June 4, 1929. K. NUTTALL 1,715,669

FAN VIBRATION ELIMINATING DEVICE

Filed Oct. 1, 1927

Fig. 1.

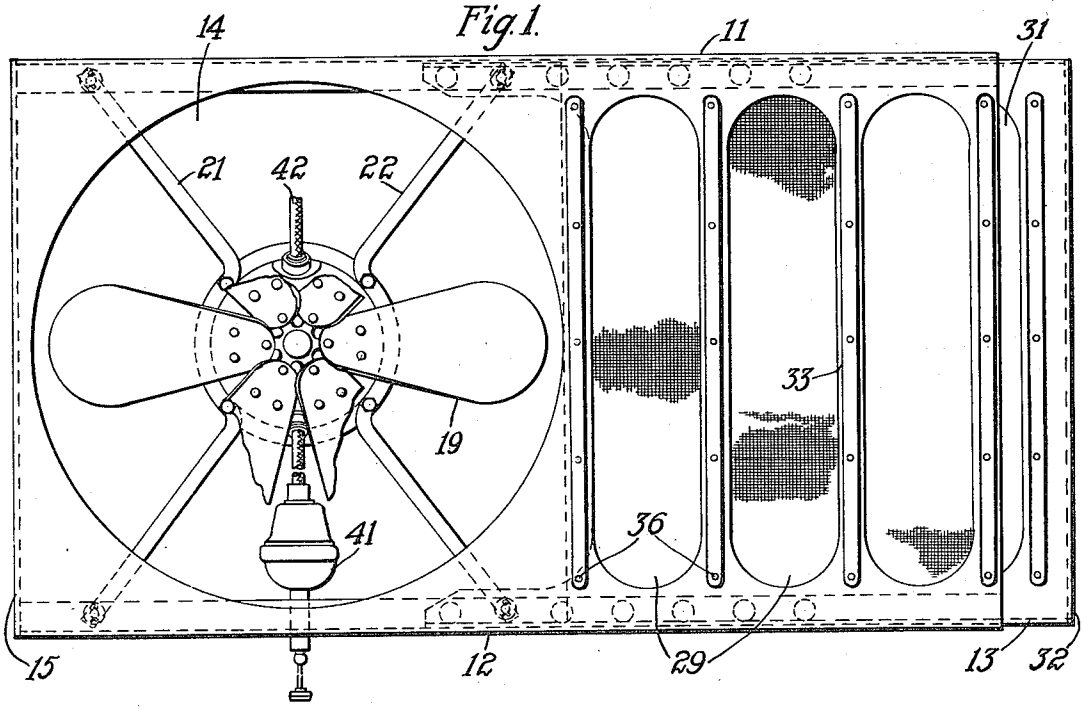


Fig. 3.

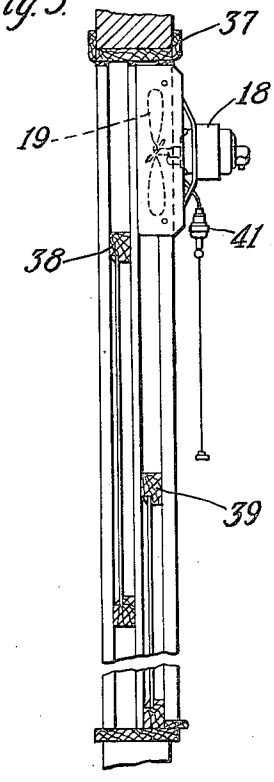
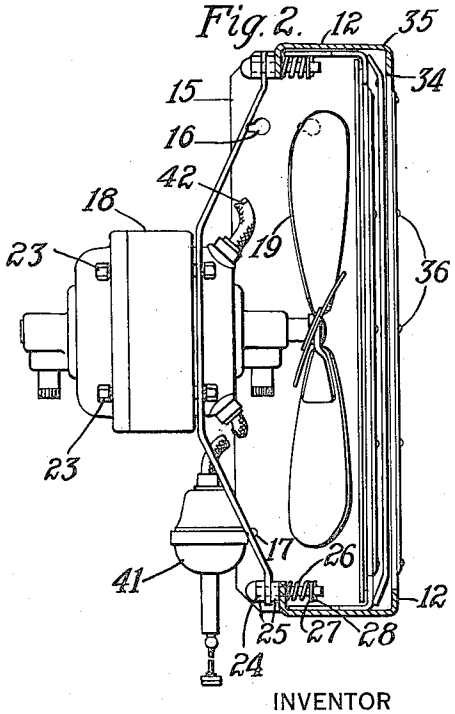


Fig. 2.



INVENTOR

Kenneth Nuttall

BY

Wesley G. Carr

ATTORNEY

Patented June 4, 1929. 1,715,669

UNITED STATES PATENT OFFICE.

KENNETH NUTTALL, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

FAN-VIBRATION-ELIMINATING DEVICE.

Application filed October 1, 1927. Serial No. 223,405.

My invention relates to exhaust or circulating fans and particularly to mounting means for such fans.

An object of my invention is to provide a relatively simple, compact and efficient mounting for kitchen exhaust or circulating fans that shall reduce to a minimum the amount of vibration transmitted from the fan.

My invention is particularly applicable to a kitchen-exhaust fan embodying a motor-driven fan mounted on a two-part adjustable frame, each part of substantially channel-shape in lateral section, by means of two laterally bowed bars. I particularly provide resilient means for yieldingly securing the ends of the bars to the frame, said means comprising a spring pin and resilient washers.

In the single sheet of drawings,

Figure 1 is a view, in front elevation, of a kitchen-exhaust fan with which is associated the device embodying my invention,

Fig. 2 is a view, partially in side elevation and partially in lateral section, of the structure shown in Fig. 1, and

Fig. 3 is a view, partially in section and partially in end elevation, showing a kitchen-exhaust fan mounted in a window frame.

An adjustable frame for a kitchen-exhaust fan is designated generally by the numeral 11 and comprises an outer sheet metal member 12, of substantially overhung channel-shape in lateral section, and an inner sheet metal member 13 of substantially channel-shape in lateral section. The two members 12 and 13 are longitudinally adjustable relatively to each other, in order to permit of mounting them in window frames of different widths.

The member 12 is, as has been stated, of substantially overhung channel-shape in lateral section and is made of relatively thin sheet metal. An opening 14 is provided in the intermediate portion of the member 12 and is made of some suitable size to substantially correspond to the dimensions of a standard fan which is to be operatively associated with the member 12. An end portion of the member 12 is bent over it at right angles thereto, as designated by the numeral 15 in Figs. 1 and 2 of the drawings.

A plurality of openings 16 and 17 are provided adjacent to the upper and the lower edges of the portion 15 in order that the frame assembly may be mounted in its proper operative position within a window frame on suitable mounting screws (not shown in detail).

A fan-motor assembly is illustrated as embodying a motor frame 18 and a plurality of fan blades 19 mounted on the motor shaft in the usual manner. While the fan-motor assembly is of substantially standard desk-fan construction, it departs therefrom in that no standard or base is provided therefor, the outer frame being of any suitable or desired shape, here shown as substantially circular.

Supporting means for the fan motor 18 comprises two bent bars 21 and 22, the intermediate portions of which are bent laterally in one plane to arcuate shape to correspond to the periphery of the motor frame 18, which is secured to the intermediate portions by frame bolts 23, in a manner well known in the art. Nuts and lock washers are provided to hold the motor frame on the supporting bars.

The outer ends of each of the bars 21 and 22 are provided with openings therethrough which are alined with a plurality of openings in the overhung portion of the member 12 of channel shape.

The openings in the bars 21 and 22 and in the member 12 are made of predetermined diameters, and a spring pin 24 extends through each pair of alined openings in the arms and in the channel member, respectively.

Each of the pins 24 has two resilient washers 25 located thereon, one on each side of the end of each of the bars 21 and 22. A spring 26, of helical shape, is also located on the shank of the pin 24, together with a washer 27 and a cotter pin 28. When assembling the pin 24 in any one of the positions shown in Figs. 1 and 2 of the drawings, the spring 26 is compressed to a predetermined extent in order that the ends of the bars 21 and 22 shall

have frictional engagement with the inturned edge portions of the member 12. The diameters of the openings in the arms 21 and 22 and in the member 12 are made such that the pin 24 fits loosely therein in order that a yielding or resilient frictional engagement may be effected between the ends of the bars and the said member.

A plurality of openings 29 are provided in the intermediate portion of the member 12, and a plurality of openings 31, of substantially the dimension, shape and location as the openings 29, are provided in the member 13. Member 13 is also of channel shape, in lateral section, and has an end portion 32 bent at right angles thereto. Relatively narrow strips of metal 33 are allowed to remain between the openings 29, and the metal of these strips is grooved or indented from the rear, as shown in the drawings, in order to stiffen the respective members 12 and 13.

As it is desired to close the openings 29 and 31 to the flow of air, but to permit light to enter therethrough, a sheet of coated wire screen 34 of suitable size is provided, and is held in place by a mat 35 which consists of a relatively thin sheet of metal having openings therein corresponding to the openings 29 in the member 12. The side edge portions of the member 35 are bent outwardly, as shown more particularly in Fig. 2 of the drawings, in order that they may engage the edges of the intermediate portion of the member 13 and press it yieldingly towards the overhung portions. A plurality of rivets 36 are provided to hold the mat 35 and the transparent sheet 34 in their proper operative positions against the intermediate portion of the member 12.

Substantially the same construction is employed for closing the openings 31 in the member 13 against the passage of air therethrough, but permitting light to pass therethrough.

Fig. 3 illustrates a kitchen-exhaust fan with which is operatively associated the device embodying my invention, namely, the yielding supporting means for the fan, and, as there shown, a window frame 37 has an exhaust fan mounted therein on suitable supporting screws (not shown in detail). The upper window 38 is dropped the proper distance to provide an opening of substantially the same height as the height of the members 12 and 13 and the lower window 39 is, of course, permitted to remain in it susual position.

A pull switch 41 is provided in order to permit of controlling the energization of the fan in accordance with the conditions in the room wherein the fan is installed. A supply-circuit conductor 42 of the usual type, is also provided to permit of connecting the motor to a suitable source of supply of electric energy.

I have found that a device of this kind is particularly effective in reducing the amount of vibration which is transmitted from the motor-driven fan proper to the frame and more particularly to the window frame. If transmitted to the window frame it has a tendency to be amplified by the walls of the building and thus a small amount of noise may become amplified to too great an extent.

I believe that the fact that the bars 21 and 22 are bowed outwardly, as shown more particularly in Fig. 2 of the drawings, is of some consequence in reducing the amount of noise of vibration transmitted from the fan, as these provide a resilient supporting bar for each side of the motor frame, the ends of which are yieldingly and frictionally supported on a relatively light sheet-metal frame that is made in two parts, one of which is provided with a resilient means for pressing the other part into its proper operative position.

The spring-equipped pins, shown more particularly in Fig. 2 of the drawings, permit of a small amount of movement of the motor-driven fan and of the two arms in any one of three major directions relatively to the supporting frame 11, and I believe this freedom of movement to be an essential element in effecting a reduction in the amount of noise which is transmitted from the fan to the surrounding supporting structure or to a building.

Various modifications may be made in the device embodying my invention without departing from the spirit and the scope thereof and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claims.

I claim as my invention:

1. In an exhaust or circulating fan, the combintion with a fan motor and a supporting frame, of a plurality of laterally-resilient supporting bars having their respective intermediate portions rigidly secured to the motor and laterally yielding means for securing the ends of said bars to the frame.

2. In an exhaust or circulating fan, the combination with a fan motor and a supporting frame of substantially overhung channel-shape portions in lateral section, of a plurality of laterally bowed supporting bars having their respective intermediate portions secured to the motor casing, and laterally-yielding means for securing the ends of said bars to the overhung end portions of said frame.

3. In an exhaust or circulating fan, the combination with a fan motor and a supporting frame of substantially overhung channel shape in lateral section and having a plurality of openings in the overhung end portions thereof, of a plurality of bars having their respective intermediate portions secured to the motor casing and having an opening at each end thereof alined with one of the open-

ings in the frame, and a spring-equipped pin extending loosely through the alined openings in one of the bars and in the frame.

4. In an exhaust fan, the combination with a fan motor and a supporting frame, of a plurality of supporting bars extending across said frame and having the motor casing secured to the intermediate portions thereof, and spring-equipped pins extending through the ends of the bars and through portions of the frame to reduce vibration of the fan motor relatively to the frame.

In testimony whereof, I have hereunto subscribed my name this 28th day of September, 1927.

KENNETH NUTTALL.