

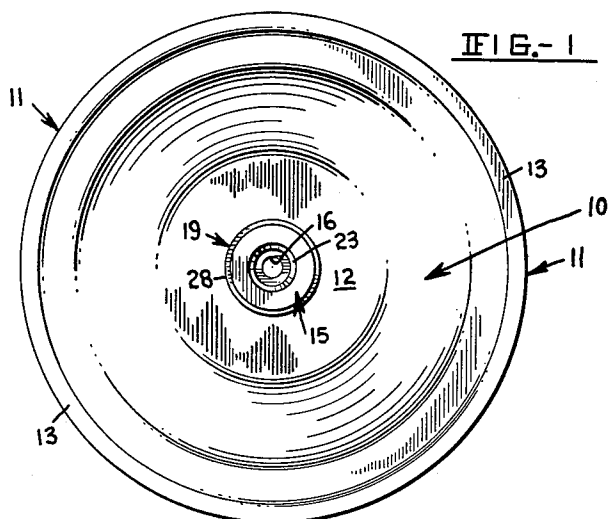
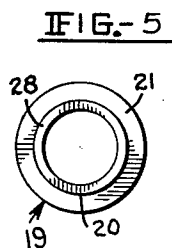
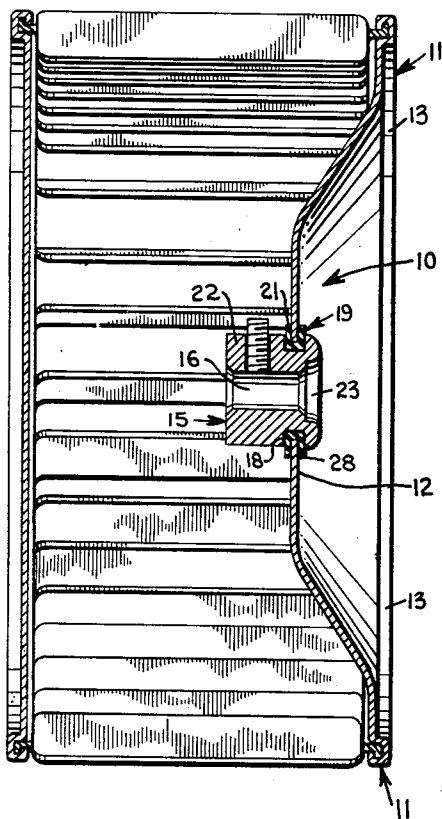
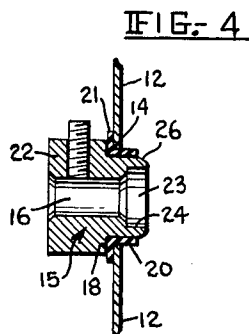
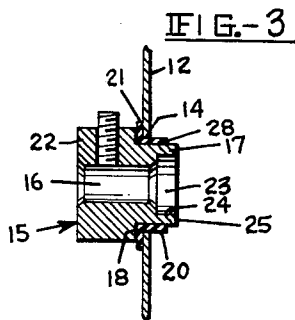
May 5, 1964

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3,131,468

METHOD OF CUSHION MOUNTING A HUB ON A BLOWER WHEEL

Filed April 30, 1963



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3,131,468

METHOD OF CUSHION MOUNTING A HUB ON
A BLOWER WHEEL

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Filed Apr. 30, 1963, Ser. No. 276,739
3 Claims. (Cl. 29—436)

This invention relates to a method of providing a mounting for a blower wheel having a back plate carrying a hub for mounting on a driving shaft. The invention is particularly concerned with means for absorbing vibrations of the wheel when rotating so as to give as nearly a soundless operation as possible. Even with the best procedure in balancing the wheel, there may still be a slight imbalance of the wheel when finally assembled and mounted.

It is the primary purpose of this invention to provide a method of assembling a cushion intermediate the back plate and the driving hub, this cushioning being accomplished in a very simple manner resulting in effect a grommet receiving the marginal opening through the back plate through which the hub is carried and the grommet itself being carried by the hub all without having to manipulate the grommet in its final state to have it receive that margin of the back plate.

A primary object of the invention is to provide a method of mounting the back plate on the driving hub in a manner which lends itself to quantity production of the device with a minimum amount of hand work.

A further primary object of the invention is to provide a firm resilient securing of the back plate on the driving hub so as to retain the blower wheel in balance dynamically as well as statically throughout long years of usage.

These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description of one particular form of the invention which is illustrated in the accompanying drawing, in which:

FIG. 1 is a view in rear elevation of a blower having a back plate;

FIG. 2 is a diametrical section on a greatly enlarged scale through the blower wheel;

FIG. 3 is a detail in diametrical section longitudinally through the wheel driving hub and an initial step in the operation of the invention;

FIG. 4 is a like view in longitudinal diametrical section with the projecting end of the driving hub in slightly modified form; and

FIG. 5 is a plan view of a cushion member.

Taking a blower wheel as illustrated in FIGS. 1 and 2 as a practical example to which the invention is applied, there is a back plate 10 in the wheel which is generally designated by the numeral 11. This back plate in the present form illustrated is dish to have a central area portion 12 in a plane normal to the axis of rotation of the wheel 11, and the plane of this area 12 is spaced innerly within the wheel 11 a distance beyond the plane of the back edge 13 of the wheel. This shaping of the back plate 10 is common and is employed to give stability to the wheel 11.

The center of the plate area 12 has a circular opening therethrough defined by a margin 14. This margin defines the circular opening which is centered on the horizontal, driving axis of the wheel 11.

A mounting hub 15 is provided to have a central bore 16 therethrough to receive a driving shaft (not shown). The hub 15 is provided with a reduced diameter pilot portion 17 having a diameter less than that of the margin

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14. The junction of this reduced portion 17 with the main body of the hub 15 provides a shoulder 18 therearound.

A resilient circular member generally designated by the numeral 19 has a cylindrical length 20 with an external diameter substantially equal to the diameter of the margin 14. This cushion member 19 has an annular flange 21 turned radially from the cylindrical portion 20 having an external diameter approximately equal to or slightly exceeding the diameter of the major portion 22 of the hub 15. The internal diameter of the cylindrical portion 20 is substantially equal to the external diameter of the hub portion 17.

The length of the hub portion 17 is such that it will receive therearound the member 19 to have the flange 21 abut the shoulder 18 and have a length of the cylindrical portion 17 extend beyond the edge 23 of the member portion 20, FIG. 3. The outer end portion of the cylindrical part 17 of the hub 15 is counterbored as at 23 to provide a wall 24 of thinner radial thickness than is the radial thickness of the body portion 22 through which the shaft as above indicated is received and secured.

The thin wall 24 of the outer end portion of the part 17 is provided so that it may be spun around outwardly to curl the extending portion of the member 20 against the back face of the wheel plate 12 as indicated in FIG. 2.

The outer edge portion 25 around the counterbore 23 may be left in a plane at right angles to the axis of the hub 15, or it may be provided with a radiused corner 26, FIG. 4, to facilitate the starting of the spinning action. However either the square corner form or the radiused corner form operate satisfactorily. In any event, the member 19 assumes the shape as indicated in FIG. 2 where a cross-section is of U-shape, and the entire member in that shape is compressed snugly to have the flange portion 21 compressed against the shoulder 18 and the up and back turned edge portion of the member 20 brought up compressively against the back plate 12, and at the same time the member 19 is compressed against the circumferential surface of the portion 17 of the hub 15 so that the plate 12 is held in a plane at right angles to the axis of the bore 16 and at the same time is held concentrically of that axis.

The material entering into the member 19 is resilient and elastic, and is capable of maintaining its compressed form without permitting the plate 12 to enter into the "wobbling" action. This material may be any one of the suitable plastics such as synthetic rubber and the like so long as it has the quality of dampening the sound or rather vibrations which may be conducted from the blading of the wheel 11 to the margin 14 of the back plate 12.

Therefore by this undue construction and method of operation, the resilient member 19 is applied to the hub 15 without having to employ hand manipulation, and the firm insulation of the plate 12 from the hub 15 which of course is made out of metal in the normal procedures, sound dampening is had.

While we have herein shown and described our invention in the one particular form, obviously structural changes may be employed without departing from the spirit of the invention, and we therefore do not desire to be limited to that precise form beyond the limitations which may be imposed by the following claims.

We claim:

1. The method of cushioning a driven member against vibration transmission to a driving hub having an annular shoulder, which method comprises

forming the hub with a tubular extension from the shoulder;

forming a cylindrical, resilient and elastic tubular mem-

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ber to have a radially outwardly extending collar; telescoping the tubular member over said hub extension collar first;

forming the driven member with a plate and a central hole therethrough of a diameter substantially the same as the external diameter of said tubular member;

placing the plate over the hub extension to have the tubular member extend through the plate hole and abut said collar; and

spinning the end of said hub extension around against the inner side of an end portion of said tubular member, turning that end portion radially outwardly from the hub extension and into compressive contact with said plate and urging the plate against said collar compressing it against said shoulder.

2. The method of assembling a driving hub having a tubular end portion, a length extending from the outer end of that portion to an annular outwardly extending abutment; a resilient tubular member with an external diameter less than the diameter of said abutment and an internal diameter approximately equal to the external diameter of said hub length, and an outwardly extending collar around one end, the overall length of the tubular member being approximately equal to said hub length; and a driven disc-like member having a hole therethrough of a diameter approximately equal to the external diameter of said tubular member, the driven member having a thickness adjacent the margin of its hole less than the length of said hub length; which method comprises telescoping the tubular member over the hub length and bringing the tubular member collar against said hub abutment;

placing the driven member on the tubular member to have it extend through the driven member hole and bear against said collar; and

flaring outwardly the hub tubular end portion into a flange, simultaneously folding the resilient tubular member end into an annular flange portion back and against the area of a portion of the driven member adjacent said hole forming the resilient tubular member to have a cross-section substantially U-shaped with said driven member being carried within the U-section and insulated from the hub abutment, the hub length, and compressively between said hub abutment and the hub flanged portion.

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3. The method of mounting a driven member on a hub for sound dampening purposes wherein there is a driven member having a plate with a central opening therethrough;

a driving hub having an axial bore therethrough; said hub having two external diameters, one less than the other and defining an annular shoulder therebetween;

a resilient cushion member having a cylindrical hollow length and an outwardly extending radial flange around one end of the member;

said method comprising telescoping said cushion member over said hub lesser diameter and having said flange abutting said shoulder;

positioning said driven member on said cushion member to have the cushion member extend through said driven member opening and therebeyond, providing a peripheral portion about said opening being in contact with said flange; and

flaring the hub end to form a flange thereon while simultaneously folding the end of the hollow length of the cushion member into an annular flange portion back and against the portion of the driven member adjacent the opening whereby the folded cushion member is held against the driven member under compression by the flange on the hub end;

said driven member being entirely insulated by said member from said hub.

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