equi-distant. Such precise spacing is not critical, however, it is necessary that the parts be spaced in such a manner that there will always be one hanger which is capable of tak-

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ing the load when the mounting structure is rotated 90° in either direction from that shown in Fig. 1 for mounting in a vertical casement window. The term "substantially equi-distant" is intended to cover all spacing which will provide this desired effect. Whereas precise equi-distant spacing is not critical, as long as any deviations therefrom do not destroy the desired effect, it does provide the desired effect.

From the foregoing it should be evident that certain aspects of our invention are not limited to the particular details of construction of the example illustrated, and we contemplate that various and other modifications and applications will occur to those skilled in the art. It is, therefore, our intention that the appended claims will cover such modifications and applications as do not depart from the true spirit and scope of our invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. The combination of a mounting structure and a fan assembly, said mounting structure comprising a vertical panel having an opening therein, an orifice ring on said structure aligned with said opening, supporting means on said orifice ring detachably supporting said fan assembly, said supporting means comprising a plurality of hangers and a spring clip, said spring clip being spring biased radially outwardly away from the center of said orifice ring, means on said fan assembly cooperating with said supporting means in mounting said fan assembly on said mounting structure, said means comprising a guard ring and an aligning member, said guard ring being supported on said hangers and the inner surface of said guard

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ring engaging said clip, said clip having a forked guiding portion receiving said aligning member.

2. The combination of a mounting structure and a fan assembly, said mounting structure comprising a vertical panel having an opening therein, an orifice ring on said structure aligned with said opening, supporting means on said orifice ring detachably supporting said fan assembly, said supporting means comprising a plurality of hangers and a spring clip, said spring clip being spring biased radially outwardly away from the center of said orifice ring, means on said fan assembly cooperating with said supporting means in mounting said fan assembly on said mounting structure, said means comprising a guard ring and an aligning member, said guard ring being supported on said hangers and the inner surface of said guard ring engaging said clip, said clip comprising a pair of spaced generally parallel fingers receiving said aligning member therebetween.

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