Dec. 27, 1955 L. R. HANSEL 2,728,541

MEANS TO SUPPORT A MOTOR DRIVEN FAN FROM A CARRYING PANEL

Filed Oct. 29, 1954

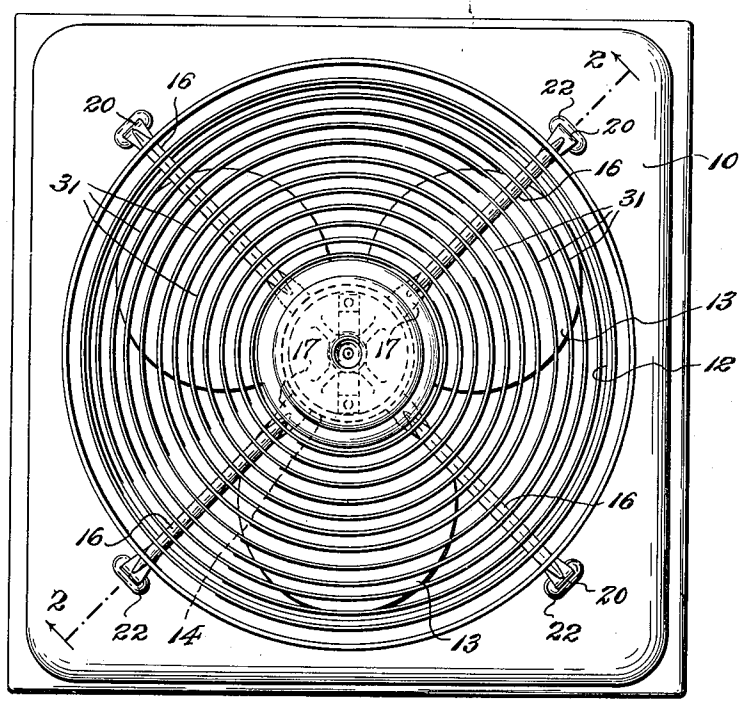


Fig. 1

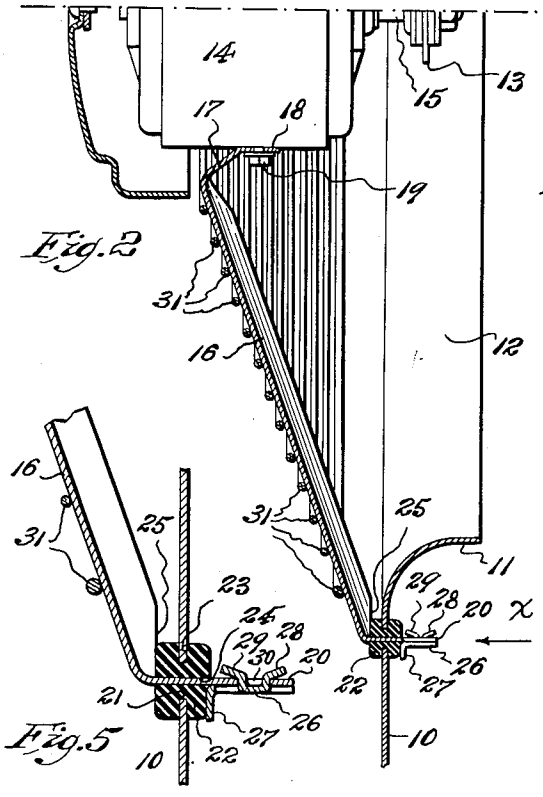


Fig. 2

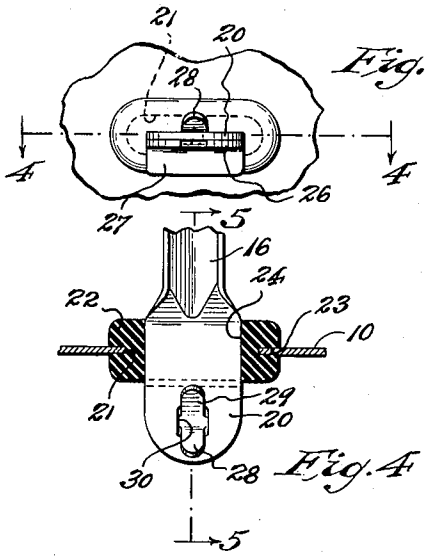


Fig. 3

Fig. 4

Fig. 5

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United States Patent Office 2,728,541 Patented Dec. 27, 1955

2,728,541

MEANS TO SUPPORT A MOTOR DRIVEN FAN FROM A CARRYING PANEL

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Application October 29, 1954, Serial No. 465,528

3 Claims. (Cl. 248—15)

This invention relates to ventilating fans of the direct electric motor driven type, and has reference, more particularly, to novel means for both supporting the fan driving motor and the fan guard structure.

In the use of ventilating fan installations it is highly desirable that substantially silent operation thereof be attained. The main sources of noise emanating from a direct motor driven fan during operation thereof is that caused by vibration due to torque and other pulsations of the motor which, by transmission to the carrying panel or frame of the installation, produces objectionable noise that will be radiated from the panel or frame surfaces, and will frequently be amplified by reason of the fact that the panel or frame surfaces produce a sounding board effect.

An object of this invention is to provide novel means, including vibration absorbing elements, for so supporting a ventilating fan driving motor from and in connection with a carrying panel or frame as to assure substantially silent operation of the ventilating fan installation, which means may also additionally serve as support for a fan guard structure.

For the purpose of illustration, the invention is shown in the accompanying drawings as applied to a ventilating fan of the kind adapted for installation in a window; it must be understood, however, that the invention can well be applied to other types of ventilating fan and blower installations.

The above stated and other objects will be understood from a reading of the following detailed description of my invention in connection with the accompanying drawings, in which:

Fig. 1 is a rear face elevational view of a ventilating fan for window installation, as equipped with novel means according to this invention for supporting the fan motor and fan guard structure.

Fig. 2 is a fragmentary cross-sectional view, taken on line 2—2 in Fig. 1, but drawn on an enlarged scale.

Fig. 3 is a fragmentary elevational view of a vibration absorbing connection between a motor and guard structure supporting arm and the carrying panel or frame of the ventilating fan installation, viewed in the direction of the arrow X in Fig. 2, but drawn on a further enlarged scale; Fig. 4 is a horizontal sectional view, taken on line 4—4 in Fig. 3; and Fig. 5 is a vertical longitudinal sectional view, taken on line 5—5 in Fig. 4.

Referring to the drawings, in which corresponding characters of reference are employed to indicate corresponding parts, the reference character **10** indicates the carrying panel or frame of the ventilating fan structure as adapted to be mounted within and across a window opening. Ordinarily such window opening receivable carrying panel or frame is provided wit dlbusjaathvmm carrying panel or frame is provided with adjustable laterally extensible means (not shown), at one or both sides thereof, whereby to fit the panel or frame in bridging relation to and across a window opening, in manner already well known to the art. The panel or frame **10** is provided with a central opening defined by an outwardly or forwardly projecting annular flange **11**, thus forming a through chamber or air passage **12** within which the ventilating fan **13** operates.

The reference character **14** indicates an electric motor by which the ventilating fan **13** is driven. Said motor **14** is rearwardly offset from and in axial alignment with the air passage **12** of the panel or frame **10**. The armature shaft **15** of the motor projects forwardly into the air passage **12**, and the fan **13** is fixed on said armature shaft so as to be directly driven thereby within said air passage **12**.

The means for supporting the motor **14**, and the ventilating fan **13** driven thereby, from the carrying panel or frame **10**, and in operative relation to the air passage **12** thereof comprises a plurality of circumferentially spaced, radial supporting arms **16** disposed to extend in rearwardly and inwardly inclined relation to and from the carrying panel or frame **10** to the motor **14**. To assure desired rigidity of said supporting arms **16**, the main body of each thereof is of suitable hollow cross-sectional shape, preferably being of inverted substantially V-shape in cross-section, with the apex edge thereof rearwardly presented.

Each said supporting arm **16** is formed at its inward end with a forwardly and inwardly inclined flattened extension **17**, which terminates in a perforate supporting ear **18** extending parallel to the axis of the motor **14**, and being adapted to engage the external surface of the motor casing. Said supporting ear **18** is secured to the motor casing in supporting relation thereto by a fastening bolt **19** or other suitable fastening means. Each supporting arm **16** is formed at its outer end with a forwardly and angularly projecting flattened foot piece **20**, disposed to extend perpendicular to the plane of the carrying panel or frame **10**.

At locations where respective supporting arms **16** are to be affixedly joined to the carrying panel or frame **10**, the latter is provided with elongated openings **21**. Mounted through each such opening **21** is a vibration absorbing or dampening element made of suitable resilient material, such as natural or synthetic rubber or equivalent resilient material. Each said element is formed to provide cushioning body **22** of substantial thickness having an encircling groove **23** indenting its periphery, which groove is adapted to receive marginal portions of an opening **21** with which the carrying panel or frame **10** is provided, whereby said body **22** embraces said marginal portions and thus affixes the body to the carrying panel or frame **10**, so that opposite side or face portions of the former project from opposite faces of the latter to lie in planes parallel thereto. The body **22** of each vibration absorbing or dampening element is provided with a central longitudinal slot **24** which extends transversely therethrough from face to face thereof, and which corresponds in length to the width of a foot piece **20** of a supporting arm **16**.

To join a supporting arm **16** in attached relation to the carrying panel or frame **10**, with a vibration absorbing or dampening element operatively interposed between the latter and the former, the foot piece **20** of the supporting arm is inserted through slot **24** of the element body **22** until the chamfered end **25** of the supporting arm, from which the foot piece extends, abuts the rearward face of said element body, and so that the free end portion of said foot piece **20** projects outwardly beyond the forward face of said element body. Means is provided for retaining the foot piece **20** against displacement from such assembled relation to the element body **22** and attached relation to the carrying panel or frame **10**. One and a preferred form of means for this purpose comprises a keeper plate **26** which is adapted to be superposed upon and suitably secured to the freely projecting outer end

portion of the foot piece **20**, said keeper plate having an angular stop flange **27** at its inner or rearward end to abut and press against the forward face of the element body **22**. A satisfactory and preferred means for attaching the keeper plate **26** to the foot piece **20** comprises forward and rearward clenching tongues **28** and **29** which are struck out from the body of the keeper plate for projection therefrom. The foot piece **20** is provided with an opening **30** through which said clenching tongues **28** and **29** project, so that the same can be bent or clenched over opposite margins of said foot piece opening **30**, thereby to strongly and immovably interlock the keeper plate in operative assembled relation to the vibration absorbing or dampening element (see Figs. 3, 4 and 5). It will be understood that within the broader aspects of this invention, any means, other than the clenching tongues **28** and **29**, may be used to secure the keeper plate **26** to the foot piece **20** of a supporting arm **16**.

The plurality of circumferentially spaced, inwardly and rearwardly inclined, radial supporting arms **16**, not only serve to support the motor **14** and fan **13** driven thereby, but also are adapted to carry a multiplicity of closely concentrically spaced rings **31**, which, in the aggregate, provide a safety guard structure that debars accidental access to the whirling fan **13** when it is in operation. Said guard rings **31** are engaged across the apex edges of the supporting arms **16**, and are suitably secured thereto, as e. g. by welding.

When the motor driven ventilating fan is in operation, pulsations and other vibrations incident to the operation thereof, can only be transmitted through the supporting arms **16** to the carrying panel or frame **10**. Due, however, to the interposition of the resilient bodies **22** of the vibration absorbing or dampening elements between the carrying panel or frame **10** and the outer ends of the supporting arms **16** attached to the latter, any vibrations transmitted through said supporting arms will be intercepted and absorbed by said vibration absorbing or dampening elements before they can reach the carrying panel or frame, and consequently noise, due to such vibration, that would otherwise be transmitted to and radiated from the carrying panel or frame surfaces, and amplified by the sounding board effect of the latter, is substantially silenced, thus assuring desired quiet operation of the motor driven ventilating fan.

Having now described my invention, I claim:

1. In means to support a motor driven fan from its carrying panel including a plurality of radial sheet metal supporting arms, each supporting arm comprising a main body of V-shape cross-section disposed in inclined extension between the carrying panel and the fan motor and having means to rigidly attach its inner end to the fan motor, means to attach the outer end of the supporting arm to the carrying panel, said latter means comprising a resilient cushioning body of substantial thickness affixed to and through the carrying panel, said cushioning body having an axial slot extending therethrough, the outer end portion of said main body of the supporting arm being formed to provide a stop shoulder to abut the rearward face of said cushioning body, a flat foot piece angularly projecting beyond said stop shoulder to extend forwardly through the slot of the cushioning body, and keeper means affixed to the freely projecting end portion of said foot piece and adapted to abut the forward face of the cushioning body, whereby to clamp said outer end portion of the supporting arm to the cushioning body.

2. In means to support a motor driven fan from its carrying panel according to claim 1, wherein the keeper means comprises a keeper plate superposed upon the projecting end portion of the foot piece, said keeper plate having a right angularly extending flange at its inner end to engage the cushioning body, and said foot piece and keeper plate having cooperative means to secure the latter to the former.

3. In means to support a motor driven fan from its carrying panel according to claim 1, wherein the keeper means comprises a keeper plate superposed upon the projecting end portion of the foot piece, said keeper plate having a right angularly extending flange at its inner end to engage the cushioning body, said keeper plate having oppositely extending clenching lugs struck out therefrom, said foot piece having an opening therein through which said clenching lugs project, and the free end portions of said clenching lugs being clenched over opposite margins of said opening into interlocked engagement with said foot piece.

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