

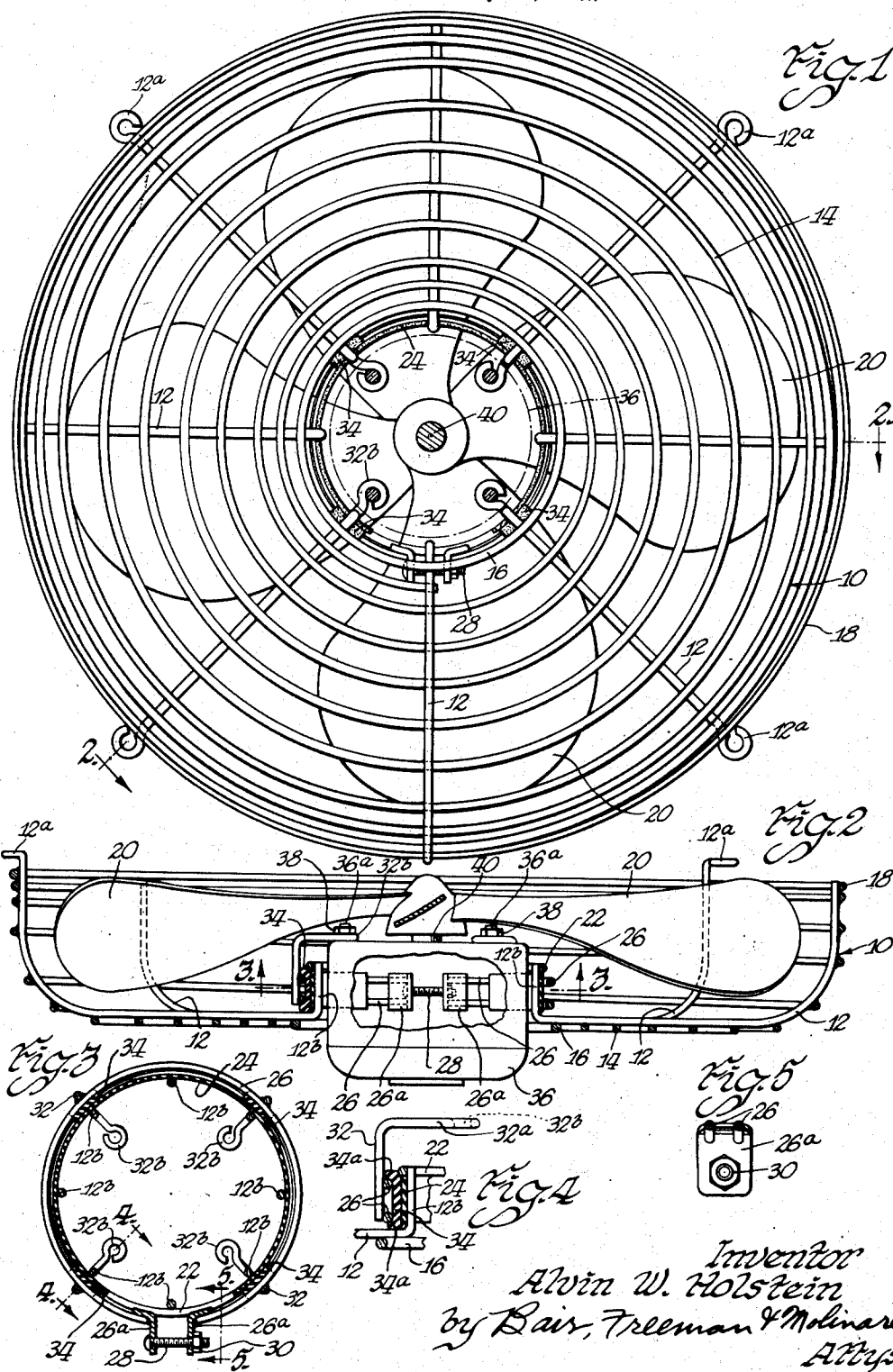
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WINDOW FAN SUPPORT

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WINDOW FAN SUPPORT

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The present invention relates to an improved support arrangement for an electric fan, particularly an electric fan of the so-called window type.

Electric fans intended for domestic use must be silent in operation, otherwise the occupants of the room ventilated are annoyed by the hum and other sounds issuing from the fan. Such sounds tend to be amplified and rendered more annoying when they are communicated to the various structures supporting the fan, and for this reason it is highly desirable to isolate the motor and fan blades—which inherently execute vibratory motion by reason of the magnetic and mechanical effects within the motor—from the other portions of the unit.

Vibration mounts to isolate the motor and fan blades from the remainder of the fan have not proven entirely satisfactory because it is necessary to provide a support that does not accent the motions executed by the motor and fan blades themselves. Even if such motions are relatively silent, if their amplitude becomes unduly great, there is danger of the blades striking the wire guard or other stationary portions of the mechanism and, in addition, the user of the fan does not regard this as normal operation and is unsatisfied. On the other hand, if the vibration isolating mount is made less elastic so that the motor and fan blades are less free to move, the purpose of the vibration isolating device is defeated and the vibrations are communicated to the noise-creating wire guard and other parts of the unit.

These difficulties are overcome to a great extent by the present invention by providing an improved mounting structure or support arrangement for the electric fan motor and blades which supports the motor in the plane transverse to the motor shaft and passing through the center of gravity of the unit. With this support, it is possible to use a relatively elastic vibration isolating structure since the motor and blades do not then execute excessive movements and the user is not annoyed by what appears to be improper operation.

It is, therefore, a general object of the present invention to provide an improved vibration isolating support for an electric fan.

A further object of the present invention is to provide an improved vibration isolating support for an electric fan which supports the motor and fan blades in a manner that achieves highly effective vibration isolation and yet at the same time does not entail excessive movements of the motor and blades.

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Still another object of the present invention is to provide an improved vibration isolating support for an electric fan which supports the fan from the wire guard and in a plane passing through the center of gravity of the motor and blades and perpendicular to the axis of the motor shaft.

It is also an object of the present invention to achieve the foregoing objects in a structure that is simple in construction, reliable in operation, gives rise to easy maintenance, and is inexpensive to manufacture.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its organization and method of operation, will best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a front elevational view of a window fan constructed in accordance with the present invention;

Figure 2 is a cross-sectional view through axis 2-2, Figure 1;

Figure 3 is a fragmentary cross-sectional view through axis 3-3, Figure 2;

Figure 4 is a somewhat enlarged fragmentary view through axis 4-4, Figure 3; and

Figure 5 is a somewhat enlarged fragmentary view through axis 5-5, Figure 3.

Referring now to Figures 1 and 2, the fan structure consists of a wire guard indicated generally at 10. This guard is defined by a series of radial struts or ribs 12 to which are welded the spiral wire 14 to form a spider web type configuration. Four of the ribs 12 form outboard eyelets 12a to receive mounting screws or bolts to support the structure. The inner margin of the guard 10 is defined by a circular wire 16 which is of somewhat heavier construction than the wire 14 and is welded to the ribs 12. The outer margin of the guard is defined by the circular wire 18 somewhat heavier than wire 14 which is likewise welded to the ribs 12. It will be observed that the ribs 12 extend rearwardly adjacent their outer margins so that the fan blade 20 is protected from both the front and the side.

At their inner margins the ribs 12 extend axially and rearwardly in relation to the guard. These portions are indicated at 12b, Figures 2, 3, and 4. At their rearward terminus these ribs are welded to a circular wire 22 which is seen in Figures 4 and 3. A strap 24 of split sleeve conformation is secured by welding, or otherwise, to the axially extending portions 12b of the ribs 12 in the space

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between the marginal ring 22 and the radially extending portions of the ribs 12 to define a cylindrical surface upon which the resilient members 34 seat.

A pair of wire rings 26 encircle the sleeve 24 as shown in Figures 3 and 4. These rings are split and receive the ear-brackets 26a at their split portions. As shown in Figure 2, these brackets extend across both rings 26, being secured thereto by welding or similar means. At their downturned portions, as shown in Figure 3, the brackets 26a have holes which receive the bolts 28. Nut 30 on this bolt provides an adjustable tightening of the rings 26.

Four rearwardly extending brackets 32 are secured to the outer edges of the rings 26 by welding or similar means. These brackets are formed of wire and in part extend rearwardly as shown in Figure 4 and in part extend inwardly as at 32a, Figure 4. Eyelets 32b are formed by these brackets at their radially inward extremes as shown in Figures 1 and 3.

Four resilient inserts of rubber or the like, indicated at 34, Figure 3, are sandwiched between the sleeve 24 and the rings 26. As shown in Figure 4, these resilient inserts have flange portions 34a which cage the rings 26 to anchor the rings against axial movement. It will be noted that the members or inserts 34 define a plane passing through their centers of gravity which is perpendicular to the axis of shaft 40. This plane is the plane of the cross-section of Figure 3.

The fan driving motor 36, Figure 2, is secured to the eyelets 32b by the studs 36a, each of which receives a mounting nut 38. As shown in Figure 2, the body of the motor 36 extends within the confines of the sleeve 24 and the shaft 40 extends into the guard 10. A fan blade indicated generally at 20 is mounted on the free end of shaft 40 and hence within the confines of the guard 10.

The axial extent of the brackets 32 is of such amount as to position the center of gravity of the motor 36 and blade 20 in the plane defined by the sleeve 24 and perpendicular to the axis of shaft 40. This is the plane of the cross-section of Figure 3.

By reason of the foregoing construction, vibration motions of the motor 36 and blade 20 in the radial direction of shaft 40 act only to compress or relax the inserts 34 and do not tend to cause any twisting deflections of these inserts. I have discovered that the radial movements of the motor are the ones principally responsible for the annoying noise produced by the structure. However, since these motions in the above described structure produce only compressive effects on the rubber inserts, it is possible to use a rubber or other elastic material which is quite flexible and resilient and therefore highly effective for purposes of vibration isolation. Yet, the movements of the motor and blade, so long as they are confined to the twisting movements in directions perpendicular to shaft 40, are not undesirable and in fact can be tolerated without annoyance.

The vibration isolating structure above described does not have the same flexibility with reference to twisting motions of the motor 36 and blade 20 as it has in relation to shifting motion radially of shaft 40. This is due to the presence of the overhanging portions 34a, Figure 4, of the inserts 34 and to the inherent characteristics of the structure. Thus the motor 36

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and the blade 20 are rather rigidly mounted in relation to twisting movements and there is no opportunity for such movements to reach excessive magnitude. However, I have discovered that such twisting movements are not the movements that give rise to annoying noise and that the fan operation is relatively silent despite the rather rigid anchorage of the motor and fan blade with respect to such movements.

While I have shown and described a specific embodiment of the present invention, it will, of course, be understood that various modifications and alternative constructions can be made without departing from the true spirit and scope thereof. I therefore intend by the appended claims to cover all modifications and all alternative constructions falling within their true spirit and scope.

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

1. A support arrangement for an electric fan comprising in combination; a guard screen defining an axis and having a central motor-receiving opening, the screen further having radially directed ribs with axially extending portions at the margin of said opening; a sleeve encircling the axially extending portions of said ribs; elastic members interposed between the sleeve and said axial portions of said ribs, the centers of the elastic members defining a plane perpendicular to said axis; axially extending brackets secured to said sleeve and at their free ends extending radially inwardly to define motor-supporting elements; a motor secured to said elements and within the confines of said opening; a fan blade on said motor and within the confines of the guard, the center of gravity of the blade and motor being in substantially the same plane as said plane defined by the elastic members.

2. A support arrangement for an electric fan comprising in combination, a guard screen defined by generally circumferential coplanar members encircling an axis, the screen having a central motor-receiving opening and radially extending ribs with axially extending portions at the margin of said opening; brackets extending in part substantially parallel to the axially extending portions of the ribs and in part extending radially inwardly to define motor-supporting elements; resilient elements interposed between the axially extending portions of the ribs and the axially extending parts of the brackets, the resilient elements defining a plane parallel to the plane of the screen; a motor secured to the brackets within the confines of said opening; a fan blade on the motor, the center of gravity of the motor and blade being substantially in said last plane.

3. A support arrangement for an electric fan comprising in combination, a guard screen defined by generally circumferential coplanar members encircling an axis, the screen having a central motor-receiving opening; means extending parallel to said axis at the margin of said opening and secured to said screen; brackets in part overlaying said means and in part extending radially inwardly to define motor-supporting elements; resilient elements interposed between said means and the part of the brackets overlaying said means, the resilient elements defining a plane parallel to the plane of the screen; a motor secured to the brackets within the confines of said opening; a fan blade on the motor and within the guard, the center of gravity of

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the motor and blade being substantially in said last plane.

4. A support arrangement for an electric fan comprising in combination, a guard screen defining an axis and having central motor-receiving opening, the screen further having radially directed ribs with axially extending portions at the margins of said opening; split sleeve encircling the axially extending portions of said ribs; elastic members interposed between the sleeve and the axial portions of said ribs, the centers of the elastic members defining a plane perpendicular to said axis; adjustable means to tighten the sleeve about the elastic members; axially extending brackets secured to said sleeve and at their free ends extending radially inwardly to define motor-supporting elements; a motor secured to said elements and within the confines of said opening a fan blade on the motor and within the confines of the guard, the center of gravity of the fan blade and motor being substantially in the plane defined by the elastic members.

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5. A support arrangement for an electric fan comprising in combination; a guard screen defining an axis and having a central motor-receiving opening, the screen further having radially directed ribs with axially extending portions at the margins of said opening; a first sleeve affixed to said radially extending portions of the ribs; a split sleeve encircling said first sleeve; elastic members interposed between said sleeves and having overhanging portions centering said split sleeve, the centers of said elastic members defining a plane perpendicular to said axis; axially extending brackets secured to said last sleeve and at their free ends extending radially inwardly to define motor-supporting elements; a motor secured to said elements and within the confines of said opening; and a fan blade on the motor, the center of gravity of the blade and motor being in substantially the same plane as said plane defined by the elastic members.

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No references cited.