

Sept. 25, 1956

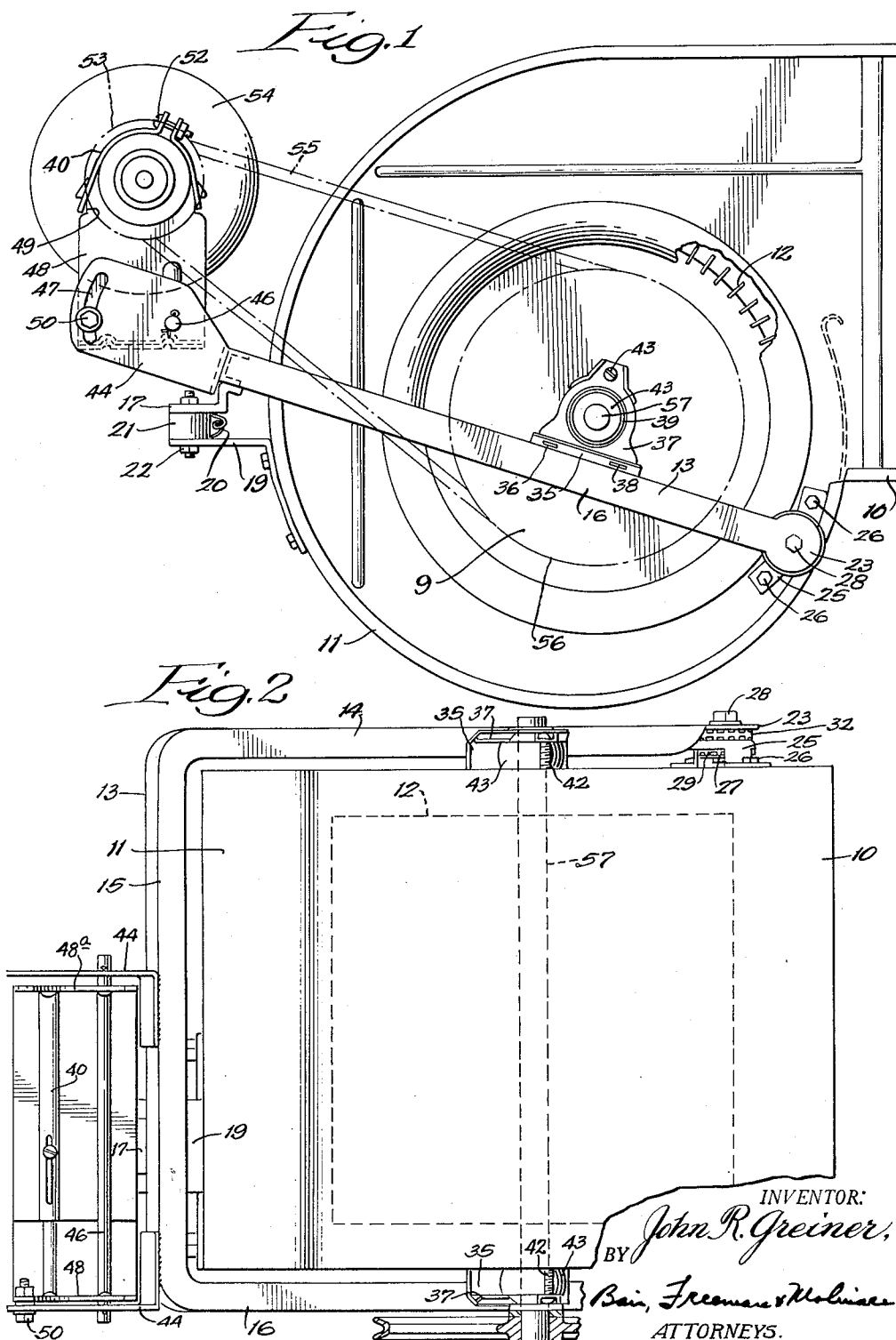
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BLOWER ASSEMBLY

Filed April 13, 1953

2 Sheets-Sheet 1



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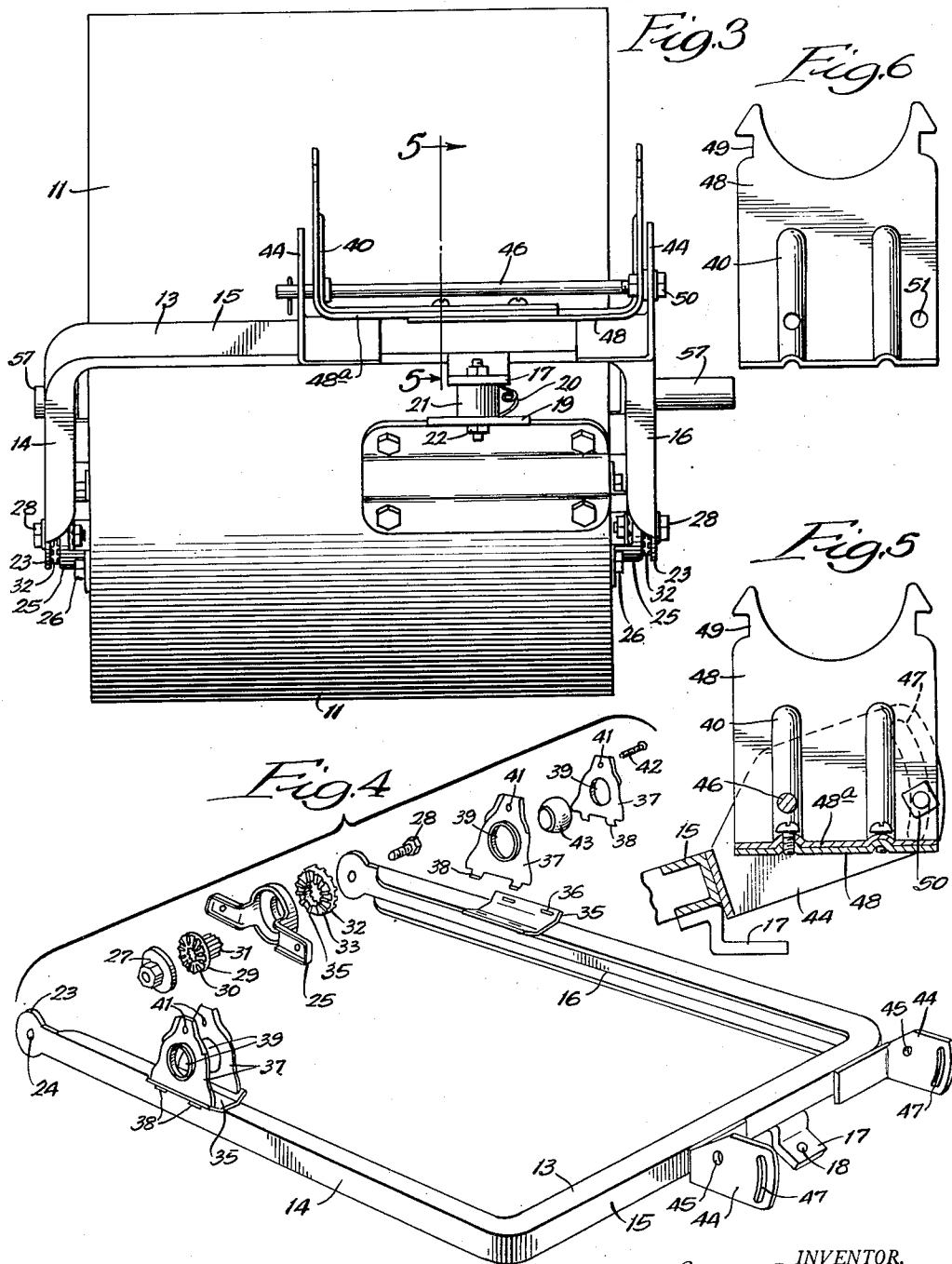
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2,764,341

BLOWER ASSEMBLY

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Application April 13, 1953, Serial No. 348,238

12 Claims. (Cl. 230—117)

This invention relates to a blower assembly, and particularly to the mounting of a blower and motor for driving the same. The invention is particularly applicable for furnace blowers, but is not necessarily limited thereto.

It is desirable to have furnace blowers as quiet as possible and it should be easy to install the driving motor on a furnace blower assembly. It must also be easy to adjust the belt tension properly while keeping the motor and blower shafts parallel. The usual blower assembly for furnaces incorporates brackets for the blower bearings that are rigidly anchored to the sides of the blower housing. Attempts have been made to embed such blower bearings in rubber or the like at the bearing socket or to float the entire supporting structure on rubber in some manner. The bracket supporting the blower bearings, however, is usually rigidly attached to the side of the blower housing.

Furthermore, the usual mounting for furnace blowers uses a steel saddle bar on the back of the blower housing which is hinged thereto. A steel motor base extends out from the saddle bar to support the motor. A threaded leg at the rear of the motor base pushes against the top of the blower housing with a rubber foot at the bottom of the adjustable leg. Such a furnace blower assembly is noisy and it is difficult to adjust the proper belt tension while maintaining shaft parallelism.

It is an object of the invention to provide a blower assembly which results in extremely quiet operation.

It is another object of the invention to provide a blower assembly, including a driving motor, in which the position of the motor may be adjusted to obtain proper belt tension, while retaining the shafts of the motor and blower in substantial parallelism.

It is a further object of the invention to provide a blower assembly mounting in which the main weight of the assembly is carried by a heavily loaded resilient means adjacent the horizontal center of gravity of the assembly.

It is also an object of the invention to provide an improved mounting for the blower itself, which is very simple and results in quiet operation in a blower assembly.

It is an additional object of the invention to take advantage of the gyroscopic effect of the blower and driving motor of a blower assembly to obtain a quiet operating unit.

It is another object of the invention to provide a motor base which is adjustable to motors of different lengths and it is also an object of the invention to provide a motor mounting for a blower assembly in which the motor is mounted on a hinged base which may be locked in position with one bolt.

It is a further object of the invention to provide a simplified bearing bracket for the blower.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set

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forth, pointed out in my claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view of the improved mounting for a blower assembly;

5 Figure 2 is a top view of the blower assembly without the driving motor;

Figure 3 is a side view of the blower assembly;

10 Figure 4 is a perspective view of the mounting frame for the blower assembly with certain parts exploded for the sake of clarity;

Figure 5 is a sectional view taken on the line 5—5 of Figure 3; and

Figure 6 is a detail view of the platform for the motor.

Referring specifically to the drawings for a detailed description of the invention, numeral 11 designates a conventional blower housing having an inlet 9 to the blower and an outlet 10 therefrom. The blower housing is of volute shape as shown in Figure 1. The blower is shown at 12 and is of the conventional Sirocco type.

20 The main frame of the improved mounting is designated generally by numeral 13 and is preferably formed from U-shaped stock to provide side legs 14 and 16 and a cross leg 15. An S-shaped bracket 17 is welded to the cross leg 15, as best shown in Figure 4, and is provided with an aperture 18. A relatively heavy bracket 19 is preferably bolted to the blower housing 11 and at least one rubber cushion connector, and preferably two cushion connectors, each comprising a block 21 of rubber or similar material is positioned between the flanges 17 and 19 by a nut and bolt assembly 22. A ground wire 20 also extends between the flanges 17 and 19.

30 Ears 23 are formed in the free ends of legs 14 and 16 of the frame 13 and are provided with apertures 24. Brackets 25 are secured to the sides of the blower housing by bolts 26. The ends of the frame 13 are secured to the blower housing and are provided with a rubber mounting so that vibrations will be absorbed. Such mounting comprises a nut and washer assembly 27, a pair of rubber grommets 29 and 32, and a bolt 28. The rubber grommet 29 has rubber protuberances 30 on one face thereof and has rubber ridges 31 formed externally thereof. The rubber grommet 32 has rubber teeth 33 formed thereon which are adapted to slide over the ridged portion 31 of grommet 29. Grommet 32 is also provided with rubber protuberances 34 on both faces thereof. Both the grommets 29 and 32 are provided with central openings there-through and when the bolt 28 is screwed onto the nut and washer assembly 27 with the grommets 29 and 32 therebetween and with the portion 31 of grommet 29 extending through the central opening in bracket 25, the ends of the frame 13 are resiliently supported or cushioned from the blower housing 11.

45 Intermediate of the legs 14 and 16 are brackets 35 which are preferably secured to the legs 14 and 16. The brackets 35 are provided with four slots 36 in upturned edges of the brackets. A pair of bearing supporting plates 37 are provided for each of the blower bearings and are formed with tabs 38 which are inserted in the slots 36. The bearing plates 37 are also provided with central apertures 39 and with threaded holes 41 through which a bolt 42 extends. A bearing member 43 is preferably spherical in outside shape and is adapted to be retained between the plates 37 and extend into the apertures 39. It will be noted that the blower bearing assembly is very simple and alignment is insured by merely loosening the bolt 42 and permitting the member 43 to adjust itself to the position of a blower shaft 57.

50 As best shown in Figure 4, generally L-shaped flanges 44 are preferably secured to the cross leg 15 and the flange 17 is positioned approximately centrally thereof. Flanges 44 are provided with apertures 45 and with arcuate slots 47.

A motor supporting structure is made up of a U-shaped member 48 and a corresponding U-shaped member 48a. If desired, the members 48 and 48a may be provided with corrugations 40 to strengthen them. Each of the members 48 and 48a are provided with recesses 49 at the upper extremities thereof. Straps 40 are adapted to hook onto the recesses 49 and be retained together by a nut and bolt assembly 52 in order to retain a motor 54 on the supports 48 and 48a. The motor 54 is provided with a pulley 53 which drives the usual V-belt 55 and the blower 12 is provided with a pulley 56 which is driven by the belt 55.

The motor frame members 48 and 48a are rotatably supported on a rod 46 extending between the upturned portions of the members 48 and 48a. Rod 46 is supported in the openings 45 in flanges 44. A circular opening 51 is provided in the lower upturned portions of the members 48 and 48a in alignment with the arcuate slots 47 in the flanges 44. A nut and bolt assembly 50 is adapted to pass through one of such openings 51 at one of the arcuate slots 47 to properly position the rotatable motor supports 48 and 48a. A bolt assembly 50 is required on one side only of the motor 54.

With the above described construction, the moving parts, that is, the motor 54 and the blower 12, are mounted onto a rigid steel channel structure 13 and this entire assembly is then resiliently connected to the blower housing 11. By mounting all of the moving parts onto a comparatively rigid channel 13, a semi-gyroscopic effect is obtained from the rotor (not shown) of the motor 54 and the blower 12. These two rotating members tend to resist direction change and as a result the frequency of the vibrations in the entire structure of moving parts is lowered to the point where such vibrations may be successfully isolated from the sheet metal blower housing to which the assembly attaches. This is one reason for the quietness of the structure described.

A second important reason for the outstanding quietness of the described assembly lies in the application of the rubber cushion connector 21 approximately under the center of gravity of the entire superstructure containing the moving parts. As best shown in Figure 1, the rubber connector 21 beneath the motor 54 is somewhat on the blower side of the center of gravity of the motor itself. The blower 12 and blower shaft 57 are lighter in weight than the motor 54 so that the location shown for the rubber cushion 21 is approximately in the center of gravity of the entire superstructure. Preferably, one standard type of rubber connector 21 is utilized on assemblies for various size motors, such as one-sixth or one-quarter horsepower, and the rubber connector 21 is very heavily loaded so that it operates at its peak efficiency in isolating vibrations. In the usual type of blower assemblies heretofore known, rubber used for isolating vibrations was not loaded heavily enough to enable the rubber to reach its maximum efficiency in vibration damping.

The cushion mounting at the ends of the frame 13 provides equal efficiency for loads in all directions. The front cushion mountings carry only a very light load and their purpose is to position and steady the entire assembly, with the major load being carried on the connector 21.

The motor base 48—48a is adjustable to motors of different lengths and, as described before, is hinged onto the motor brackets 44 which are rigidly attached to the frame 13. One bolt assembly 50 locks the motor base 48—48a in any desired position for proper belt tension. For adjusting belt tension the one bolt is loosened and the hinged base 48—48a will rotate back and forth, maintaining parallelism in the motor and blower shafts. The motor pulley 53 is of standard adjustable pitch diameter type so that the blower speed may be regulated. The process of adjusting belt tension is made very simple since belt tension must be readjusted every time the blower speed is adjusted.

The fact that the blower bearings are made up by a

spherical jacket 43 which is held in position between two bearing plates 37 which hook onto the bearing brackets 35, forms a very simple construction. One small bolt 42 through the top of the bearing brackets 37 anchors the bearing assembly into position. Loosening the bolt 42 permits the spherical bearing member 43 to float into correct alignment with the shaft 57 and tightening of the bolt 42 locks the spherical member 43 permanently into the correct position.

From the foregoing, it will be apparent that the use of the main supporting rubber cushion connector 21 approximately underneath the center of gravity of the entire assembly of moving parts is important to the quietness of operation of the blower. The hinged motor base which allows a simple adjustment of belt tension while always maintaining perfect parallelism between the motor and blower shafts is a very desirable feature. Furthermore, the bearing clamps are of simple and self-aligning construction.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. A blower assembly comprising a blower having a driving shaft, a housing surrounding the blower having an air inlet and outlet therein, an electric motor for driving the blower, a drive means connecting the motor and the blower, a substantially U-shaped rigid frame member encompassing a portion of the blower housing, means for connecting the ends of the legs of the frame member to the blower housing, a bearing for each end of the blower shaft, opposed bearing supports for said bearings on the side legs of the frame member, a supporting structure for said motor, means for connecting the motor supporting structure to the cross leg of the frame member, and resilient means between the blower housing and the cross leg of the frame member for supporting the major portion of the weight of the motor, motor supporting structure, frame member and blower.

2. A blower assembly comprising a blower having a driving shaft, a housing surrounding the blower having an air inlet and outlet therein, an electric motor for driving the blower, a drive means connecting the motor and the blower, a substantially U-shaped rigid frame member encompassing a portion of the blower housing, resilient means for connecting the ends of the legs of the frame member to the blower housing, a bearing for each end of the blower shaft, opposed bearing supports for said bearings on the side legs of the frame member, a supporting structure for said motor, means for connecting the motor supporting structure to the cross leg of the frame member, and resilient means between the blower housing and the cross leg of the frame member for supporting the major portion of the weight of the motor, motor supporting structure, frame member and blower.

3. A blower assembly comprising a blower having a driving shaft, a housing surrounding the blower having an air inlet and outlet therein, an electric motor for driving the blower, a drive means connecting the motor and the blower, a substantially U-shaped rigid frame member encompassing a portion of the blower housing, means for connecting the ends of the legs of the frame member to the blower housing, a bearing for each end of the blower shaft, opposed bearing supports for said bearings on the side legs of the frame member, a supporting structure for said motor, means for connecting the motor supporting structure to the cross leg of the frame member, and resilient means between the blower housing and the cross leg of the frame member for supporting the major portion of the weight of the motor, motor supporting structure, frame member and blower,

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member encompassing a portion of the blower housing, means for connecting the ends of the legs of the frame member to the blower housing, a bearing for each end of the blower shaft, opposed bearing supports for said bearings on the side legs of the frame member, a supporting structure for said motor, means for rotatably connecting the motor supporting structure to the cross leg of the frame member, whereby the motor may be adjusted relative to the blower shaft, and resilient means between the blower housing and the cross leg of the frame member for supporting the major portion of the weight of the motor, motor supporting structure, frame member and blower.

12. A blower assembly comprising a blower having a driving shaft, a housing surrounding the blower having an air inlet and outlet therein, an electric motor for driving the blower, a drive means connecting the motor and the blower, a substantially U-shaped rigid frame member encompassing a portion of the blower housing, means for connecting the ends of the legs of the frame member to the blower housing, a bearing for each end

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of the blower shaft, opposed bearing supports for said bearings on the side legs of the frame member, a supporting structure for said motor, means for rotatably connecting the motor supporting structure to the cross leg of the frame member, whereby the motor may be adjusted relative to the blower shaft, resilient means between the blower housing and the cross leg of the frame member for supporting the major portion of the weight of the motor, motor supporting structure, frame member and blower, and means for locking the motor supporting structure in position.

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