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(19) **United States**(12) **Patent Application Publication****Liang**(10) **Pub. No.: US 2007/0154300 A1**(43) **Pub. Date:****Jul. 5, 2007**(54) **FAN VIBRATION ABSORBER DEVICE**

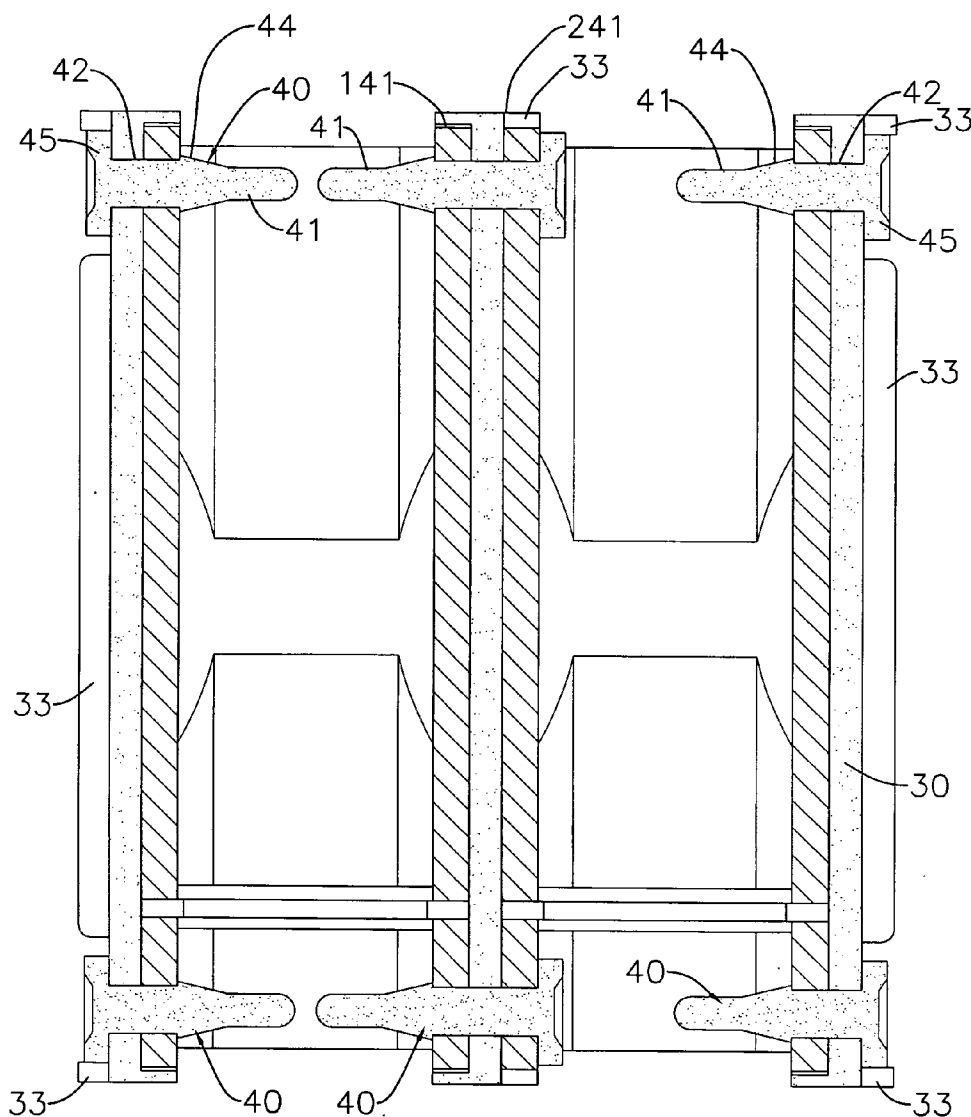
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ABSTRACT(76) Inventor: **Chien-Fa Liang**, Chung-Ho City (TW)

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A fan vibration absorber device comprising: left side fans; right side fans; rectangular connecting frames of equal thickness affixed to front and rear side walls of the left and right fans respectively, and through holes are defined in four corners of each of the connecting frames; flexible pads, which are joined to the rectangular connecting frames of the left and right side fans; flexible pins, each of which have a neck portion of relatively small diameter and an insert end, the flexible pins respectively insert into connecting holes of the flexible pads and through holes of the left and right side fans, wherein the neck portions clamp position within the through holes. The present invention is applicable for use in host computer cases or power supply devices to effectively reduce transmission of vibrational torque of the fans, and lower noise output therefrom



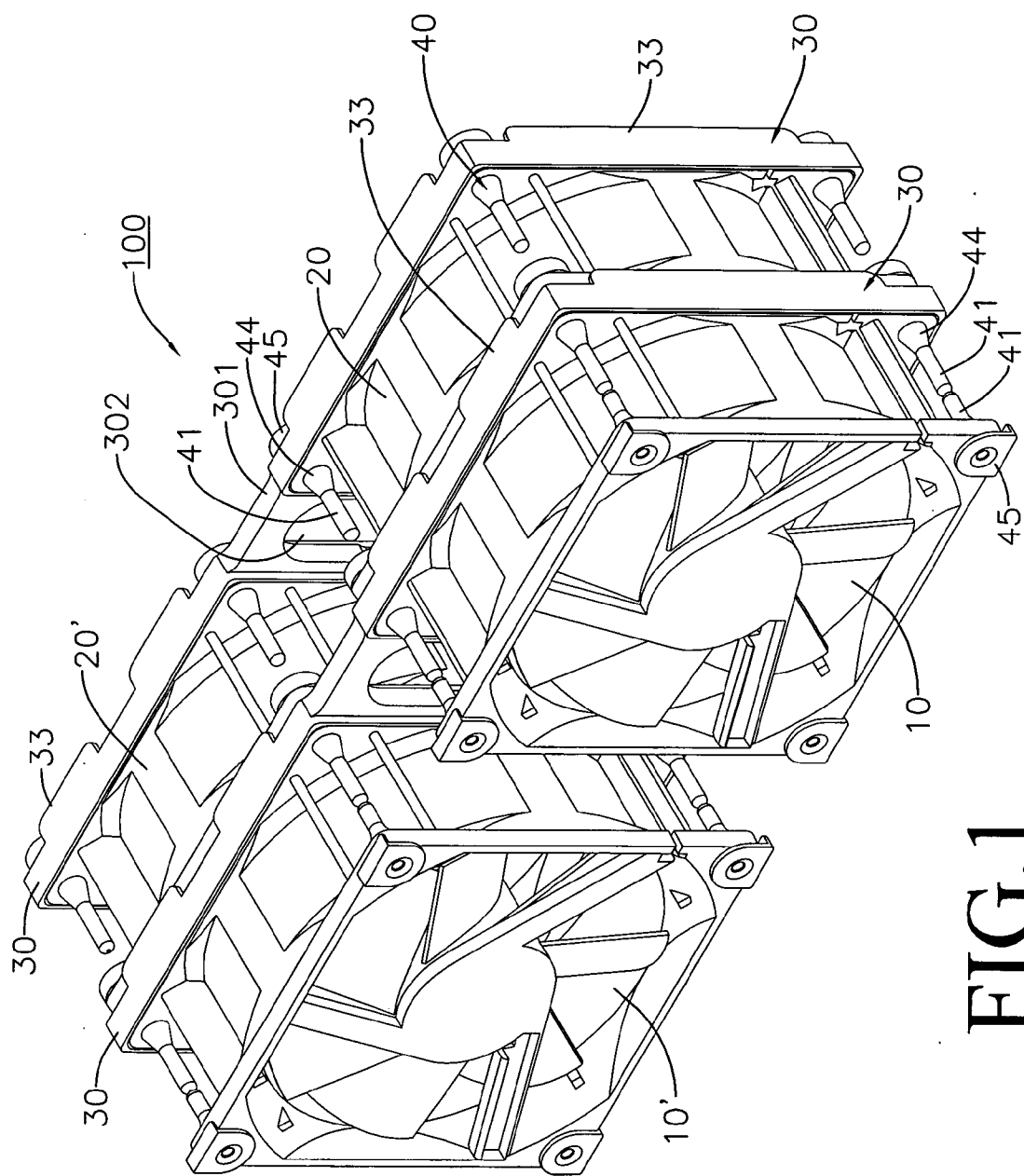


FIG.1

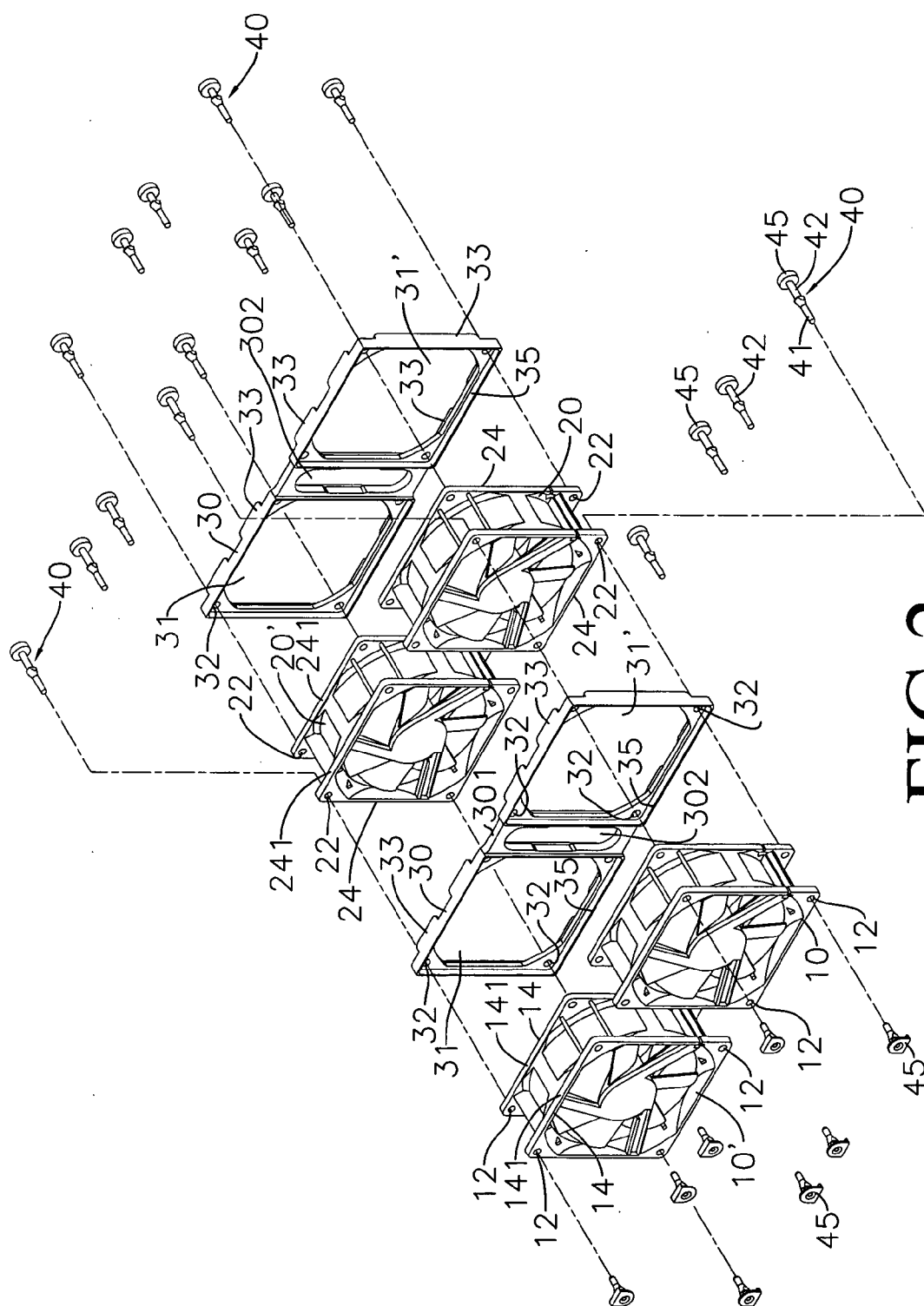


FIG. 2

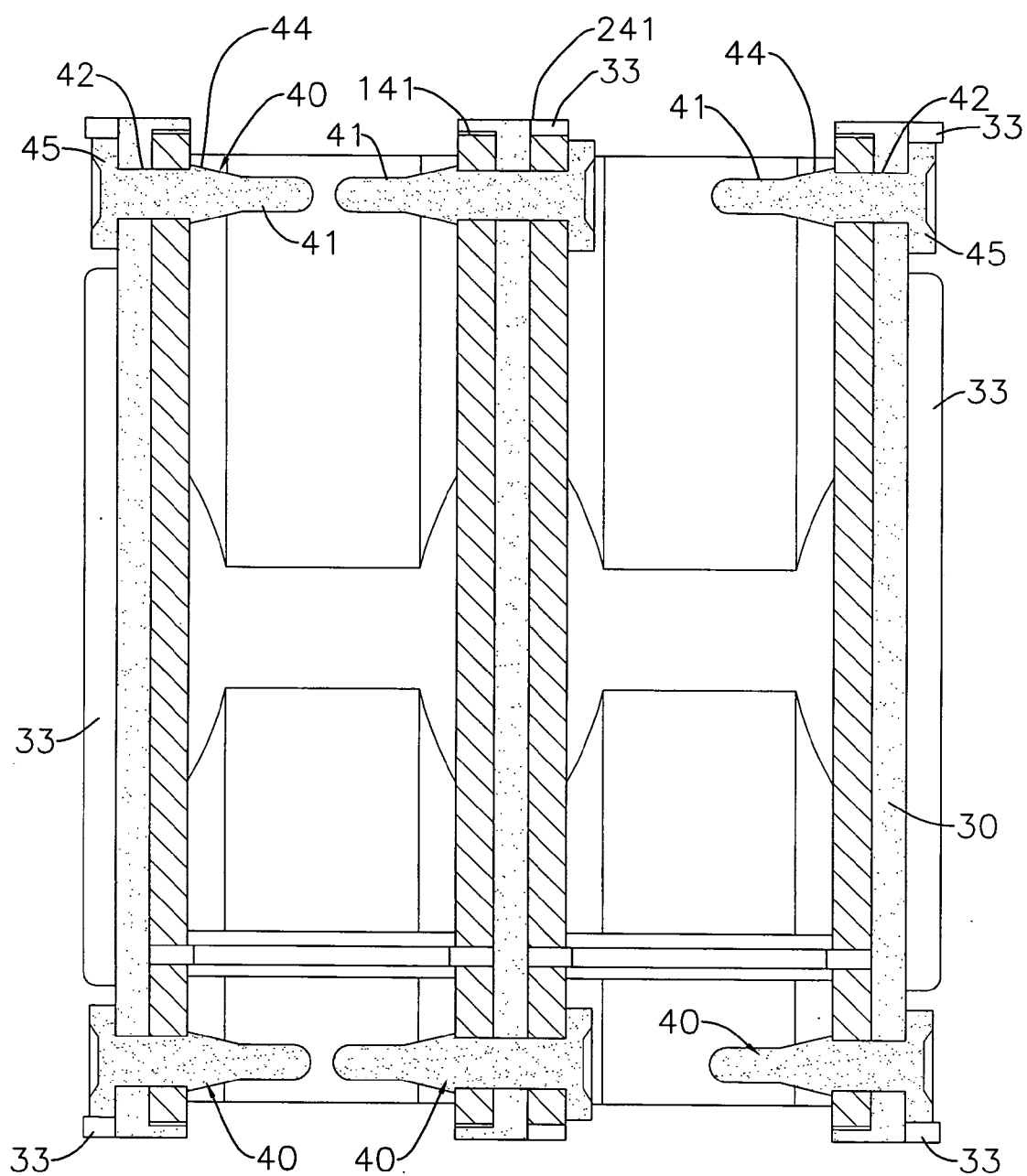


FIG.3

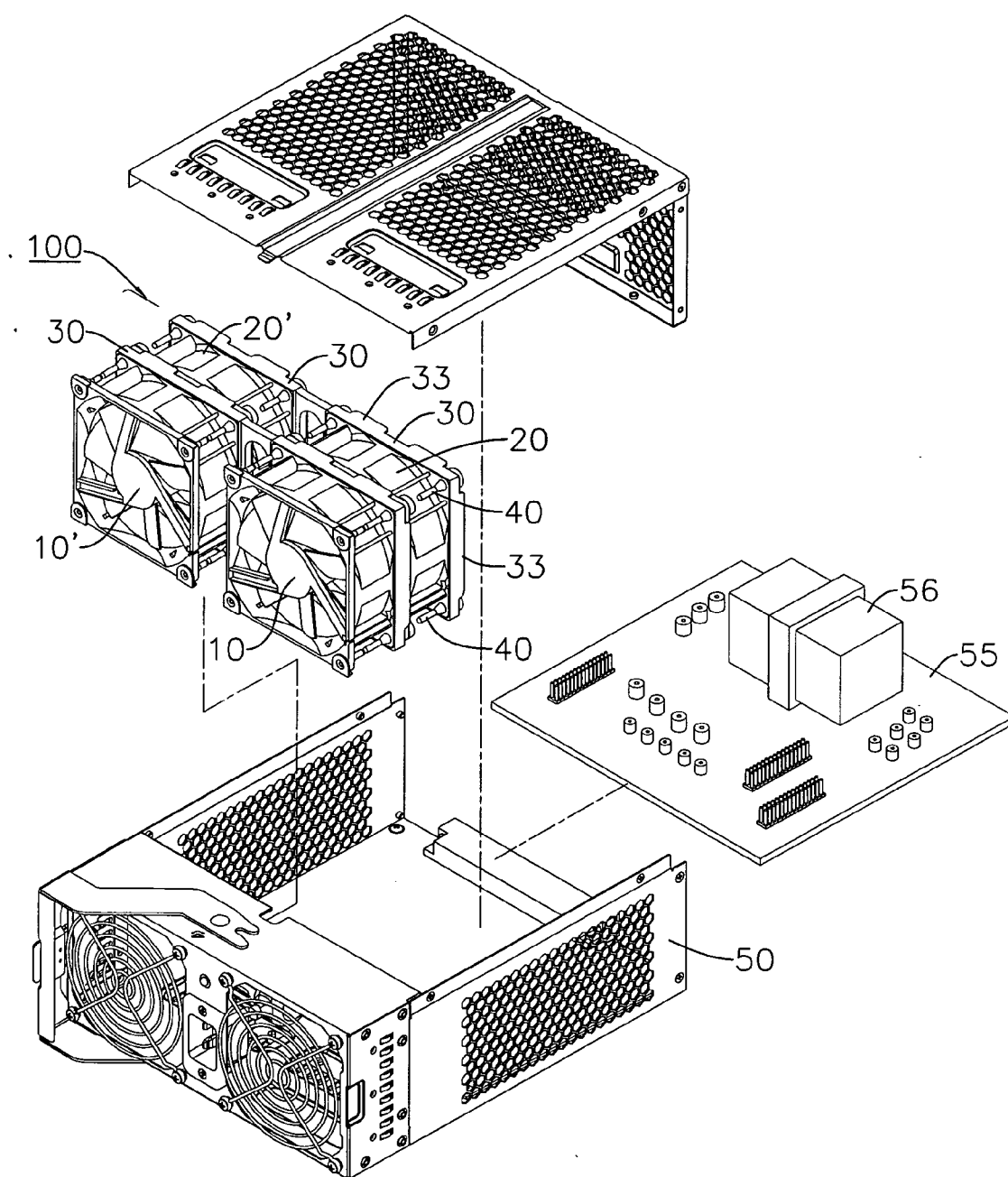


FIG.4

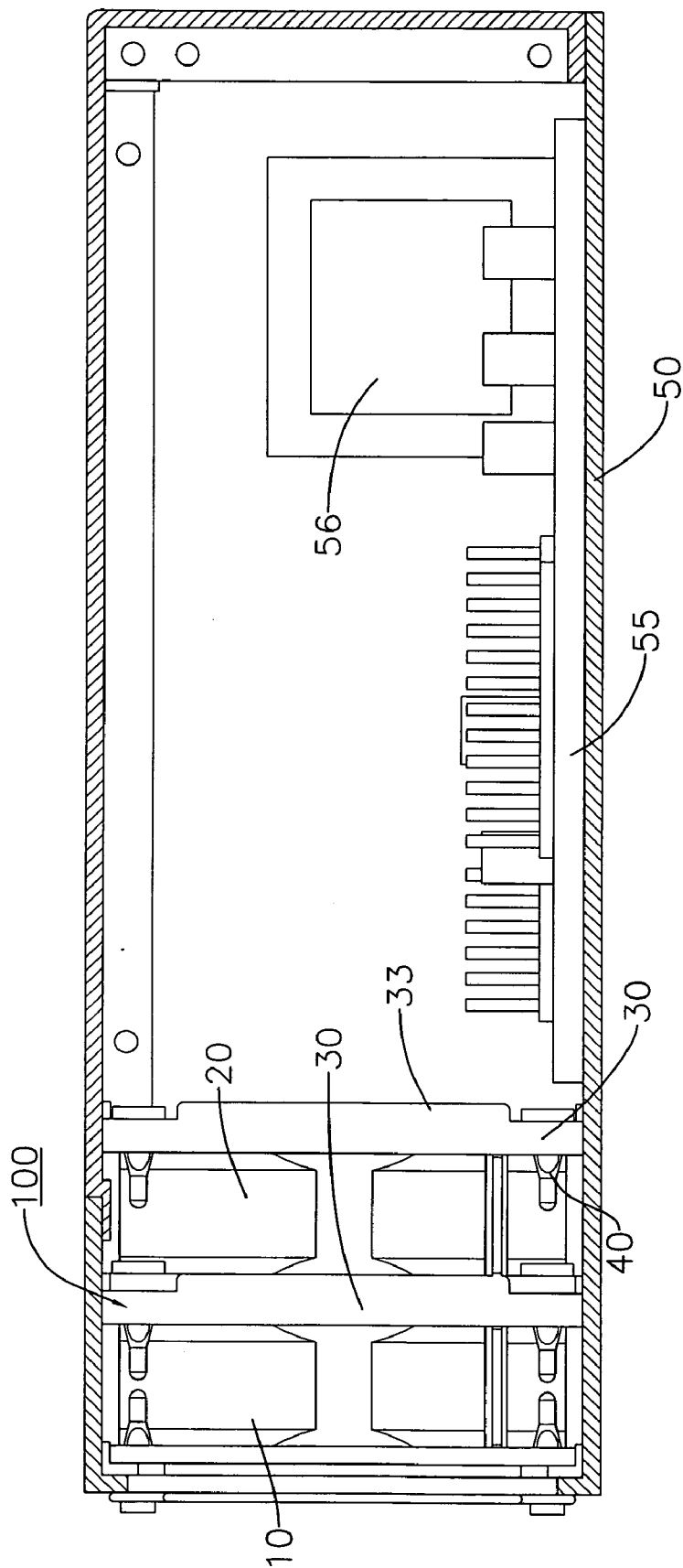


FIG. 5

FAN VIBRATION ABSORBER DEVICE

BACKGROUND OF THE INVENTION

[0001] (a) Field of the Invention

[0002] The present invention relates to a fan vibration absorber device, and more particularly to a fan vibration absorber device that effectively reduces transmission of vibrational torque of fans, and lowers noise output therefrom.

[0003] (b) Description of the Prior Art

[0004] Air convection produced by high speed rotation of heat dissipating fans conventionally used in computer power supply devices or host computers achieves the objective of dissipating heat from the electronic components.

[0005] However, when the fans are rotating, torque produced by the fan blades is transmitted to a support body of the host computer, circuit boards or the case of the computer power supply device. Moreover, the high vibration and noise produced after the fan blades have been rotating for a long period of time also cause loosening of connecting bolts on the support body or case.

[0006] Thus, it is a feature of the present invention to provide a fan vibration absorber device that overcomes the aforementioned shortcomings of prior art.

SUMMARY OF THE INVENTION

[0007] A primary objective of the present invention is to provide a fan vibration absorber device that is able to reduce vibrational moment of fans and lower noise output in a host computer case or a power supply device.

[0008] To enable a further understanding of said objectives and the technological methods of the invention herein, brief description of the drawings is provided below followed by detailed description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 shows an elevational view according to the present invention.

[0010] FIG. 2 shows an exploded elevational view according to the present invention.

[0011] FIG. 3 shows a cross-sectional schematic view depicting three pads assembled according to the present invention.

[0012] FIG. 4 shows an exploded elevational view depicting the present invention assembled and installed in a case.

[0013] FIG. 5 shows a cross-sectional schematic view depicting the present invention assembled and installed in a case.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] Referring to FIGS. 1 and 2, which show an elevational view of two pads 30 assembled to four fans and an exploded view of the present invention respectively. The fan vibration absorber device of the present invention comprises:

[0015] two or more left side fans 10, 10';

[0016] two or more right side fans 20, 20';

[0017] rectangular connecting frames 14, 24 of equal thickness affixed to front and rear side walls of the left and right fans 10, 10', 20, 20' respectively, and through holes 12, 22 are defined in four corners of each of the connecting frames 14, 24 respectively;

[0018] two or more flexible pads 30 respectively having hollow portions 31, 31', and connecting holes 32 are respectively defined in four corners positioned at outer sides of the hollow portions 31, 31', the flexible pads 30 are joined to the rectangular connecting frames 14, 24 of the left and right side fans 10, 10', 20, 20' respectively;

[0019] flexible pins 40, each of which have a neck portion 42 of relatively small diameter and an insert end 41, and the flexible pins 40 respectively insert into the connecting holes 32 of the flexible pads 30 and the through holes 12, 22 of the left and right side fans 10, 10', 20, 20' respectively.

[0020] Referring to FIGS. 1 and 2, the flexible pads 30 and the pins 40 are fabricated from rubber material, and a protruding piece 33 extends from one side of each of the flexible pads 30.

[0021] A front end of the neck portion 42 of each of the pins 40 assumes a tapered form 44, and a rear wall 45 of relatively large surface area is formed at a rear end of the neck portion 42 (see FIG. 3).

[0022] The flexible pads 30 have concave surfaces 35 that cover and join to outer surfaces 141, 241 of the connecting frames 14, 24 respectively.

[0023] Referring to FIGS. 1 and 2, wherein the flexible pads 30 have two or more of the hollow portions 31, 31'. A connecting member 301 connects the adjacent hollow portions 31, 31', and a through hole 302 is defined in each of the connecting members 301. Two adjacent sides of the flexible pads 30 respectively adjoin the pair of left side fans 10, 10' and the pair of right side fans 20, 20';

[0024] The neck portion 42 of each of the pins 40 penetrates the through holes 22, 12 of the right side fans 20, 20' and the left side fans 10, 10' respectively and the respective connecting holes 32 of the flexible pads 30, thereby positionally fixing the structural configuration of an embodiment of the present invention.

[0025] Referring to FIGS. 4 and 5, wherein an inner surface of each of the protruding pieces 33 respectively covers and joins to surfaces of the connecting frames 14, 24 of the left side fans 10, 10' and the right side fans 20, 20'.

[0026] Referring to FIGS. 4 and 5, wherein an assemblage 100 of the left side fans 10, 10' and the right side fans 20, 20', the flexible pads 30 and the pins 40 is securely installed within a case 50 that serves as an outer case for a power supply device.

[0027] Referring to FIGS. 1 and 2, which show an elevational view and an exploded elevational view of an assembly of four fans respectively, including left fans 10, 10' and right fans 20, 20'. The fans 10, 10' and 20, 20' are provided with two quadrilateral connecting frames 14, 24 respectively. An embodiment of the present invention comprises at least more than one rubber pad 30, with a preferred

embodiment having a configuration including three pads **30**, each of which can be designed with a connecting member **301** according to needs. The connecting member **301** and the pad **30** are formed as an integrated body that provides a resiliently deformable characteristic to the configuration when subjected to a force, and reciprocal connecting of the two sets of adjacent left fans **10**, **10'** and the two sets of adjacent right fans **20**, **20'**, along with resilient deformability of the connecting members **301**, enable mutual displacement. Moreover, in order to facilitate assembling an assemblage **100** at different relative positions interior of a case **50**, hollow portions **31**, **31'** are defined in the pads **30** to correspond to air inlets or air outlets of the fans **10**, **20**, **10'**, **20'** respectively.

[0028] Referring to FIG. 3, insert ends **41** and tapered forms **44** of pins **40** insert and penetrate through holes **12**, **22** of the left side fans **10**, **10'** and the right side fans **20**, **20'** respectively. A neck portion **42** of relatively small external diameter of each of the pins **40** tightly fits into the through holes **12**, **22**. Wall surfaces of relatively large diameter of the tapered forms **44** abut against wall surfaces rims of the through holes **12**, **22**. A rear wall **45** of relatively large surface area of each of the pins **40** can be of circular form or rectangular form, and the surface of the rear wall **45** abuts against wall surface rims of other ends of the through holes **12**, **22**.

[0029] Concave surfaces **35** of the pads **30** cover and join to surfaces **141**, **241** of the connecting frames **14**, **24** respectively, and the connecting frames **14**, **24** of the left and right side fans **10**, **10'**, **20**, **20'** covered and positioned on the flexible and vibration-absorbing pads **30** enable the entire assemblage **100** to be securely installed within the case **50**. Moreover, all contact surfaces between the assemblage **100** and the case **50** have one of the pads **30** disposed therebetween. Hence, the greater part of the torque produced by the high speed rotation of the left and right fans **10**, **10'**, **20**, **20'** is equally absorbed by the pads **30**, thereby achieving vibration-absorbing effectiveness and substantially reducing the vibrational torque on the assemblage **100** assembled in the case **50**, and, thus, preventing loosening of screw component members interior of the case **50** (such as bolts), and lowering noise produced by vibration.

[0030] Referring to FIGS. 4 and 5, which depict the assemblage **100** being installed within the case **50** and the assemblage **100** securely installed within the case **50** respectively. A circuit board **55** with an electronic component member **56** (such as a transformer) fixedly soldered thereon is installed within the case **50**. Because of the pads **30** disposed between all contact surfaces between inner surfaces of the case **50** and the assemblage **100**, thus, the pads **50** absorb vibrational force of the torque produced when the fans **10**, **10'**, **20**, **20'** are rotating, thereby substantially reducing vibrational force transmitted to the case **50**.

[0031] At least more than one of the pads **30** is connected to the plurality of fans **10**, **10'**, **20**, **20'**, the number of pads **30** being determined by operating requirements.

[0032] In conclusion, objectives achieved by the characteristics of the present invention, uniqueness and advancement of the present invention clearly comply with essential

elements as required for a new patent application. Accordingly, a new patent application is proposed herein.

[0033] It is of course to be understood that the embodiments described herein are merely illustrative of the principles of the invention and that a wide variety of modifications thereto may be effected by persons skilled in the art without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A fan vibration absorber device comprising:

at least more than one left side fan;

at least more than one right side fan;

rectangular connecting frames of equal thickness affixed to front and rear side walls of the left and right fans respectively, and through holes are defined in four corners of each of the connecting frames;

at least more than one flexible pad having hollow portions, and connecting holes are respectively defined in four corners positioned at outer sides of the hollow portions, the flexible pads are joined to the rectangular connecting frames of the left and right side fans;

flexible pins, each of which have a neck portion of relatively small diameter and an insert end, and the flexible pins respectively insert into the connecting holes of the flexible pads and the through holes of the left and right side fans; the neck portions clamp position within the through holes.

2. The fan vibration absorber device according to claim 1, wherein the pads and the pins are fabricated from rubber material, and a protruding piece extends from one side of each of the pads.

3. The fan vibration absorber device according to claim 1, wherein the front end of the neck portion of each of the pins assumes a tapered form.

4. The fan vibration absorber device according to claim 1, wherein the flexible pads have concave surfaces that cover and join to outer surfaces of the connecting frames.

5. The fan vibration absorber device according to claim 1, wherein each of the flexible pads has two or more of the hollow portions, a connecting member connects the adjacent hollow portions, and a through hole is defined in the connecting member;

two adjacent sides of the flexible pads respectively adjoin the pair of left side fans and the pair of right side fans;

the neck portion of each of the pins penetrates the through holes of the right side fans and the left side fans and the respective connecting holes of the pads.

6. The fan vibration absorber device according to claim 1, wherein an inner surface of each of the protruding pieces respectively covers and joins to surfaces of the connecting frames of the left side fans and the right side fans.

7. The fan vibration absorber device according to claim 1, wherein an assemblage of the left side fans and the right side fans, the pads and the pins is securely installed within a case that serves as an outer case for a power supply device.

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