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(54) Suction head of vacuum cleaner

Staubsaugersaugkopf

Tête de suction pour aspirateur

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a suction head of a vacuum cleaner, and more particularly, to a suction head of a vacuum cleaner capable of smoothly sucking dust.

2. Description of the Conventional Art

[0002] As shown in Figs. 1 and 2, an upright type vacuum cleaner in accordance with the conventional art comprises: a body 1 having an accommodation space therein; a handgrip 6 installed at an upper side of the body 1; a fan motor 2 installed in the body 1 and generating a suction force; a filter 3 arranged at a suction side of the fan motor 2 and filtering dust; a dust chamber 4 for accommodating the filter 3 and dust filtered by the filter 3; and a suction head 5 connected to the dust chamber 4 by a connection hose 7, for sucking external dust by an operation of the fan motor 2.

[0003] The suction head 5 includes: a housing 10 provided with a suction port 11 having a structure opened towards a floor; a suction duct 14 for collecting dust sucked by the suction port 11; a connection pipe 15 for connecting the suction duct 14 and the connection hose 7; a brush 13 rotatably installed at an inner side of the suction port 11 and having a plurality of bristles 12 at an outer surface thereof, for collecting dust on a floor with being rotated; a driving motor 16 for providing a driving force to rotate the brush 13; and a rotational force transmitting mechanism for transmitting a rotational force of the driving motor 16 to the brush 13. The rotational force transmitting mechanism is composed of a driving pulley 17 connected to a motor shaft of the driving motor 16, a driven pulley 18 installed at an outer circumference of the brush 13, and a belt 19 for connecting the driving pulley 17 and the driven pulley 18.

[0004] In the conventional vacuum cleaner, when a power source is applied to the vacuum cleaner, a suction force is generated at the suction port 11 of the suction head 5 by a suction force generated at the fan motor 2. By the suction force, dust on a floor is sucked through the suction port 11 thus to be introduced into the body 1 through the suction duct 14, the connection pipe 15, and the connection hose 7.

[0005] At this time, when the driving motor 16 is rotated, a rotational force of the driving motor 16 is transmitted to the brush 13 through the driving pulley 17, the belt 19, and the driven pulley 18 and thereby the brush 13 is rotated by 360°. As the brush 13 is rotated, the bristles 12 installed on an outer surface of the brush 13 separate dust from the floor thereby to facilitate a suction of dust attached on the floor.

[0006] However, in the suction head 5 of the conventional vacuum cleaner, the brush 13 is rotated by 360° in a single direction. According to this, the bristles 12 of the brush 13 brush the floor in a single direction thereby to have a limitation in brushing the floor.

[0007] US Patent No.4,430,768 discloses an agitator structure for suction cleaners having an oscillating brush. US Patent No.4,426,751 discloses a vacuum cleaner nozzle having two brushes rotated in opposite directions.

SUMMARY OF THE INVENTION

[0008] Therefore, an object of the present invention is to provide a suction head of a vacuum cleaner capable of enhancing a cleaning function by constructing a brush installed in a suction port to reciprocatingly rotate within a predetermined angle.

[0009] Another object of the present invention is to provide a suction head of a vacuum cleaner capable of properly sucking brushed dust into a body by constructing a brush to be respectively provided with a suction duct at both sides of a brushing direction of a floor.

[0010] To achieve these and other advantages and In accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a suction head of a vacuum cleaner as set out in claim 1.

[0011] The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

[0013] In the drawings:

Fig. 1 is a perspective view showing an upright type vacuum cleaner in accordance with the conventional art;

Fig. 2 is a cross-section view showing a suction head of the vacuum cleaner in accordance with the conventional art;

Fig. 3 is a perspective view showing an upright type vacuum cleaner according to the present invention;

Fig. 4 is a cross-section view showing a suction head of the vacuum cleaner according to the present invention;

Fig. 5 is a perspective view showing a brush and a brush driving device provided at the suction head of the vacuum cleaner according to the present invention;

Fig. 6 is a frontal view showing the suction head of

the vacuum cleaner according to the present invention;

Fig. 7 is a sectional view taken along line VII-VII of Fig. 6; and

Figs. 8 and 9 are sectional views showing an operation state of the suction head of the vacuum cleaner according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0015] As shown in Figs. 3 and 4, an upright type vacuum cleaner according to the present invention comprises: a body 1 having an accommodation space therein; a handgrip 6 installed at an upper side of the body 1; a fan motor 2 installed in the body 1 and generating a suction force; a filter 3 arranged at a suction side of the fan motor 2 and filtering dust; a dust chamber 4 for accommodating the filter 3 and dust filtered by the filter 3; and a suction head 100 connected to the dust chamber 4 by a connection hose 7, for sucking external dust by an operation of the fan motor 2.

[0016] The suction head 100 includes: a housing 110 provided with a suction port 20 having a structure opened towards a floor; a cylindrical brush 30 rotatably installed in the suction port 20 and having a plurality of bristles 31 arranged in a longitudinal direction thereof; a brush driving device 40 for reciprocatingly rotating the brush 30 forwardly and backwardly within a range of a predetermined angle; a first suction duct 50 having an inlet 51 positioned corresponding to a direction of dust movement when the brush 30 rotates in a forward direction; a second suction duct 60 having an inlet 61 positioned corresponding to a direction of dust movement when the brush 30 rotates in a backward direction; and a connection pipe 115 for connecting the first suction duct 50 and the second suction duct 60 to the connection hose 7.

[0017] The bristles 31 are uniformly installed on the brush 30 in a longitudinal direction of the brush 30 as a plurality of rows.

[0018] As shown in Fig. 5, the brush driving device 40 is composed of: a driving motor 41 for providing a driving force; and a driving force transmitting unit 42 for transmitting a driving force of the driving motor 41 to the brush 30 so that the brush 30 can be reciprocatingly rotated within a range of a predetermined angle.

[0019] The driving force transmitting unit 42 is composed of: a rotary link 44 fixed to a motor shaft 43 of the driving motor 41 and coaxially rotated together with the motor shaft 43; a hinge bracket 45 installed at one side of an outer circumferential surface of the brush 30; and a connecting rod 46 of which one end is hingedly connected to the rotary link 44 at a position eccentric from a rotation center of the rotary link 44 and of which another end is hingedly connected to the hinge bracket 45 thus to perform an angular reciprocating motion by a rotation of the rotary link 44.

[0020] The driving force transmitting unit 42 converts a rotation motion of the motor shaft 43 of the driving motor 41 into a forward reciprocating rotation and a backward reciprocating rotation of the brush 30.

[0021] As shown in Figs. 6 and 7, the inlet 51 of the first suction duct 50 is arranged at a rear side of the brush 30 and extended to a rear side of the housing 110, and an outlet 52 of the first suction duct 50 is connected to the connection pipe 115.

[0022] When the brush 30 is forwardly rotated, that is, the brush 30 is rotated counterclockwise as shown in Fig. 7, the first suction duct 50 serves as a flow path of dust brushed by the bristles 31 thus to be moved to the rear side of the suction port 20.

[0023] Meanwhile, it is preferred that the inlet 51 of the first suction duct 50 is curvedly formed toward the suction port 20 for more effective suction of air.

[0024] The inlet 61 of the second suction duct 60 is arranged to be opened towards a floor at the front side of the brush 30 and is extended along an upper circumference of the suction port 20, and an outlet 62 of the second suction duct 60 is connected to the first suction duct 50.

[0025] When the brush 30 is backwardly rotated, that is, the brush 30 is rotated clockwise as shown in Fig. 7, the second suction duct 60 serves as a flow path of dust brushed by the bristles 31 thus to be moved to the front side of the suction port 20.

[0026] Preferably, a width in right and left directions of the inlet 61 of the second suction duct 60 is substantially same as a width in right and left directions of the suction port 20 in order to increase an area of a duct into which dust is sucked.

[0027] In order to increase a suction force inside the duct, a width in right and left directions of the second suction duct 60 is gradually decreased from the inlet 61 towards the outlet 62. According to this, a width in front and rear directions of the suction duct 60 is gradually decreased towards both sides of the second suction duct 60 (refer to Fig. 4).

[0028] Preferably, a guide portion 70 is formed at the outlet 62 of the second suction duct 60, for guiding air passing through the second suction duct 60 toward the first suction duct 50. The guide portion 70 maintains constant pressure and regular flow of air which flows from the second suction duct 60 to the first suction duct 50.

[0029] The guide portion 70 may be protruded from an inner wall of the second suction duct 60, and the thickness of the guide portion 70 becomes smaller toward the first suction duct 50. It is preferred that both surfaces 72 and 74 of the guide portion 70, the surfaces 72 and 74 facing the first and second suction ducts 50 and 60 are curvedly formed.

[0030] Hereinafter, an operation of the suction head of the vacuum cleaner according to the present invention will be explained as follows. A motion direction of each

member is explained with reference to the attached drawings, and the present invention is not limited to the motion direction.

[0031] When a power source is applied to the vacuum cleaner, a suction force is generated at the suction port 20 of the suction head 100 by a suction force generated by the fan motor 2. By the suction force, dust on a floor is sucked through the suction port 20 thus to be introduced into the dust chamber 4 of the body 1.

[0032] As shown in Figs. 8 and 9, a rotational force is generated at the driving motor 41. When the rotational force of the driving motor 41 is transmitted to the brush 30 through the driving force transmitting unit 42, the brush 30 is reciprocatingly rotated within a range of a predetermined angle.

[0033] As shown in Fig. 8, when the brush 30 is forwardly rotated, that is, the brush 30 is rotated counterclockwise, the bristles 31 brush dust on the floor towards the rear side of the suction port 20. According to this, most of brushed dust is introduced into the inlet 51 of the first suction duct 50 arranged at the rear side of the suction port 20.

[0034] As shown in Fig. 9, when the brush 30 is backwardly rotated, that is, the brush 30 is rotated clockwise, the bristles 31 brush dust on the floor towards the front side of the suction port 20. According to this, most of brushed dust is introduced into the inlet 61 of the second suction duct 60 arranged at the front side of the suction port 20. Then, the dust flows along the second suction duct 60, and is introduced into the first suction duct 50 through the outlet 62 of the second suction duct 60.

[0035] The dust introduced into the first suction duct 50 and the second suction duct 60 is introduced into the connection pipe 115, and then is introduced into the dust chamber 4 of the body 1 through the connection hose 7. The dust filtered by the filter 3 inside the dust chamber 4 remains in the dust chamber 4, and the air filtered by the filter 3 is exhausted to outside of the body 1.

[0036] The suction head 100 of the vacuum cleaner according to the present invention is constructed so that the brush 30 can be reciprocatingly rotated within a range of a predetermined angle. According to this, an entire area occupied by the suction head 100 can be evenly brushed.

[0037] Also, the first suction duct 50 and the second suction duct 60 for introducing dust are respectively provided at both sides of a direction that the brush 30 brushes the floor. According to this, brushed dust can be smoothly sucked into the body 1.

[0038] Additionally, the width of right and left directions of the second suction duct 60 arranged at the front side of the suction port 20 is substantially same as the width of right and left directions of the suction port 20, and the width of right and left directions of the second suction duct 60 is gradually decreased from the inlet 61 towards the outlet 62. According to this, the entire region that the second suction duct 60 passes can be smoothly cleaned by using a proper suction force.

[0039] As the present invention may be embodied in several forms without departing from its scope defined by the claims, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified.

Claims

1. A suction head of a vacuum cleaner, comprising:

a housing (110) having a suction port (20) through which dust can be sucked;
a brush (30) rotatably installed in the suction port and having a plurality of bristles (31) arranged in a longitudinal direction thereof;
a brush driving device (40) for reciprocatingly rotating the brush within a range of a predetermined angle;
wherein the suction port (20) is formed to be opened towards a floor,
characterized by
a first suction duct (50) having an inlet (51) positioned corresponding to a direction of dust movement when the brush rotates in a forward direction; and
a second suction duct (60) having an inlet (61) positioned corresponding to a direction of dust movement when the brush rotates in a backward direction,
and by the two inlets (51, 61) being disposed to be spaced from the opened portion of the suction port (20).

2. The suction head of claim 1, wherein the brush driving device (40) is composed of:

a driving motor (41) for providing a driving force; and
a driving force transmitting unit (42) for transmitting a driving force of the driving motor to the brush (30) so that the brush can be reciprocatingly rotated within a range of a predetermined angle.

3. The suction head of claim 2, wherein the driving force transmitting unit (42) is composed of:

a rotary link (44) fixed to a motor shaft (43) of the driving motor (41) and concentrically rotated with the motor shaft;
a hinge bracket (45) installed at one side of an outer circumferential surface of the brush; and
a connecting rod (46) having one end hingedly connected to the rotary link at a position eccentric from a rotation center of the rotary link and having another end hingedly connected to the

hinge bracket.

4. The suction head of claim 1, wherein the inlet (51) of the first suction duct (50) is arranged at a rear side of the suction port (20), and the inlet (61) of the second suction duct (60) is arranged at a front side of the suction port and extended along an upper circumference of the suction port.

5. The suction head of claim 4, wherein an outlet (62) of the second suction duct (60) is connected to the first suction duct (50).

6. The suction head of claim 5, wherein a guide portion (70) is formed at the outlet (62) of the second suction duct (60), for guiding air passing through the second suction duct toward the first suction duct (50).

7. The suction head of claim 6, wherein both surfaces of the guide portion (70) are curvedly formed.

8. The suction head of claim 6, wherein the guide portion (70) is formed by protruding from a wall forming the second suction duct (60).

9. The suction head of claim 4, wherein the inlet (51) of the first suction duct (50) Is curvedly formed toward the suction port (20).

10. The suction head of claim 4, wherein a width in right and left directions of the inlet (61) of the second suction duct (60) is substantially same as a width In right and left directions of the suction port (20).

11. The suction head of claim 10, wherein a width in right and left directions of the second suction duct (80), is gradually decreased from the inlet (61) toward the outlet (62).

12. The suction head of claim 10, wherein a width In front and rear directions of the second suction duct (60) is gradually decreased towards a right side or a left side of the second suction duct.

Patentansprüche

1. Saugkopf eines Staubsaugers, umfassend:

ein Gehäuse (110) mit einem Saugmund (20), durch welchen Staub einsaugbar ist;
eine Bürste (30), die drehbar im Saugmund angebracht ist und eine Vielzahl von Borsten (31) aufweist, die in einer Längsrichtung dieser angeordnet sind;
eine Bürstenantriebsvorrichtung (40) zum Auf- und Abwärtsdrehen der Bürste innerhalb eines Bereichs eines vorbestimmten Winkels;
wobei der Saugmund (20) zu einem Boden hin offen ausgebildet ist;
gekennzeichnet durch
einen ersten Saugkanal (50) mit einem Eingang (51), der entsprechend einer Staubbewegungsrichtung positioniert ist, wenn sich die Bürste in eine Vorwärtsrichtung dreht; und
einen zweiten Saugkanal (60) mit einem Eingang (61), der entsprechend einer Staubbewegungsrichtung positioniert ist, wenn sich die Bürste in eine Rückwärtsrichtung dreht;
sowie **dadurch**, dass die beiden Eingänge (51, 61) so angeordnet sind, dass sie von dem offenen Abschnitt des Saugmundes (20) beabstandet sind.

2. Saugkopf nach Anspruch 1, wobei die Bürstenantriebsvorrichtung (40) zusammengesetzt ist aus:

einem Antriebsmotor (41) zum Bereitstellen einer Antriebskraft; und
einer Antriebskraftübertragungseinheit (42) zum Übertragen einer Antriebskraft des Antriebsmotors auf die Bürste (30), so dass die Bürste innerhalb eines Bereichs eines vorbestimmten Winkels aufwärts und abwärts drehbar ist.

3. Saugkopf nach Anspruch 2, wobei die Antriebskraftübertragungseinheit (42) zusammengesetzt ist aus:

einem Drehelement (44), das an einer Motorwelle (43) des Antriebsmotors (41) befestigt ist und sich mit der Motorwelle konzentrisch dreht;
einen Gelenkbügel (45), der an einer Seite einer Außenumfangsfläche der Bürste angebracht ist; und
eine Verbindungsstange (46), deren eines Ende gelenkig mit dem Drehelement an einer Position exzentrisch von einem Rotationszentrum des Drehelements verbunden ist, und deren anderes Ende gelenkig mit dem Gelenkbügel verbunden ist.

4. Saugkopf nach Anspruch 1, wobei der Eingang (51) des ersten Saugkanals (50) an einer Rückseite des Saugmundes (20) angeordnet ist, und der Eingang (61) des zweiten Saugkanals (60) an einer Vorderseite des Saugmundes angeordnet ist und sich entlang eines oberen Umfangs des Saugmundes erstreckt.

5. Saugkopf nach Anspruch 4, wobei ein Ausgang (62) des zweiten Saugkanals (60) mit dem ersten Saugkanal (50) verbunden ist.

6. Saugkopf nach Anspruch 5, wobei ein Führungsabschnitt (70) am Ausgang (62) des zweiten Saugka-

nals (60) ausgebildet ist, um durch den zweiten Saugkanal geleitete Luft zum ersten Saugkanal (50) zu führen.

7. Saugkopf nach Anspruch 6, wobei beide Flächen des Führungsabschnitts (70) gekrümmt ausgebildet sind.

8. Saugkopf nach Anspruch 6, wobei der Führungsabschnitt (70) durch Vorspringen von einer den zweiten Saugkanal (60) ausbildenden Wandung ausgebildet ist.

9. Saugkopf nach Anspruch 4, wobei der Eingang (51) des ersten Saugkanals (50) zum Saugmund (20) gekrümmt ausgebildet ist.

10. Saugkopf nach Anspruch 4, wobei eine Breite in die rechte und linke Richtung des Eingangs (61) des zweiten Saugkanals (60) im Wesentlichen dieselbe ist wie eine Breite in die rechte und linke Richtung des Saugmundes (20).

11. Saugkopf nach Anspruch 10, wobei eine Breite in die rechte und linke Richtung des zweiten Saugkanals (60) vom Eingang (61) zum Ausgang (62) nach und nach abnimmt.

12. Saugkopf nach Anspruch 10, wobei eine Breite in die Vorwärts- und Rückwärtsrichtung des zweiten Saugkanals (60) zu einer rechten Seite oder einer linken Seite des zweiten Saugkanals nach und nach abnimmt.

Revendications

1. Tête d'aspiration d'un aspirateur, comprenant :

un boîtier (110) comportant un orifice d'aspiration (20) à travers lequel de la poussière peut être aspirée ;
une brosse (30) installée de manière à pouvoir tourner dans l'orifice d'aspiration et comportant une pluralité de poils (31) agencés dans un sens longitudinal de celle-ci ;
un dispositif d'entraînement de brosse (40) pour faire tourner la brosse en va-et-vient à l'intérieur d'une plage d'un angle prédéterminé ;
l'orifice d'aspiration (20) étant formé pour être ouvert vers un plancher, **caractérisée par**
un premier conduit d'aspiration (50) comportant une entrée (51) positionnée en correspondance avec un sens de déplacement de la poussière lorsque la brosse tourne dans un sens vers l'avant ; et
un deuxième conduit d'aspiration (60) comportant une entrée (61) positionnée en correspondance avec un sens de déplacement de la poussière lorsque la brosse tourne dans un sens vers l'arrière ;
et en ce que les deux entrées (51, 61) sont disposées pour être espacées de la portion ouverte de l'orifice d'aspiration (20).

2. Tête d'aspiration selon la revendication 1, dans laquelle le dispositif d'entraînement de brosse (40) se compose :

d'un moteur d'entraînement (41) pour fournir une force d'entraînement ; et
d'une unité de transmission de force d'entraînement (42) pour transmettre une force d'entraînement du moteur d'entraînement à la brosse (30) de façon que la brosse puisse pivoter en va-et-vient dans une plage d'un angle prédéterminé.

3. Tête d'aspiration selon la revendication 2, dans laquelle l'unité de transmission de force d'entraînement (42) se compose :

d'une liaison rotative (44) fixée à un arbre de moteur (43) du moteur d'entraînement (41) et tournant concentriquement avec l'arbre de moteur ;
d'un support d'articulation (45) installé sur un côté d'une surface circonférentielle extérieure de la brosse ; et
d'une bielle (46) ayant une extrémité reliée de manière articulée à la liaison rotative à une position excentrée par rapport à un centre de rotation de la liaison rotative et ayant une autre extrémité reliée de manière articulée au support d'articulation.

4. Tête d'aspiration selon la revendication 1, dans laquelle l'entrée (51) du premier conduit d'aspiration (50) est agencée sur un côté arrière de l'orifice d'aspiration (20), et l'entrée (61) du deuxième conduit d'aspiration (60) est agencée sur un côté avant de l'orifice d'aspiration et s'étend le long d'une circonférence supérieure de l'orifice d'aspiration.

5. Tête d'aspiration selon la revendication 4, dans laquelle une sortie (62) du deuxième conduit d'aspiration (60) est reliée au premier conduit d'aspiration (50).

6. Tête d'aspiration selon la revendication 5, dans laquelle une portion de guidage (70) est formée à la sortie (62) du deuxième conduit d'aspiration (60), pour guider de l'air traversant le deuxième conduit d'aspiration vers le premier conduit d'aspiration (50).

7. Tête d'aspiration selon la revendication 6, dans la-

quelle les deux surfaces de la portion de guidage (70) sont incurvées.

8. Tête d'aspiration selon la revendication 6, dans laquelle la portion de guidage (70) est formée en faisant saillie à partir d'une paroi constituant le deuxième conduit d'aspiration (60).

9. Tête d'aspiration selon la revendication 4, dans laquelle l'entrée (51) du premier conduit d'aspiration (50) est incurvée vers l'orifice d'aspiration (20).

10. Tête d'aspiration selon la revendication 4, dans laquelle une largeur vers la droite et vers la gauche de l'entrée (61) du deuxième conduit d'aspiration (60) est sensiblement identique à une largeur vers la droite et vers la gauche de l'orifice d'aspiration (20).

11. Tête d'aspiration selon la revendication 10, dans laquelle une largeur vers la droite et vers la gauche du deuxième conduit d'aspiration (60) diminue progressivement à partir de l'entrée (61) vers la sortie (62).

12. Tête d'aspiration selon la revendication 10, dans laquelle une largeur vers l'avant et vers l'arrière du deuxième conduit d'aspiration (60) diminue progressivement vers un côté droit ou vers un côté gauche du deuxième conduit d'aspiration.

FIG. 1

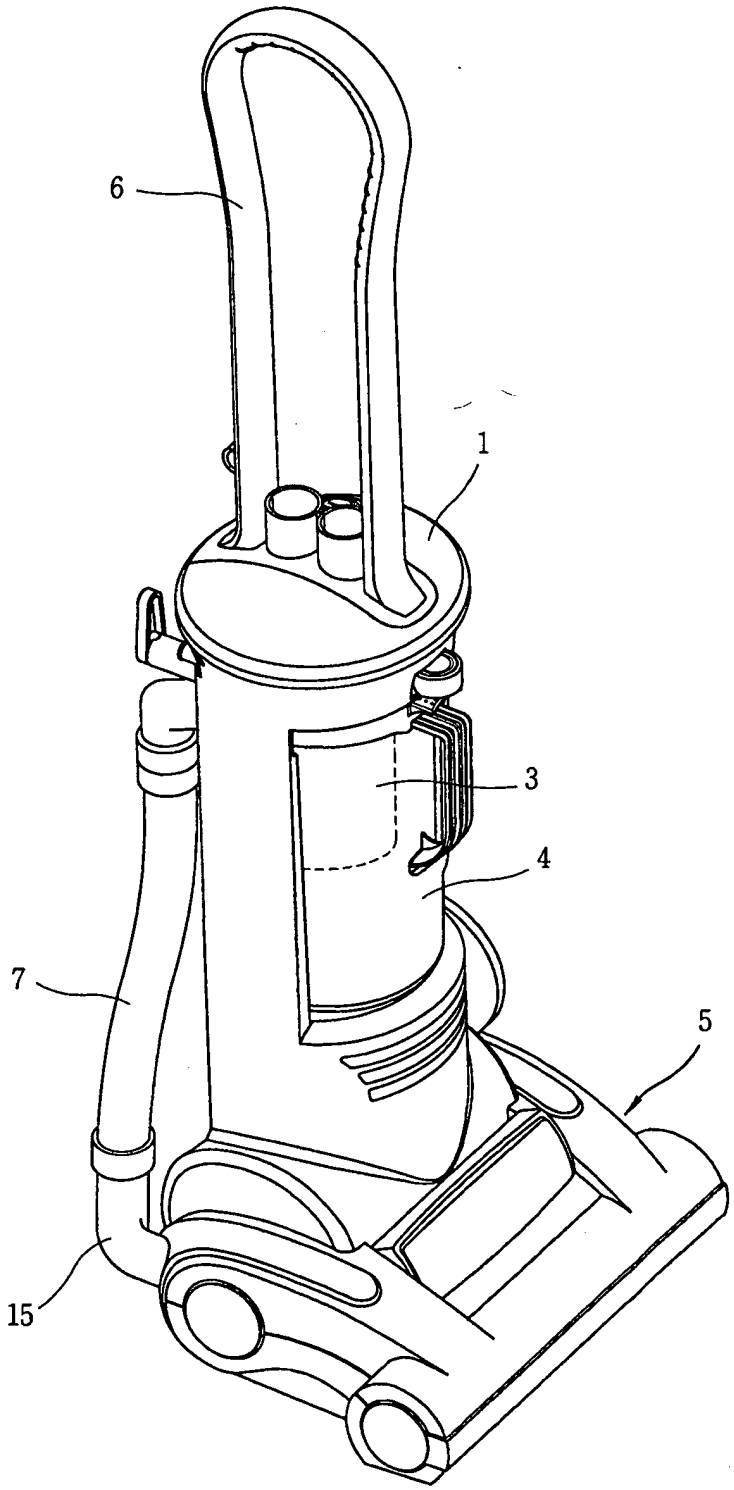


FIG. 2

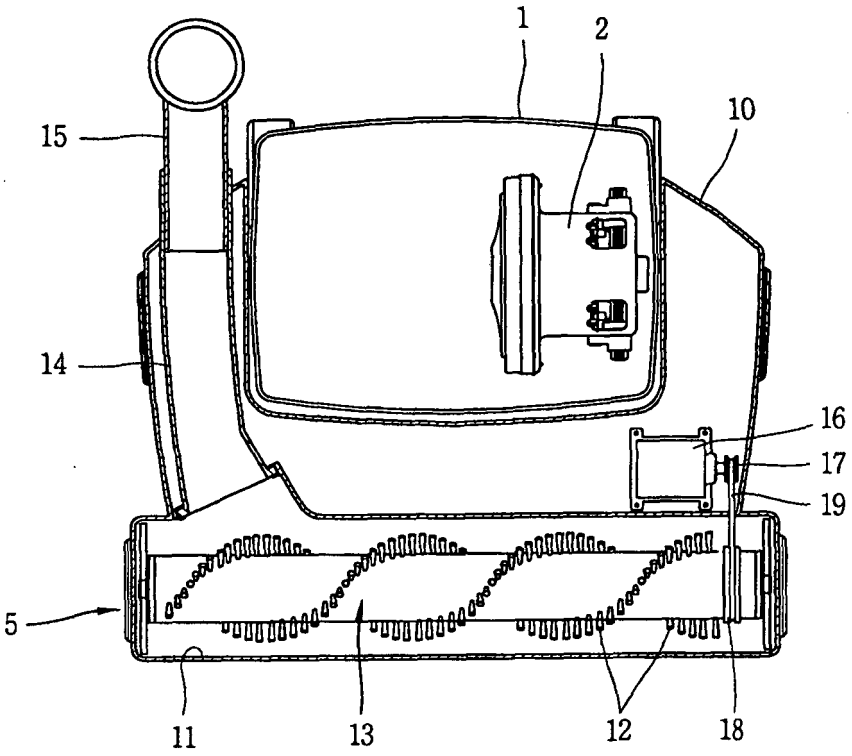


FIG. 3

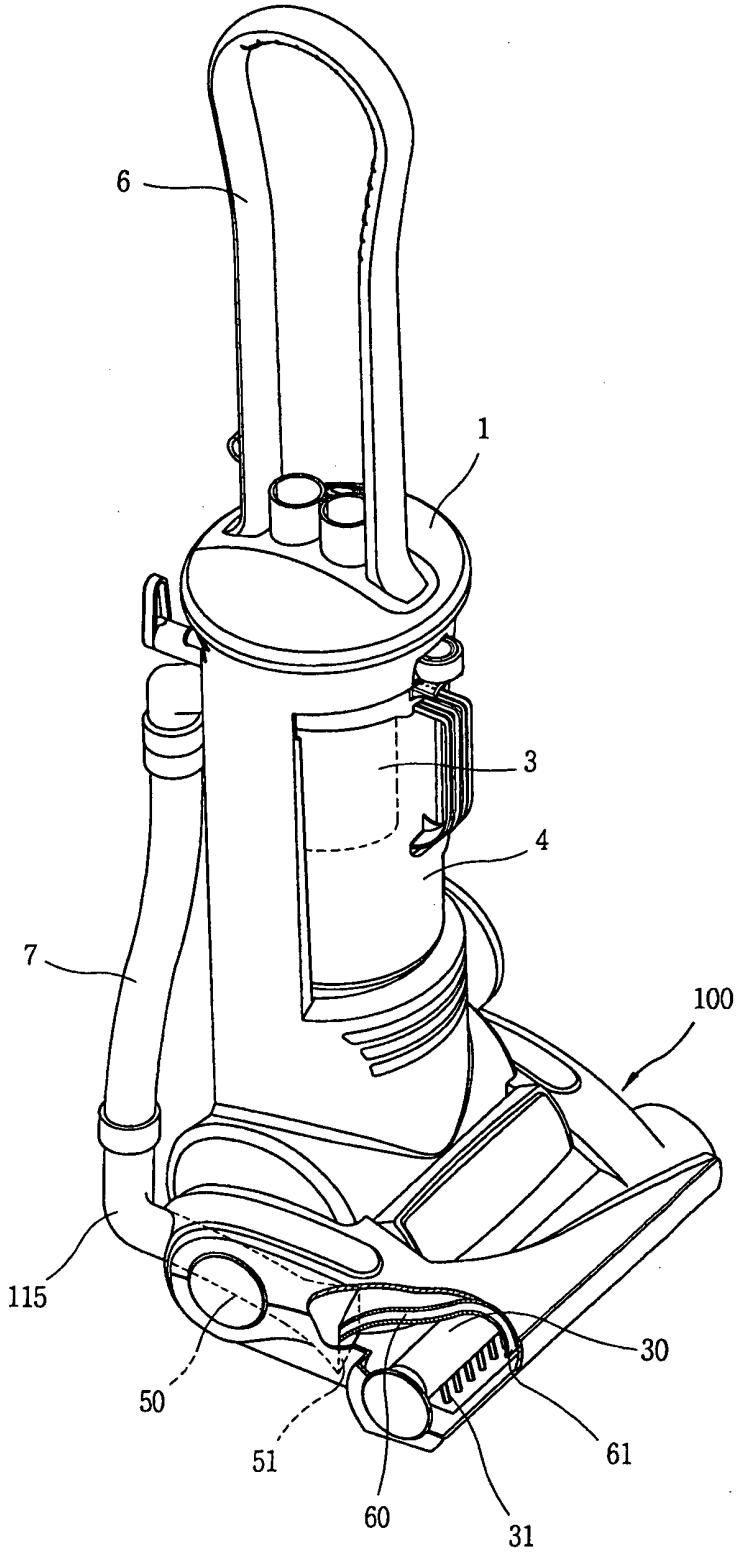


FIG. 4

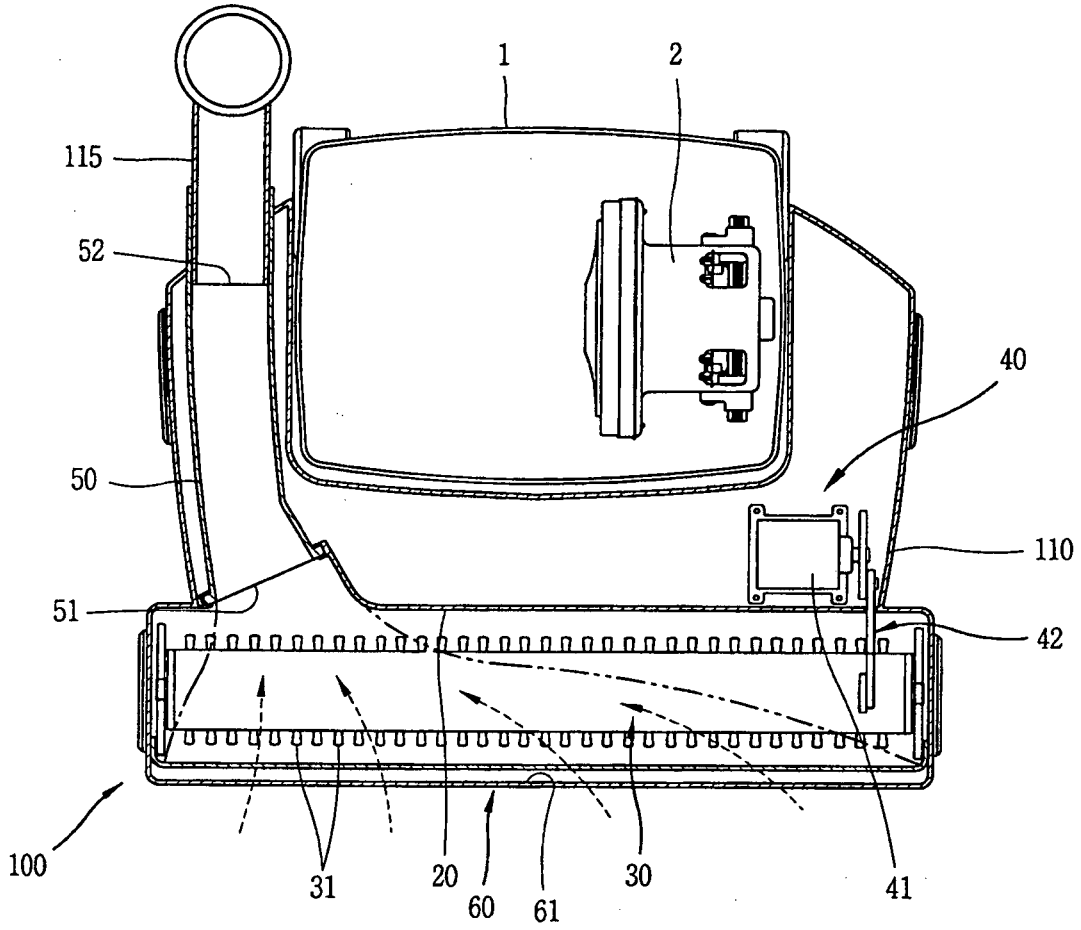


FIG. 5

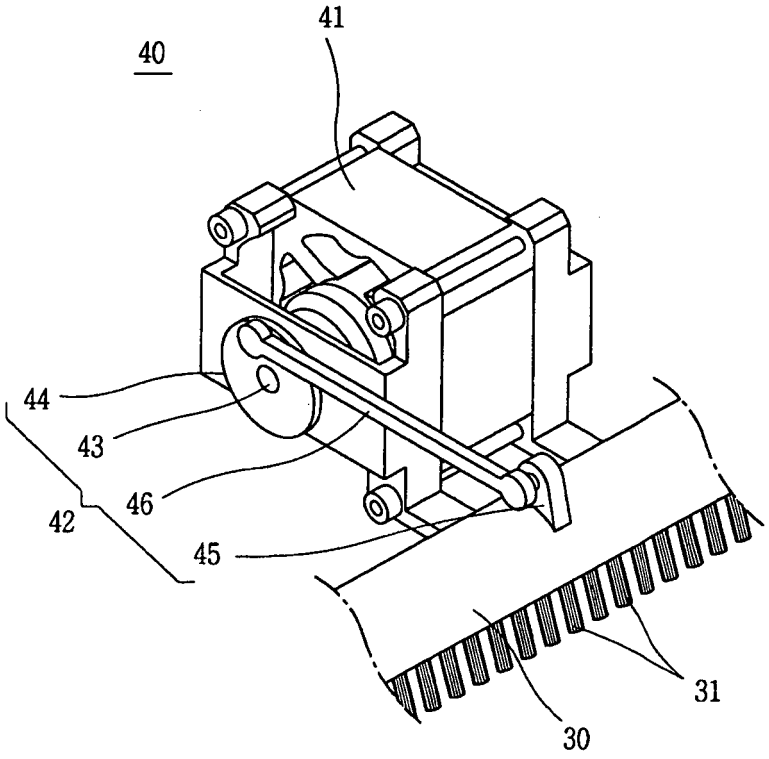


FIG. 6

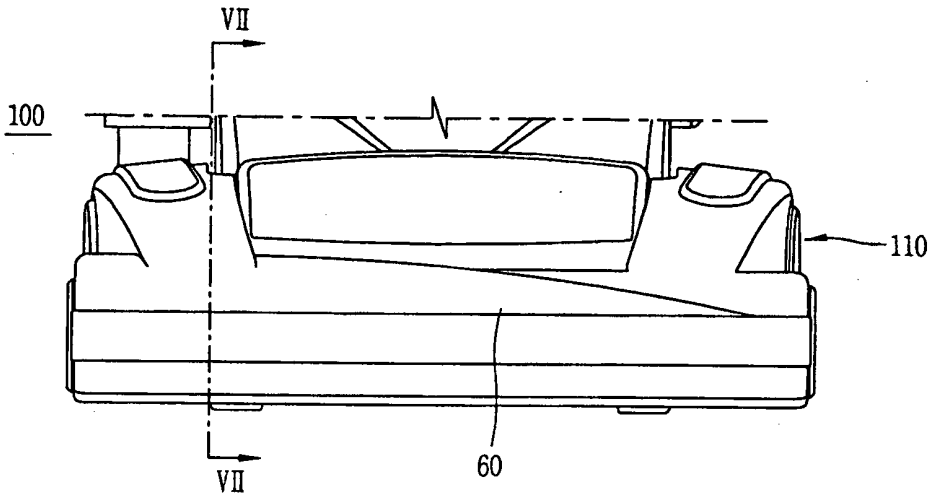


FIG. 7

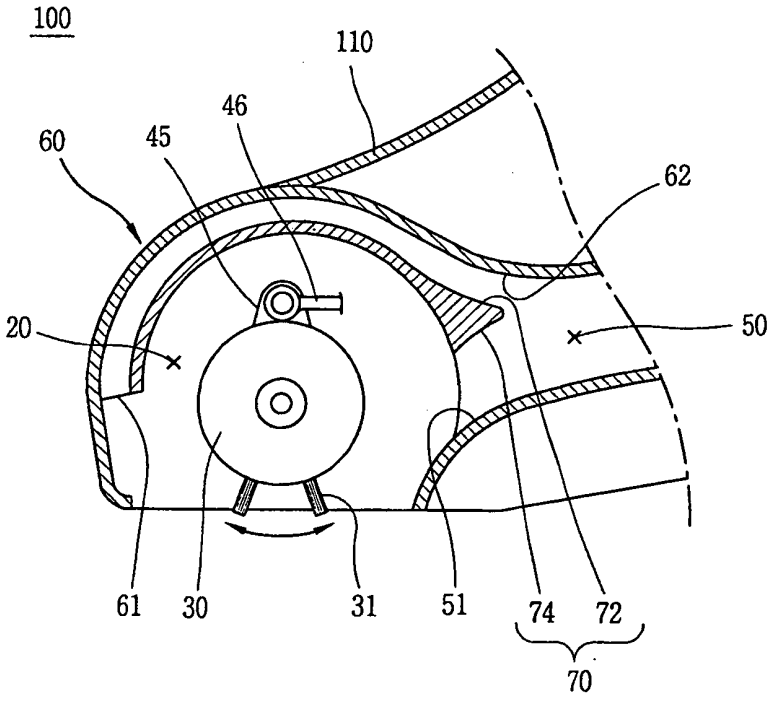


FIG. 8

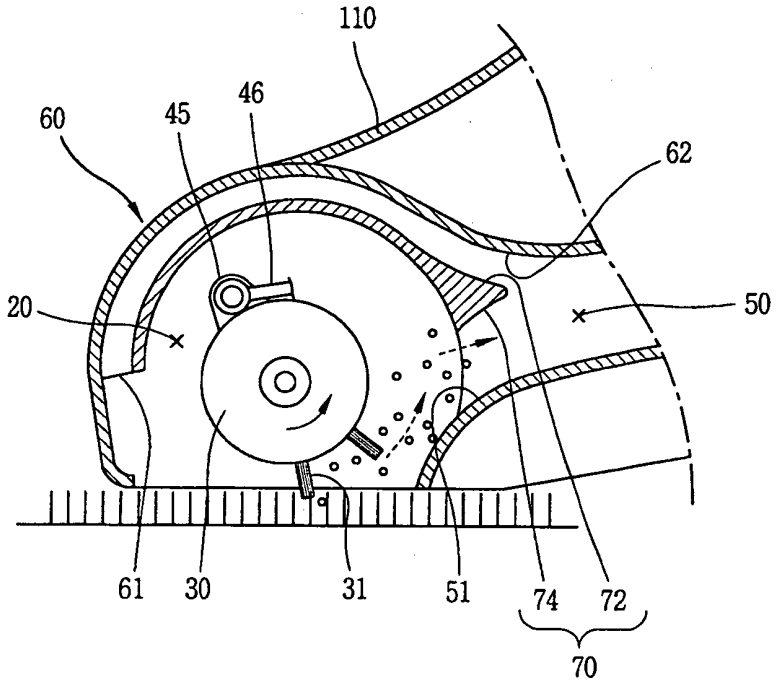
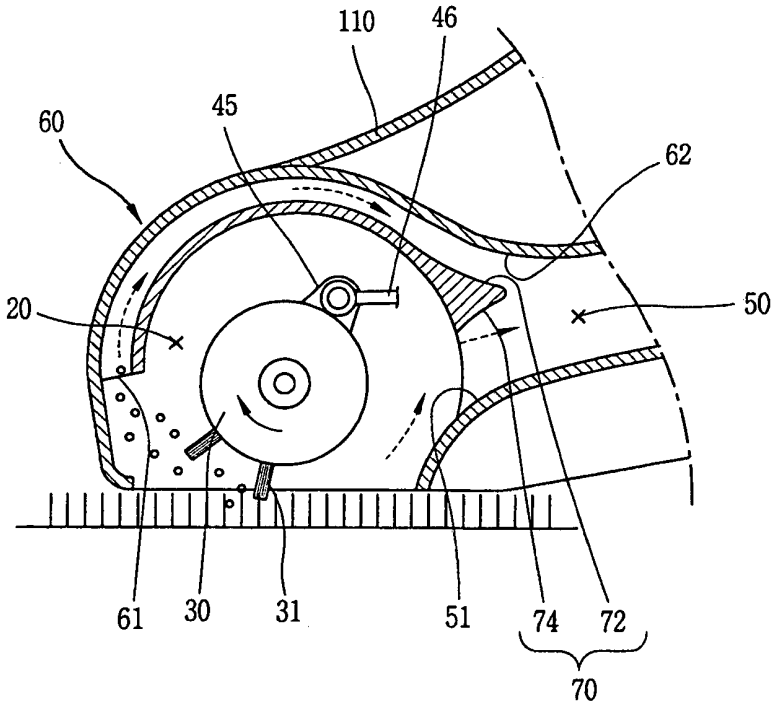

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FIG. 9


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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4430768 A **[0007]**
- US 4426751 A **[0007]**