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(54) **Vacuum cleaner.**

(57) In a vacuum cleaner, a body case (1) has defined therein an accommodating chamber (6) in a hermetically partitioned fashion. A motor-driven blower (10) is vertically arranged within the accommodating chamber (6) in such a manner that a blower component (10a) is located below a motor component (10b). A partition wall defining the accommodating chamber (6) is composed of a tubular rib (11) formed in integral relation to the body case (1) and a noise insulating case (12) formed separately from the body case (1). The noise insulating case (12) is so arranged as to be mounted to the tubular rib (11). With such arrangement, the blower (10) is supported with sufficient air-tightness and vibration isolation. Incorporation of the motor-driven blower (10) into the body case (1) can be facilitated. Even when a motor-driven blower (10) high in capacity is employed, it is possible to easily prevent the noise insulating case (12) from being thermally deformed.

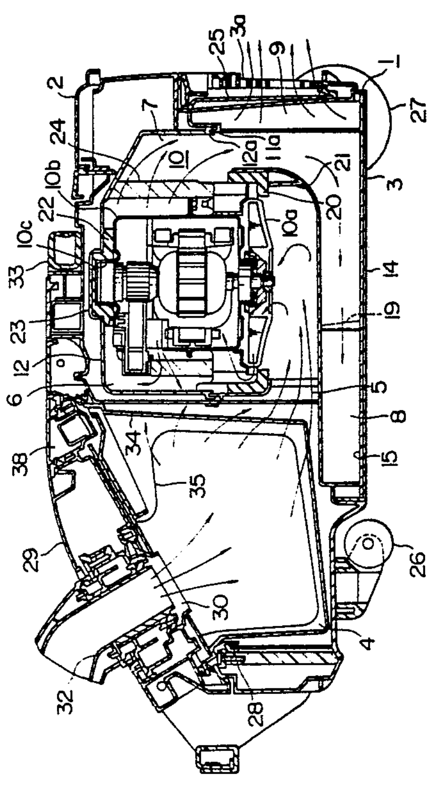

FIG. I

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VACUUM CLEANER

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to vacuum cleaners suitable for domestic use and, more particularly, to a vacuum cleaner which can solve various problems of a motor-driven blower for use in the vacuum celaner.

Description of the Prior Art

In a conventional vacuum cleaner, as disclosed in Japanese Patent Application Laid-Open No. 61-115529, a motor-driven blower accommodating chamber is defined within a body case in a hermetically partitioned manner. A motor-driven blower composed of a blower component and a motor component is arranged horizontally within the accommodating chamber. The motor-driven blower is supported, in a vibration isolating fashion, by a noise insulating case which serves as a partition wall defining the motor-driven blower accommodating chamber. Specifically, the blower component is supported at its outer periphery by the noise insulating case through a front rubber vibration isolator, and the motor component is supported by the noise insulating case through a rear rubber vibration isolator. Further, the front rubber vibration isolator is provided with a lip in pressure contact with an inner wall surface of the noise insulating case, in order to maintain sufficient air-tightness with respect to the noise insulating case.

With the arrangement of the above-described prior art, the weight of the motor-driven blower is applied to only lower portions of the respective front and rear rubber vibration isolators. In particular, a section of the lip at the lower portion of the front rubber vibration isolator is pressed strongly and is deformed. On the other hand, a section of the lip at the upper portion of the front rubber isolator is moved away from the inner wall surface of the noise insulating case. Further, as the motor-driven blower rotates, a space upstream of the blower is brought to negative pressure, thereby producing urging force tending to move the front rubber vibration isolator toward the upstream side, that is, urging force acting in a direction perpendicular to the direction of the urging force due to the weight of the motor-driven blower. Such urging force causes a gap to be formed between the noise insulating case and the lip section at the upper portion of the front rubber vibration isolator. Thus, the above-described prior art has such a problem that it is impossible to obtain sufficient air-tight effect due to the front rubber vibration isolator.

Moreover, the arrangement of the above-mentioned prior art is such that, at assembling, the front rubber vibration isolator having the lip is forcibly fitted into the noise insulating case. Because of such arrangement, there is a strong likelihood that a portion or portions of the lip is or are deformed and turned up. Thus, the prior art has such a problem that sufficient effects of air tightness and vibration isolation cannot be achieved.

Furthermore, no consideration is made in the prior art to an arrangement for incorporating the motor-driven blower into the body case. Thus, there is a problem that the motor-driven blower cannot easily be incorporated into the body case. In addition, no consideration is also made to such a problem that when a high capacity motor-driven blower is employed, exhaust air flow is brought to a high temperature level. If the exhaust air flow is elevated in temperature, there would be an anxiety that the noise insulating case is thermally deformed.

SUMMARY OF THE INVENTION

In view of the above-discussed problems, it is an object of the invention to provide a vacuum cleaner in which it is possible to achieve sufficient vibration isolation of a motor-driven blower and sufficient air-tight support thereof, in which it is easy to incorporate the motor-driven blower into a body case, and in which, when a motor-driven blower of high capacity is employed, it is possible to cope with prevention of a noise insulating case from being thermally deformed.

The above-mentioned object is achieved by a vacuum cleaner comprising a body case having defined therein, in a hermetically partitioned fashion, a dust collecting chamber, a communication passage communicating with the dust collecting chamber, a motor-driven blower accommodating chamber communicating with the communication passage, an exhaust passage communicating with the motor-driven blower accommodating chamber, and an exhaust chamber communicating with the exhaust passage; and a motor-driven blower composed of a blower component and a motor component, the motor-driven blower being vertically arranged within the motor-driven blower accommodating chamber in such a manner that the blower component is located below the motor component, wherein a partition wall defining the motor-driven blower accommodating chamber is composed of a tubular rib formed in integral relation to the body case and covering the blower component of the motor-driven blower, and a noise insulating case formed separately from the body case and covering the motor component of the motor-driven blower, the noise insulating case being so arranged as to be mounted to the tubular rib.

In the vacuum cleaner arranged as above, the motor-driven blower is vertically arranged within the motor-driven blower accommodating chamber in such a manner that the blower component is located below the motor component. With such arrangement, urging force due to the weight of the motor-driven blower and suction force due to generation of negative pressure resulting from rotation of the motor-driven blower are uniformly applied to the entire region of an elastic member for supporting the blower component of the motor-driven blower in an air-tight and vibration-isolating fashion. Further, the urging force and the suction force act in the same direction, so that strong urging force can be obtained. Accordingly, no gap is formed between the elastic member and the partition wall of the motor-driven blower accommodating chamber, making it possible to achieve a sufficient airtightness effect due to the elastic member.

In addition, the arrangement is such that the partition wall of the motor-driven blower accommodating chamber is composed of the tubular rib formed in integral relation to the body case and the noise insulating case separate from the body case, and the noise insulating case is adapted to be mounted to the tubular rib. In the arrangement, assembling is made in such a manner that the motor-driven blower is incorporated into the tubular rib and, subsequently, the noise insulating case is fixedly mounted to the tubular rib. Thus, it is possible to facilitate incorporation of the motor-driven blower into the motor-driven blower accommodating chamber.

Further, the arrangement is such that the noise insulating case is mounted to the tubular rib. With such arrangement, if the use of a motor-driven blower of high capacity causes exhaust air flowing from the motor-driven blower to be elevated to a high temperature level, only the noise insulating case should be formed of a heat-resistant material. By doing so, it is made possible to prevent deformation of the partition wall of the motor-driven blower accommodating chamber, without the necessity of the entire body case being formed of the heat-resistant material.

Moreover, because of the vertical arrangement of the motor-driven blower, two urging forces including the urging force due to the weight of the motor-driven blower and the urging force due to the negative pressure resulting from rotation of the motor-driven blower can be applied to the elastic member. Thus, the sufficient air-tight effect can be obtained, even if the elastic member is formed with no lip having an anxiety of being turned up.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a longitudinal cross-sectional view showing a principal portion of a vacuum cleaner according to an embodiment of the invention;

Fig. 2 is a perspective view of the entire vacuum cleaner;

Fig. 3 is an exploded perspective view of a lower case section and component parts associated therewith;

Fig. 4 is an exploded perspective view of the lower case section turned upside down;

Fig. 5 is a perspective view of an upper case section;

Fig. 6 is a horizontal cross-sectional view of a noise insulating case;

Fig. 7 is a horizontal cross-sectional view of the lower case section, showing a silencing passage; and

Fig. 8 is a graphical representation of frequency characteristics indicating silencing effects.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the invention will be described below with reference to the drawings.

Referring to the drawings, in particular, to Fig. 1, a vacuum cleaner comprises a body case 1 divided into two sections including an upper case section 2 and a lower case section 3 which are separable from each other. The upper and lower case sections 2 and 3 are formed of synthetic resin. Defined within the body case 1 in a hermetically partitioned manner are a dust collecting chamber 4, a communication passage 5 communicating with the dust collecting chamber 4, a motor-driven blower accommodating chamber 6 communicating with the communication passage 5, an exhaust passage 7 communicating with the motor-driven blower accommodating chamber 6, a silencing passage 8 communicating with the exhaust passage 7, and an exhaust chamber 9 communicating with the silencing passage 8.

A partition wall defining the motor-driven blower accommodating chamber 6 is composed of a tubular rib 11 formed in integral relation to the lower case section 3 and covering a blower component 10a of a motor-driven blower 10, and a noise insulating case 12 formed separately from the body case 1 and covering a motor component 10b of the motor-driven blower 10. The noise insulating case 12 is detachably mounted to the tubular rib 11 in such a manner that the entire periphery of an opening end face of the tubular rib 11 is air-tightly fitted into a groove 12a formed along the entire periphery of an opening end face of the noise insulating case 12 and, subsequently, screws 13 and 13a shown in Fig. 6 are used to attach the noise insulating case 12 to the tubular rib 11.

The dust collecting chamber 4 is arranged in side by side relation to the motor-driven blower accommodating chamber 6. The communication passage 5 communicates with a lower portion of the partition wall defining the motor-driven blower accommodating chamber 6, that is, with a lower portion of the side wall of the tubular rib 11. The exhaust passage 7 communicates with an upper portion of the partition wall defining the motor-driven blower accommodating chamber 6, that is, with an upper portion of the side wall of the noise insulating case 12.

The exhaust passage 7 has an inflow end portion defined by a wall section integral with the noise insulating case 12. The exhaust passage 7 extends downwardly along the side wall of the noise insulating case 12. The exhaust passage 7 has an outflow end portion defined by a wall section integral with the tubular rib 11 which is formed in integral relation to the lower case section 3. The noise insulating case 12 is formed of material higher in heat resistance than the upper and lower case sections 2 and 3.

The silencing passage 8 is defined by a bottom surface of the lower case section 3 and a case cover 14 air-tightly held on the bottom surface. The silencing passage 8 is substantially in the form of the letter U, and communicates with the exhaust chamber 9 which is arranged at the rear section of the body case 1. A noise absorption material 15 is attached to an inner surface of the case cover 14. The case cover 14 is formed of synthetic resin. The exhaust passage 7 and the silencing passage 8 communicate with each other through an opening formed in the bottom surface of the lower case section 3.

The exhaust passage 7 has a cross-sectional passage area smaller than that of the noise insulating case 12. The silencing passage 8 has a cross-sectional passage area larger than that of the exhaust passage 7. The exhaust chamber 9 has a cross-sectional passage area larger than that of the silencing passage 8.

As shown in Fig. 3, a plurality of small ribs 16 are formed at an inlet of the communication passage 5, for preventing the large dust such as a piece of paper or the like from entering the motor-driven blower accommodating chamber 6. A single guide rib 17 is provided along a flow passage extending from the communication passage 5 to the motor-driven blower 10 arranged within the motor-driven blower accommodating chamber 6. The guide rib 17 is formed in integral relation to the lower case section 3, and has a function of smoothly leading air from the dust collecting chamber 4 toward an inlet of the blower component 10a of the motor-driven blower 10.

The inner wall surface defining a flow passage extending from the motor-driven blower accommodating chamber 6 to the exhaust passage 7 has a configuration enabling exhaust air to flow smoothly. The inner wall surface defining a flow passage extending from the exhaust passage 7 to the silencing passage 8 has a configuration enabling the exhaust air to flow smoothly.

As clearly shown in Fig. 4, a plurality of rectifying vanes 18 are provided within the silencing passage 8, for changing the direction of the exhaust air flow by 180 degrees to smoothly lead the exhaust air flow to the exhaust chamber 9. The rectifying vanes 18 are formed in integral relation to the bottom surface of the lower case section 3. A rectifying net 19 is provided on the side of upstream ends of the respective rectifying vanes 18, that is, on the side of inflow ends of the respective rectifying vanes 18. The rectifying net 19 is formed by a synthetic resin net or a metallic net having a fine mesh for enabling air-flow noises to be prevented from being produced.

The inflow end portion of the exhaust passage 7 is defined by the wall section integral with the noise insulating case 12. The outflow end portion of the exhaust passage 7 is defined by the tubular rib 11. The noise insulating case 12 is mounted to the tubular rib 11 to thereby complete the exhaust passage 7 for leading the exhaust air flow from the motor-driven blower accommodating chamber 6 to the silencing passage 8.

The motor-driven blower 10 is vertically arranged within the motor-driven blower accommodating chamber 6 in such a fashion that the blower component 10a is located below the motor component 10b. A mounting section 21 is formed at a lower portion of the inner peripheral wall surface of the tubular rib 11. A ring-like first elastic member 20 is mounted on the mounting section 21 for air-tightly isolating vibration from the blower component 10a of the motor-driven blower 10. The mounting section 21 is formed by a ring-like rib provided in integral relation to the lower case section 3.

The noise insulating case 12 is formed at its top with a mounting section 23 at which a second elastic member 22 is mounted for supporting the motor component 10b of the motor-driven blower 10 in a vibration-isolating manner. The mounting section 23 has a recess into which the second elastic member 22 can be fitted. Each of the first and second elastic members 20 and 22 is formed by a rubber vibration isolator. A noise absorption cover 24 is so arranged as to surround the outer periphery of the motor component 10b of the motor-driven blower 10. The inflow end portion of the exhaust passage 7 extends in tangential relation to the outer periphery of the motor component 10b of the motor-driven blower 10. If necessary, a noise absorption material may be attached to the inner peripheral surface of the noise insulating case 12. The second elastic member 22 is mounted to the motor-driven blower 10 in such a manner that the second elastic member 22 is fitted about an outer peripheral surface of a projection 10c of a bearing for a shaft of the motor component 10b.

An exhaust window 3a is formed in the rear wall of the lower case section 3, and communicates with the exhaust chamber 9. A fine dust filter 25 is arranged at an upstream end of the exhaust window 3a such that the filter 25 is detachable from the outside of the body case 1. A caster 26 and a pair of wheels 27 and 27a are mounted at a lower surface of the lower case section 3 as best shown in Fig. 4.

The upper case section 2 is fixedly mounted to the lower case section 3 by means of screws 28 to complete the body case 1. An opening formed in the upper case section 2, that is, an opening of the dust collecting chamber 4 is covered by a closure 29 which is mounted to the upper case section 2 so as to be capable of being opened and closed. The closure 29 is formed therein with a suction port 30. A coupling 32 of a suction hose 31 (see Fig. 2) is adapted to be detachably mounted to the suction port 30. A grip handle 33 is mounted to the top surface of the upper case section 2.

A dust collecting case 34 formed of a non-woven fabric or the like is detachably mounted within the dust collecting chamber 4. A disposable bag filter 35 such as a paper bag or the like is accommodated in the duct collecting case 34. An inlet of the bag filter 35 is air-tightly held at the suction port 30 in the closure 29 when the same is closed.

As shown in Fig. 2, the suction hose 31 is mounted to the closure 29 by the coupling 32 in such a fashion as to be rotatable through 360 degrees. An extension pipe 36 and a suction nozzle 37 are connectable to the suction hose 31. The closure 29 is formed therein with a chamber 38 for accommodating an aromatic. A grip hand for use in carrying the body case 1 is provided at the front ends of the respective upper and lower case sections 2 and 3.

A dust collecting meter is accommodated in the upper case section 2. The closure 29 is formed of synthetic resin and is so arranged as to provide air-tightness between the closure 29 and the opening in the upper case section 2 when the closure 29 is closed. If necessary, a filter having a coarse mesh may be arranged between the dust collecting chamber 4 and the communication passage 5. It is required that the dust collecting case 34 is formed by a filter material having a fine mesh, to enable the dust collecting case 34 per se to serve to collect the dust when the bag filter 35 fails to be mounted. The dust collecting case 34 is so designed as to be washed in water when the case 34 is contaminated.

The motor-driven blower 10 is arranged such that air flowing from the blower component 10a cools the interior of the motor component 10b and, subsequently, flows out in the direction tangential to the outer periphery of the motor component 10b through windows provided in the outer periphery. A commutator motor mechanism is incorporated in the motor component 10b.

As shown in Fig. 3, a circuit board 39 has a fin 39a which is located within the exhaust passage 7 defined by the noise insulating case 12 and the tubular rib 11. A code-reel accommodating chamber 40 is defined adjacent the motor-driven blower accommodating chamber 6 within the body case 1. A planar section 12b facilitating mounting of the circuit board 39 is formed at a portion of the top wall of the noise insulating case 12, which is located adjacent the outer periphery of the noise insulating case 12. The planar section 12b is formed therein with a slit-like bore 12c into which the fin 39a is inserted.

With the arrangement described above, as the motor-driven blower 10 rotates, air flows into the bag filter 35 through the suction port 30 and passes through the bag filter 35 and the dust collecting case 34. The air flows into the motor-driven blower accommodating chamber 6 through the communication passage 5, and is guided by the guide rib 17 smoothly into the blower component 10a. The air flowing out of the blower component 10a cools the interior of the motor component 10b and, subsequently, expands and flows out, as exhaust air flow, to the space around the outer periphery of the motor component 10b. The noises such as the wind noises produced by the motor-driven blower 10 and the rotational noises of ball bearings are insulated by the noise insulating case 12. The exhaust air flowing out of the motor-driven blower accommodating chamber 6 enters the exhaust passage 7 and is compressed therewithin.

The exhaust air flows down along the exhaust passage 7 and, subsequently, the exhaust air enters the silencing passage 8 and expands therewithin. The exhaust air flow entering the silencing passage 8 is divided into a plurality of air currents by the plurality of rectifying vanes 18, and is changed in direction by 180 degrees by the same. The exhaust air flow enters the exhaust chamber 9 and is discharged therefrom to the outside of the body case 1 through the exhaust window 3a. The exhaust air currents divided within the silencing passage 8 are joined with each other and, subsequently, the air flows into the exhaust chamber 9 and expands therewithin.

The noises resulting from rotation of the motor-driven blower 10 are reduced in level, because the air is repeatedly compressed and expanded during passage of the air through the exhaust passage 7, the silencing passage 8 and the exhaust chamber 9. The noises are further reduced in level by the action of the noise absorption material 15.

The fine dust passing through the dust collecting case 34 and the fine dust such as brush powder resulting from rotation of the motor-driven blower 10 are filtered off by the fine dust filter 25 without leaking from the motor-driven blower accommodating chamber 6, the exhaust passage 7, the silencing passage 8 and the exhaust chamber 9 to the inside and outside of the body case 1. Accordingly, the interior of the body case 1 is prevented from being contaminated, and only the clean air flows out through the exhaust window 3a. Thus, the vacuum cleaner is excellent in sanitation.

The noises resulting from rotation of the motor-driven blower 10 are insulated by the double wall including the noise insulating case 12 and the upper case section 2. Accordingly, the noises are heard merely at an extremely low level at a location above the body case 1.

Since the silencing passage 8 is formed into the U-shape by the utilization of the bottom surface of the lower case section 3, it is easy to form the silencing passage 8 of a long size. Further, even if the silencing passage 8 of a long size is formed, the body case 1 is prevented from increasing in size.

When the motor-driven blower 10 of high capacity is employed and an amount of cooling air within the motor component 10b is reduced due to plugging of the dust collecting case 34 or the bag filter 35, the exhaust air flowing out of the motor component 10b is brought to a high temperature level. Therefore, the noise insulating case 12 is heated to a high temperature level. Since, however, the noise insulating case 12 is formed of a material high in heat resistance, the noise insulating case 12 can be prevented from being thermally deformed. In this connection, since the noise insulating case 12 is formed separately from the body case 1 and is so arranged as to be mounted to the tubular rib 11, only the noise insulating case 12 is formed of the high heat-resistant material and the body case 1 can be formed of usual inexpensive synthetic resin.

Since the motor-driven blower 10 is accommodated in the motor-driven blower accommodating chamber 6 such that the blower component 10a is located below the motor component 10b, the weight of the motor-driven blower 10 and the urging force due to the negative pressure resulting from rotation of the motor-driven blower 10, which act in the same direction, are applied to the entire region of the first elastic member 20. Accordingly, the first elastic member 20 is urged against the entire region of the mounting section 21 with strong and uniform urging force. Thus, there can be provided stable effects of air-tightness and vibration-insulation.

Incorporation of the motor-driven blower 10 into the lower case section 3 is carried out in the following manner. That is, the first elastic member 20, the second elastic member 22 and the noise absorption cover 24 are first mounted beforehand on the motor-driven blower 10. Subsequently, the motor-driven blower 10 is inserted into the tubular rib 11 such that the first elastic member 20 is mounted on the mounting section 21. Then, the noise insulating case 12 is covered onto the motor-driven blower 10, and is fixed to the tubular rib 11 by the use of the screws 13 and 13a. Thus, incorporation of the motor-driven blower 10 is completed. It is not essential to beforehand mount the first and second elastic members 20 and 22 and the noise absorption cover 24 onto the motor-driven blower 10. That is, incorporation of the motor-driven blower 10 into the lower case section 3 may be such that the first elastic member 20 is mounted on the mounting section 21 within the tubular rib 11, the motor-driven blower 10 is then mounted into the first elastic member 20, subsequently, the noise absorption cover 24 and the second elastic member 22 are mounted on the motor-driven blower 10, and the noise insulating case 12 is then covered onto the motor-driven blower 10.

Fig. 8 is a graphical representation of a frequency characteristic indicating the noise insulating effect due to the noise insulating case 12 incorporated in the vacuum cleaner according to the illustrated embodiment. The noises are measured at a location one meter above the upper case section 2. The line a represents the prior art, while the line b indicates the illustrated embodiment. It will be understood from the frequency characteristic that the noise insulating effect of the illustrated embodiment is considerably improved as compared with that of the prior art.

Although the communication passage 5 in the illustrated embodiment is relatively short, the passage 5 may have an increased length. Conversely, the communication passage 5 may be formed merely by a bore through which the dust collecting chamber 4 and the motor-driven blower accommodating chamber 6 communicate with each other. Furthermore, if the motor-driven blower of low capacity is employed so that the noise due to rotation of the motor-driven blower is low, the silencing passage 8 may be dispensed with. In this case, the exhaust passage 7 is in direct communication with the exhaust chamber 9.

In the illustrated embodiment, the air can be caused to flow from the dust collecting chamber 4 to the exhaust chamber 9 through the communication passage 5, the motor-driven blower accommodating chamber 6, the exhaust passage 7 and the siliencing passage 8, and can be discharged to the outside of the body case 1 through the window 3a, without leaking into the space within the body case 1. Accordingly, provision of the fine dust filter 25 short of the exhaust window 3a makes it possible to ensure removal of not only the fine dust flowing from the dust collecting chamber 4 into the exhaust chamber 9, but also the fine dust such as brush powder produced by the motor-driven blower 10. Thus, more sanitary cleaning operation can be carried out.

Claims

1. A vacuum cleaner comprising a body case (1) having defined therein, in a hermetically partitioned fashion, a dust collecting chamber (4), a communication passage (5) communicating with said dust collecting chamber (4), a motor-driven blower accommodating chamber (6) communicating with said communication passage (5), an exhaust passage (7) communicating with said motor-driven blower accommodating chamber (6), and an exhaust chamber (9) communicating with said exhaust passage (7); and a motor-driven blower (10) composed of a blower component (10a) and a motor component (10b), said motor-driven blower (10) being vertically arranged within said motor-driven blower accommodating chamber (6) in such a manner that said blower component (10a) is located below said motor component (10b), characterized in that

a partition wall defining said motor-driven blower accommodating chamber (6) is composed of a tubular rib (11) formed in integral relation to said body case (1) and covering said blower component (10a) of said motor-driven blower (10), and a noise insulating case (12) formed separately from said body case (1) and covering said motor component (10b) of said motor-driven blower (10), said noise insulating case (12) being so arranged as to be mounted to said tubular rib (11).

2. A vacuum cleaner according to claim 1, characterized in that said noise insulating case (12) is formed of a material higher in heat resistance than said body case (1).

3. A vacuum cleaner according to claim 1, characterized in that said noise insulating case (12) is detachably mounted to said tubular rib (11).

4. A vacuum cleaner according to claim 1, characterized in that said body case (1) is composed of a lower case section (3) and an upper case section (2), said tubular rib (11) being formed in integral relation to said lower case section (3).

5. A vacuum cleaner according to claim 1, characterized in that said exhaust passage (7) has an inflow end portion defined by a wall integral with said noise insulating case (12).

6. A vacuum cleaner according to claim 1, characterized in that said exhaust passage (7) communicates with an upper portion of said partition wall defining said motor-driven blower accommodating chamber (6).

7. A vacuum cleaner according to claim 1, characterized in that said exhaust passage (7) extends downwardly along a side wall of said noise insulating case (12).

8. A vacuum cleaner according to claim 1, characterized in that said exhaust passage (7) has a cross-sectional passage area smaller than that of said noise insulating case (12).

9. A vacuum cleaner according to claim 1, characterized in that said communication passage (5) communicates with a lower portion of said partition wall defining said motor-driven blower accommodating chamber (6).

10. A vacuum cleaner according to claim 9, characterized by including a guide rib (17) provided at a flow passage extending from said communication passage (5) to said motor-driven blower (10) within said motor-driven blower accommodating chamber (6).

11. A vacuum cleaner according to claim 1, characterized in that said exhaust passage (7) has an outflow end portion defined by a wall integral with said tubular rib (11).

12. A vacuum cleaner comprising a body case (1) having defined therein, in a hermetically partitioned fashion, a dust collecting chamber (4), a communication passage (5) communicating with said dust collecting chamber (4), a motor-driven blower accommodating chamber (6) communicating with said communication passage (5), an exhaust passage (7) communicating with said motor-driven blower accommodating chamber (6), a silencing passage (8) communicating with said exhaust

passage (7), and an exhaust chamber (9) communicating with said silencing passage (8); and a motor-driven blower (10) composed of a blower component (10a) and a motor component (10b), said motor-driven blower (10) being vertically arranged within said motor-driven blower accommodating chamber (6) in such a manner that said blower component (10a) is located below said motor component (10b), characterized in that

a partition wall defining said motor-driven blower accommodating chamber (6) is composed of a tubular rib (11) formed in integral relation to said body case (1) and covering said blower component (10a) of said motor-driven blower (10), and a noise insulating case (12) formed separately from said body case (1) and covering said motor component (10b) of said motor-driven blower (10), said noise insulating case (12) being formed of a material higher in heat resistance than said body case (1) and being detachably mounted to said tubular rib (11).

13. A vacuum cleaner according to claim 12, characterized in that said silencing passage (8) has a cross-sectional passage area larger than that of said exhaust passage (7).

14. A vacuum cleaner according to claim 12, characterized in that said silencing passage (8) is formed substantially into a U-shape.

15. A vacuum cleaner according to claim 12 or claim 14, characterized by including at least one rectifying vane (18) a-ranged within said silencing passage (8).

16. A vacuum cleaner according to claim 15, characterized by including a rectifying net (19) arranged on the side upstream of said rectifying vane (18) within said silencing passage (8).

17. A vacuum cleaner according to claim 12 or claim 13, characterized by including a case cover (14) arranged at a bottom surface of said body case (1), said silencing passage (8) being defined between the bottom surface of said body case (1) and said case cover (14).

18. A vacuum cleaner according to claim 12, characterized in that said exhaust chamber (9) has a cross-sectional passage area larger than that of said silencing passage (8).

19. A vacuum cleaner comprising a body case (1) composed of an upper case section (3) and a lower case section (2), said body case (1) having defined therein, in a hermetically partitioned fashion, a dust collecting chamber (4), a communication passage (5) communicating with said dust collecting chamber (4), a motor-driven blower accommodating chamber (6) communicating with said communication passage (5), an exhaust passage (7) communicating with said motor-driven blower accommodating chamber (6), a silencing passage (8) communicating with said exhaust passage (7), and an exhaust chamber (9) communicating with said silencing passage (8); and a motor-driven blower (10) composed of a blower component (10a) and a motor component (10b), said motor-driven blower (10) being vertically arranged within said motor-driven blower accommodating chamber (6) in such a manner that said blower component (10a) is located below said motor component (10b), characterized in that

a partition wall defining said motor-driven blower accommodating chamber (6) is composed of a tubular rib (11) formed in integral relation to said lower case section (3) of said body case (1) and covering said blower component (10a) of said motor-driven blower (10), and a noise insulating case (12) formed separately from said body case (1) and covering said motor component (10b) of said motor-driven blower (10), said noise insulating case (12) being detachably mounted to said tubular rib (11),

a first elastic member (20) is mounted on a mounting section (21) provided within said tubular rib (11), for air-tightly isolating vibration from an outer periphery of said blower component (10a) of said motor-driven blower (10), and

a second elastic member (22) is mounted to a mounting section (23) provided on said noise insulating case (12), for supporting said motor component (10b) of said motor-driven blower (10) in a vibration isolating fashion.

20. A vacuum cleaner according to claim 19, characterized in that said mounting section (21) within said noise insulating case (12) is formed by a rib integral with said lower case section (3).

21. A vacuum cleaner according to claim 19, characterized in that said exhaust passage (7) has an inflow end portion extending in tangential relation to said motor component (10b) of said motor-driven blower (10).

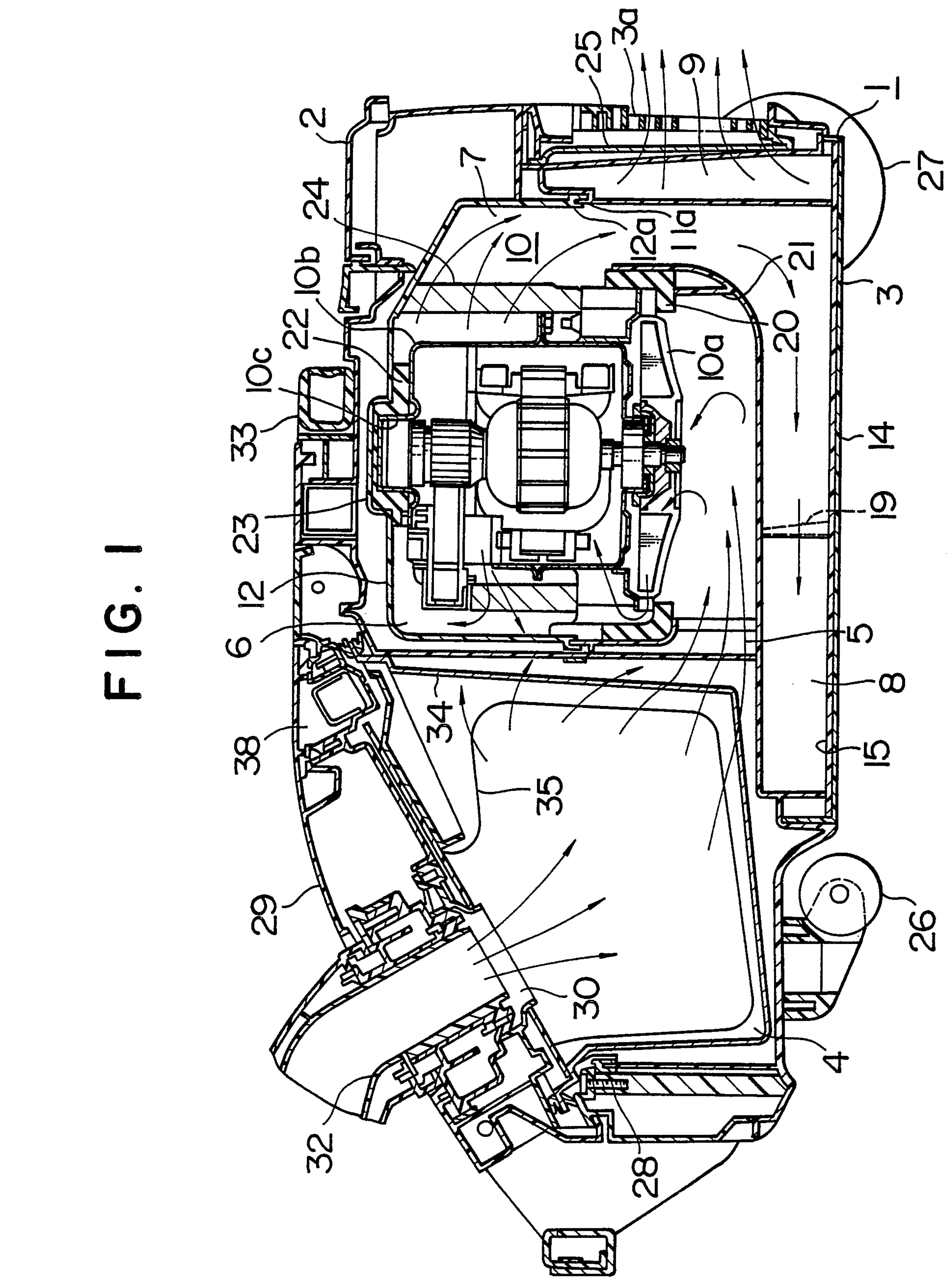
22. A vacuum cleaner according to claim 19, characterized in that said first elastic member (20) is mounted to said mounting section (21) within said noise insulating case (12), said motor-driven blower (10) is then mounted onto said first elastic member (20), said motor component (10b) of said motor-driven blower (10) is then covered with a noise absorption material (24) and, subsequently, said noise insulating case (12) is mounted to said tubular rib (11) by means of screws (13, 13a).

23. A vacuum cleaner according to claim 22, characterized in that said second elastic member (22) is beforehand mounted to a top of said motor component (10b) of said motor-driven blower (10).

24. A vacuum cleaner according to claim 22, characterized in that with said noise absorption material (24), said first elastic member (20) and said second elastic member (22) beforehand mounted on said motor driven blower (10), said

motor-driven blower (10) is mounted onto said mounting section (21) within said noise insulating case (12).

FIG. I



1
2
3
3a
4
5
6
7
8
9
10
10a
10b
10c
11a
12
12a
14
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FIG. 2

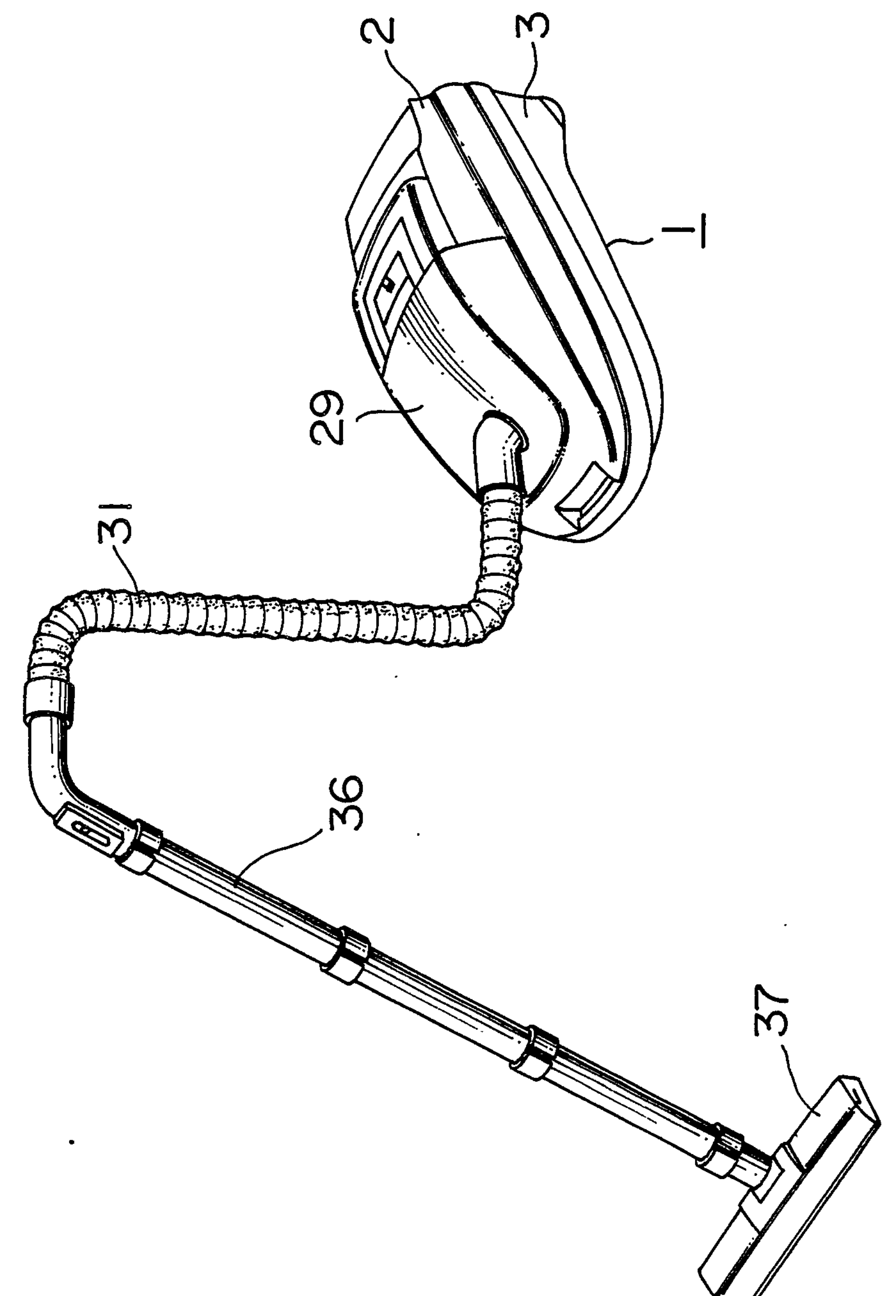


FIG. 3

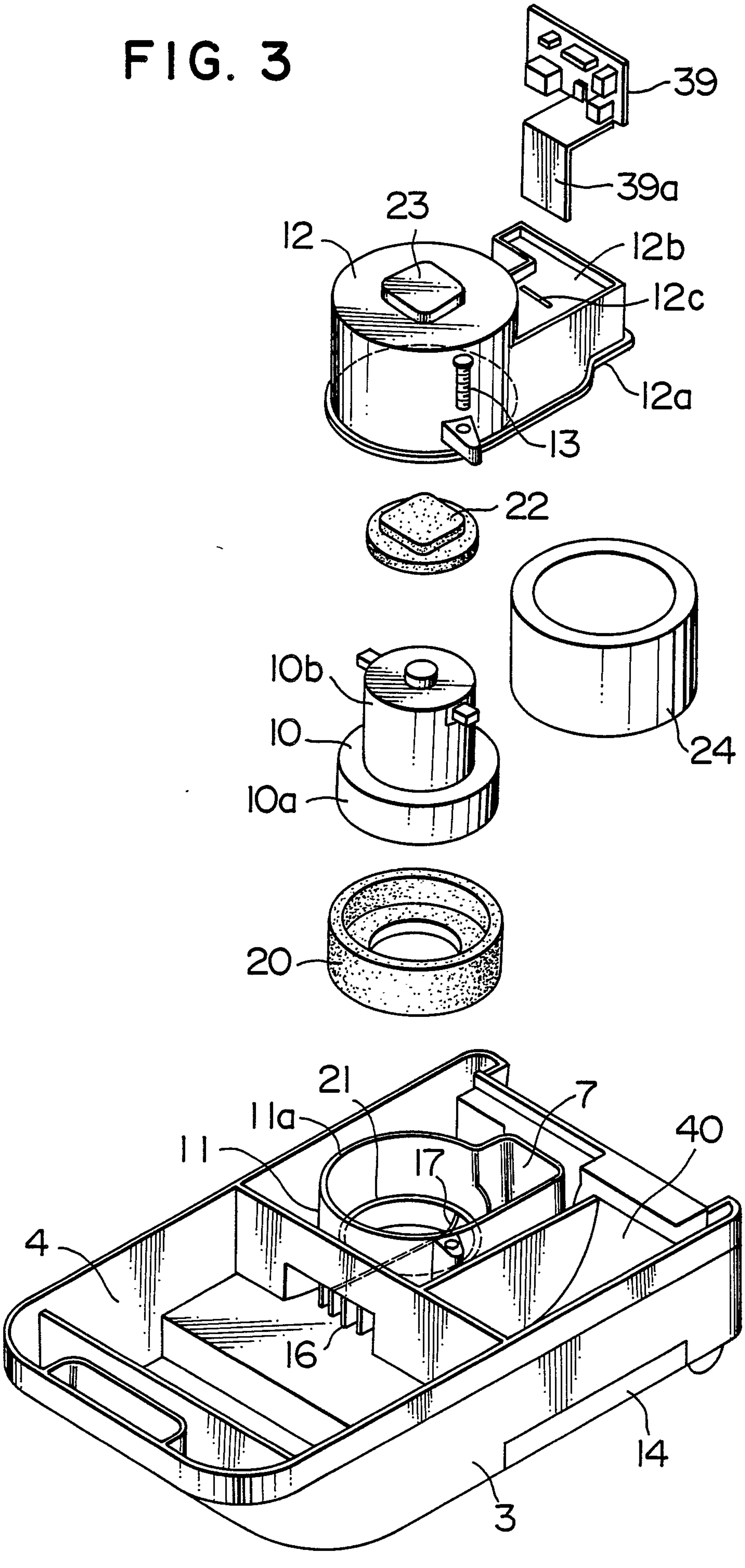

39
39a
23
12
12b
12c
12a
13
22
10b
10
10a
24
20
21
11a
11
17
7
40
4
16
14
3

FIG. 4

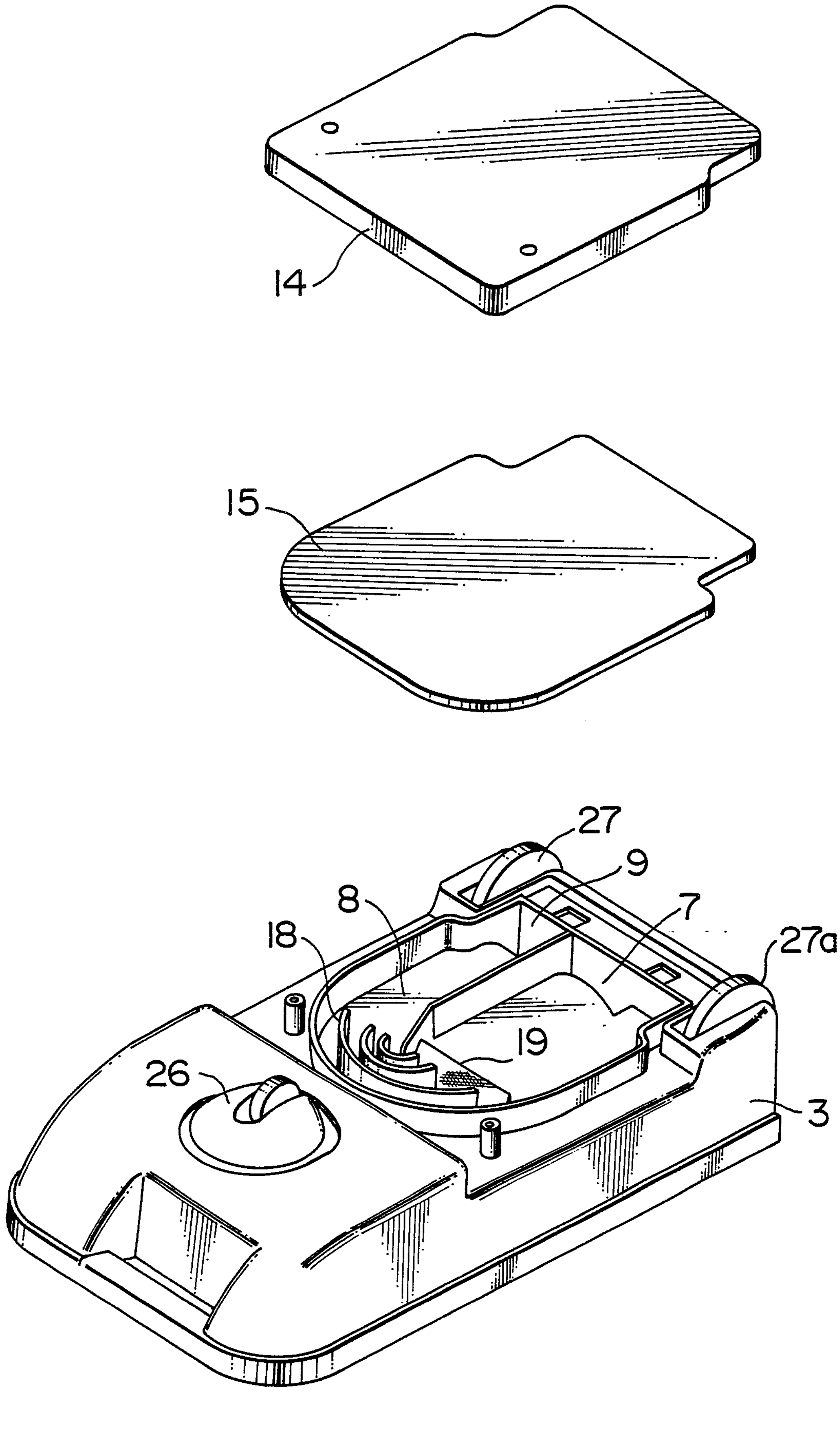


FIG. 5

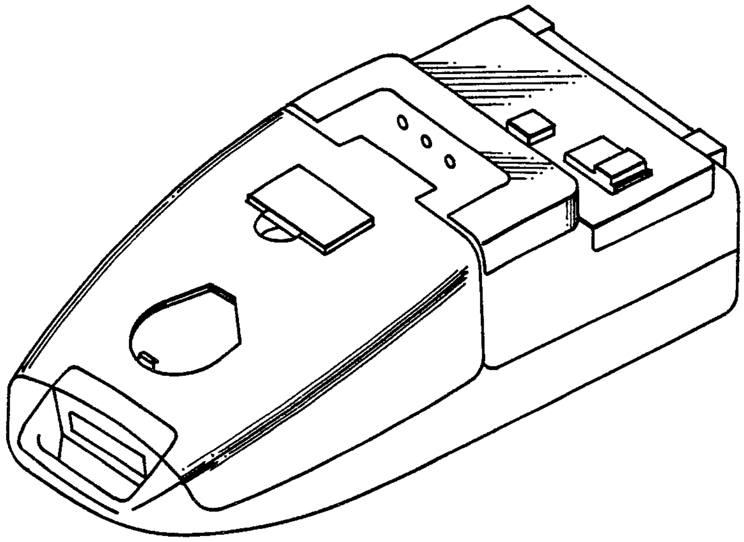


FIG. 6

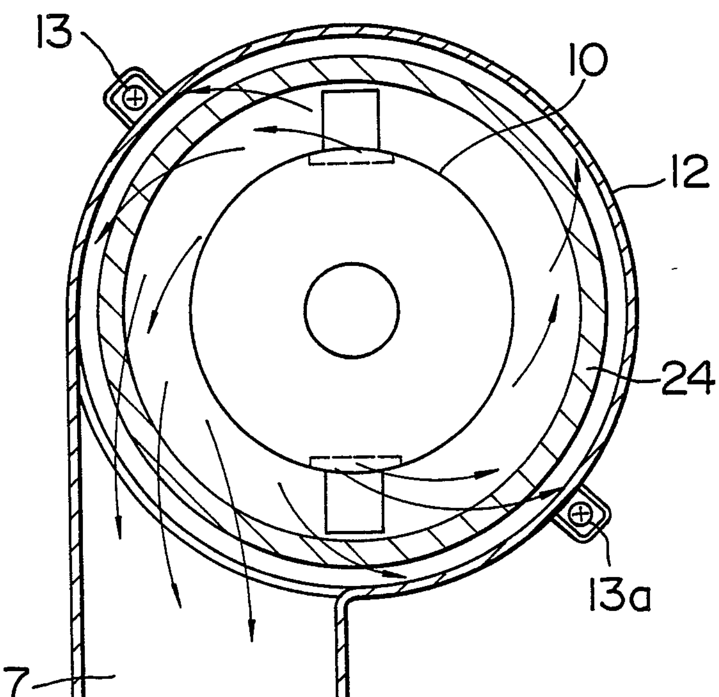
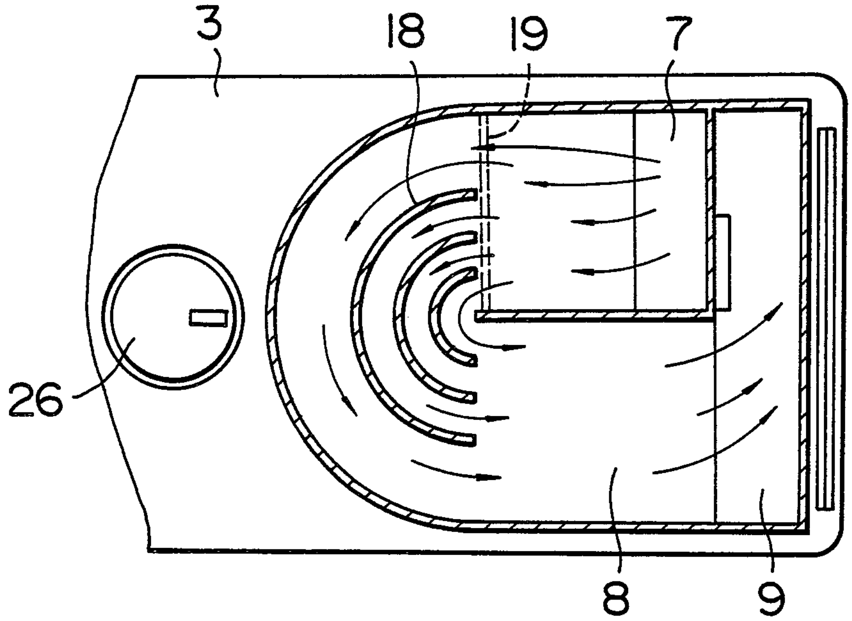


FIG. 7


3
18
19
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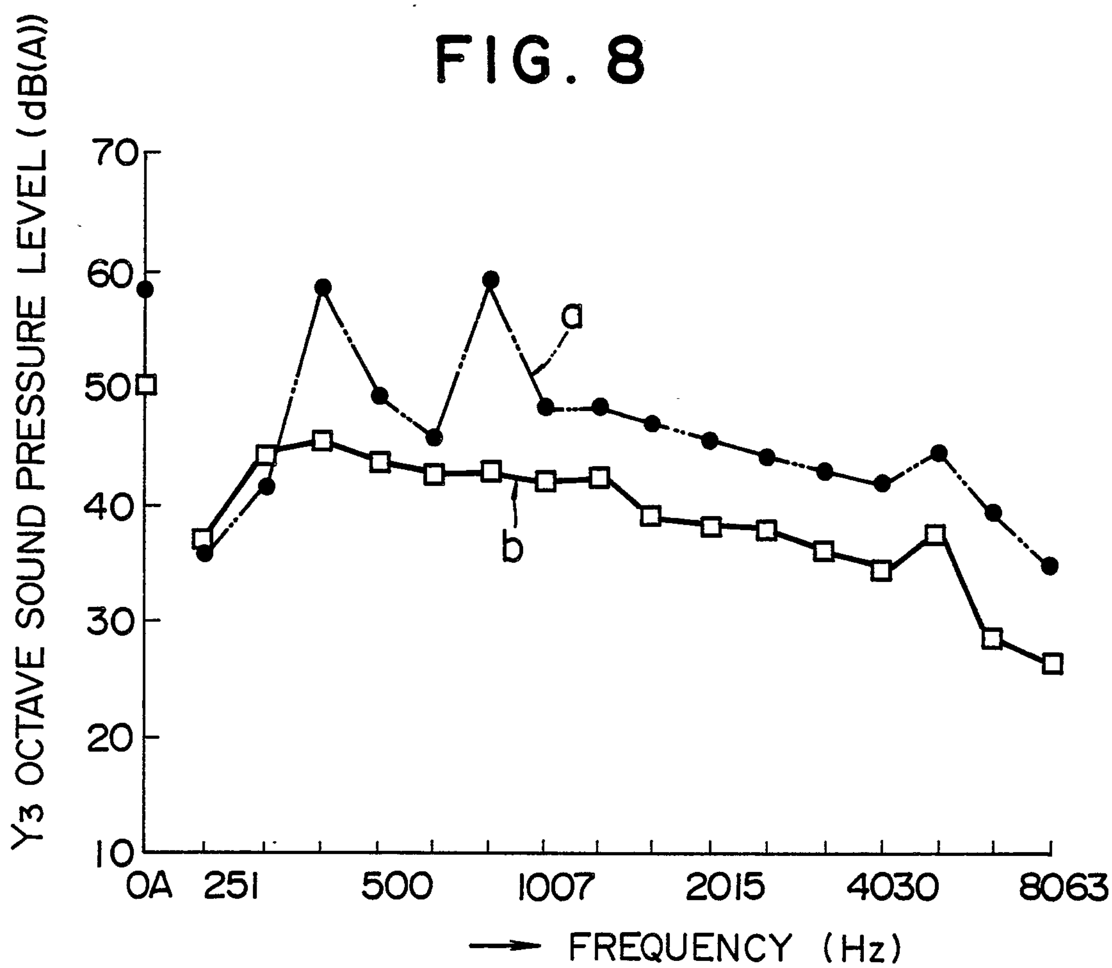
9

FIG. 8


Y3 OCTAVE SOUND PRESSURE LEVEL (dB(A))
70
60
50
40
30
20
10
a
b
OA
251
500
1007
2015
4030
8063
FREQUENCY (Hz)