(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 604 603 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.12.2005 Bulletin 2005/50

(51) Int Cl.[7]: **A47L 9/04**

(21) Application number: **05290288.9**

(22) Date of filing: **09.02.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR LV MK YU

(30) Priority: **12.06.2004 KR 2004043304**

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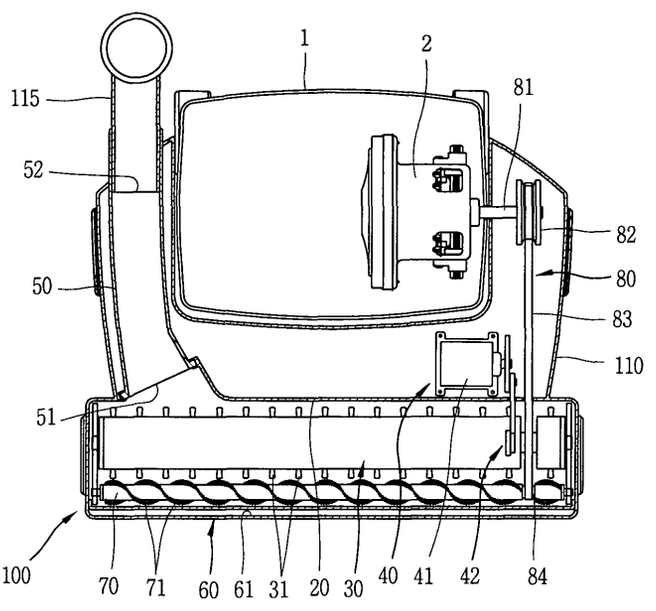
(54) Suction head of vacuum cleaner

(57) A suction head (100) of a vacuum cleaner, comprises: a housing (110) having a suction port (20) through which dust on a floor is sucked by an operation of a fan motor (2); a primary brush (30) rotatably installed in the suction port (20) and having a plurality of bristles (31) arranged in a longitudinal direction thereof; a primary brush driving device (40) for reciprocatingly rotating the primary brush (30) within a range of a predetermined angle; and an auxiliary brush (70) rotatably installed at one side of the primary brush (30) and having a plurality of bristles (71) arranged in a longitudinal direction thereof, for supplementing an operation of the primary brush (30) with being rotated. According to this, an entire area occupied by the suction head (100) can be evenly brushed, and brushed dust can be smoothly sucked.

FIG. 4



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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 enhancing a cleaning function by providing an auxiliary brush for supplementing an operation of a brush to collect dust on a floor.

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.

SUMMARY OF THE INVENTION

[0007] 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 thus to collect dust to reciprocatingly rotate within a range of a predetermined angle.

[0008] 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 providing an auxiliary brush for supplementing an operation of the brush.

[0009] 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, comprising: a housing having a suction port through which dust on a floor is sucked by an operation of a fan motor; a primary brush rotatably installed in the suction port and having a plurality of bristles arranged in a longitudinal direction thereof; a primary brush driving device for reciprocatingly rotating the primary brush within a range of a predetermined angle; and an auxiliary brush rotatably installed at one side of the primary brush and having a plurality of bristles arranged in a longitudinal direction thereof, for supplementing an operation of the primary brush with being rotated.

[0010] 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

[0011] 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.

[0012] 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 primary brush and a primary brush driving device provided at the suction head of the vacuum cleaner according to the present invention;

Fig. 6 is a sectional view showing the suction head of the vacuum cleaner according to the present invention; and

Fig. 7 is a sectional view showing an operation state of the suction head of the vacuum cleaner according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0014] 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.

[0015] The suction head 100 includes: a housing 110 provided with a suction port 20 having a structure opened towards a floor; a cylindrical primary brush 30 rotatably installed in the suction port 20 and having a plurality of bristles 31 arranged in a longitudinal direction thereof; a primary brush driving device 40 for reciprocatingly rotating the primary 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 primary 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 primary brush 30 rotates in a backward direction; a connection pipe 115 for connecting the first suction duct 50 and the second suction duct 60 to the connection hose 7; a cylindrical auxiliary brush 70 rotatably installed at one side of the primary brush 30 and having a plurality of bristles 71 arranged in a longitudinal direction thereof, for supplementing an operation of the primary brush 30 with being rotated; and a rotational force transmitting unit 80 for transmitting a rotational force of the fan motor 2 to the auxiliary brush 70.

[0016] The bristles 31 of the brush 30 are uniformly installed on the primary brush 30 in a longitudinal direction of the primary brush 30 as a plurality of rows.

[0017] As shown in Fig. 5, the primary 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 primary brush 30 so that the primary brush 30 can be reciprocatingly rotated within a range of a predetermined angle.

[0018] 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 primary brush 30; and a connecting rod 46 having one end hingedly connected to the rotary link 44 at a position eccentric from a rotation center of the rotary link 44 and having another end hingedly connected to the hinge bracket 45 thus to perform an angular reciprocating motion by a rotation of the rotary link 44.

[0019] The driving force transmitting unit 42 converts a rotational motion of the motor shaft 43 of the driving motor 41 into a forward and backward reciprocating rotation of the primary brush 30.

[0020] As shown in Fig. 6, the inlet 51 of the first suction duct 50 is arranged at a rear side of the primary brush 30 and is 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.

[0021] When the primary brush 30 is forwardly rotated, that is, the primary brush 30 is rotated counterclockwise as shown in Fig. 6, the first suction duct 50 serves as a primary path of dust brushed by the bristles 31 of the primary brush 30 thus to be moved to the rear side of the suction port 20.

[0022] The inlet 61 of the second suction duct 60 is arranged to be opened towards a floor at the front side of the primary 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.

[0023] When the primary brush 30 is backwardly rotated, that is, the primary brush 30 is rotated clockwise as shown in Fig. 6, the second suction duct 60 serves as a secondary path of dust brushed by the bristles 31 of the primary brush 30 thus to be moved to the front side of the suction port 20.

[0024] The auxiliary brush 70 is disposed between the primary brush 30 and the inlet 61 of the second suction duct 60, and the bristles 71 are sequentially installed at an outer circumferential surface of the auxiliary brush 70 in a circumferential direction.

[0025] The rotational force transmitting unit 80 is composed of a driving pulley 82 connected to a motor shaft 81 extended from the fan motor, a driven pulley 84 installed at one side of the auxiliary brush 70, and a belt 83 for connecting the driving pulley 82 and the driven pulley 84.

[0026] The auxiliary brush 70 is forwardly rotated, that is, is counterclockwise rotated in Fig. 6, and moves dust brushed by the primary brush 30 rotating in a backward

(i.e., clockwise) direction, thus to be moved to the front side of the suction port 20 toward a rear side of the suction port 20.

[0027] The auxiliary brush 70 can be backwardly rotated, that is, can be clockwise rotated in Fig. 6, and can induce dust brushed by the primary brush 30 rotating in a backward (i.e., clockwise) direction, thus to be moved to the front side of the suction port 20 toward the inlet 61 of the second suction duct 60.

[0028] 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.

[0029] 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.

[0030] At this time, as shown in Fig. 7, a rotational force is generated at the driving motor 41. When the rotational force of the driving motor 41 is transmitted to the primary brush 30 through the driving force transmitting unit 42, the primary brush 30 is reciprocatingly rotated within a range of a predetermined angle.

[0031] As shown in Fig. 7, when the primary brush 30 is forwardly rotated, that is, the primary brush 30 is rotated counterclockwise, the bristles 31 of the primary brush 30 brush dust on the floor towards the rear side of the suction port 20. According to this, most of the brushed dust is introduced into the inlet 51 of the first suction duct 50.

[0032] As shown in Fig. 7, when the primary brush 30 is backwardly rotated, that is, the primary brush 30 is rotated clockwise, the bristles 31 of the primary brush 30 brush dust on the floor towards the front side of the suction port 20. Also, the bristles 71 of the auxiliary brush 70 brush the floor, and move dust brushed by the primary brush 30 thus to be moved to the front side of the suction port 20 toward the rear side of the suction port 20.

[0033] According to this, the dust moved to the rear side of the suction port 20 by a rotation of the auxiliary brush 70 is introduced into the inlet 51 of the first suction duct 50.

[0034] According to this, most of the dust brushed by the primary brush 30 and the auxiliary brush 70 is introduced into the first suction duct 50 having a suction force comparatively greater than that of the second suction duct 60.

[0035] A part of dust that has not moved to the rear side of the suction port 20 by the auxiliary brush 70 is introduced into the inlet 61 of the second suction duct 60, 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.

[0036] 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 clean air filtered by the filter 3 is exhausted to outside of the body 1.

[0037] The suction head 100 of the vacuum cleaner according to the present invention is constructed so that the primary 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 thereby to enhance a cleaning function.

[0038] Also, the auxiliary brush 70 connected to the fan motor 2 thus to be rotated is installed between the primary brush 30 and the second suction duct 60, so that dust brushed by the primary brush 30 can be smoothly sucked.

[0039] Additionally, since a driving force of the fan motor 2 is used in order to rotate the auxiliary brush 70 without an additional driving force generating means, a construction by an installation of the auxiliary brush 70 is simplified.

[0040] Also, since the first suction duct 50 and the second suction duct 60 for introducing dust are provided at both sides of the primary brush 30 and the auxiliary brush 70, respectively, brushed dust can be smoothly sucked into the body 1 by the primary brush 30 and the auxiliary brush 70.

[0041] As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, 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, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalence of such metes and bounds are therefore intended to be embraced by the appended claims.

Claims

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

a housing having a suction port through which dust on a floor is sucked by an operation of a fan motor;

a primary brush rotatably installed in the suction port and having a plurality of bristles arranged in a longitudinal direction thereof;

a primary brush driving device for reciprocatingly rotating the primary brush within a range of a predetermined angle; and

an auxiliary brush rotatably installed at one side of the primary brush and having a plurality of bristles arranged in a longitudinal direction

thereof, for supplementing an operation of the primary brush with being rotated.

2. The suction head of claim 1, further comprising a rotational force transmitting unit for transmitting a rotational force of the fan motor to the auxiliary brush.

3. The suction head of claim 2, wherein the rotational force transmitting unit is composed of:

a driving pulley connected to a motor shaft extended from the fan motor;
a driven pulley mounted at one side of the auxiliary brush; and
a belt for connecting the driving pulley and the driven pulley.

4. The suction head of claim 1, further comprising:

a first suction duct having an inlet positioned corresponding to a direction of dust movement when the primary brush rotates in a forward direction; and
a second suction duct having an inlet positioned corresponding to a direction of dust movement when the primary brush rotates in a backward direction.

5. The suction head of claim 4, wherein the inlet of the first suction duct is arranged at a rear side of the suction port, and the inlet of the second suction duct is arranged at a front side of the suction port and extended along an upper circumference of the suction port.

6. The suction head of claim 5, wherein the auxiliary brush is installed between the primary brush and the inlet of the second suction duct, and is rotated to brush dust on a floor towards the primary brush.

7. The suction head of claim 5, wherein an outlet of the second suction duct is connected to the first suction duct.

8. The suction head of claim 1, wherein the primary brush driving device is composed of:

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

9. The suction head of claim 8, wherein the driving force transmitting unit is composed of:

a rotary link fixed to a motor shaft of the driving motor and concentrically rotated with the motor shaft;
a hinge bracket installed at one side of an outer circumferential surface of the primary brush; and
a connecting rod 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.

FIG. 1

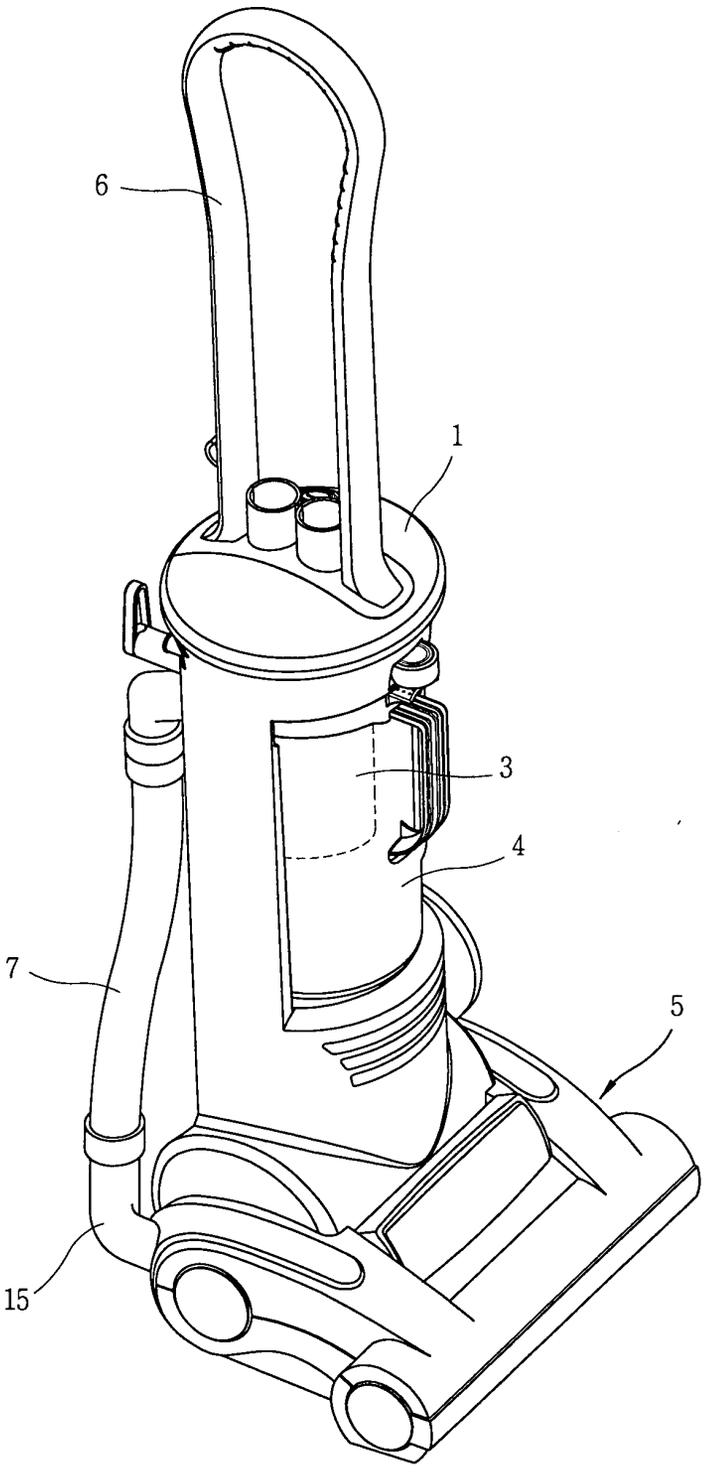

FIG. 2

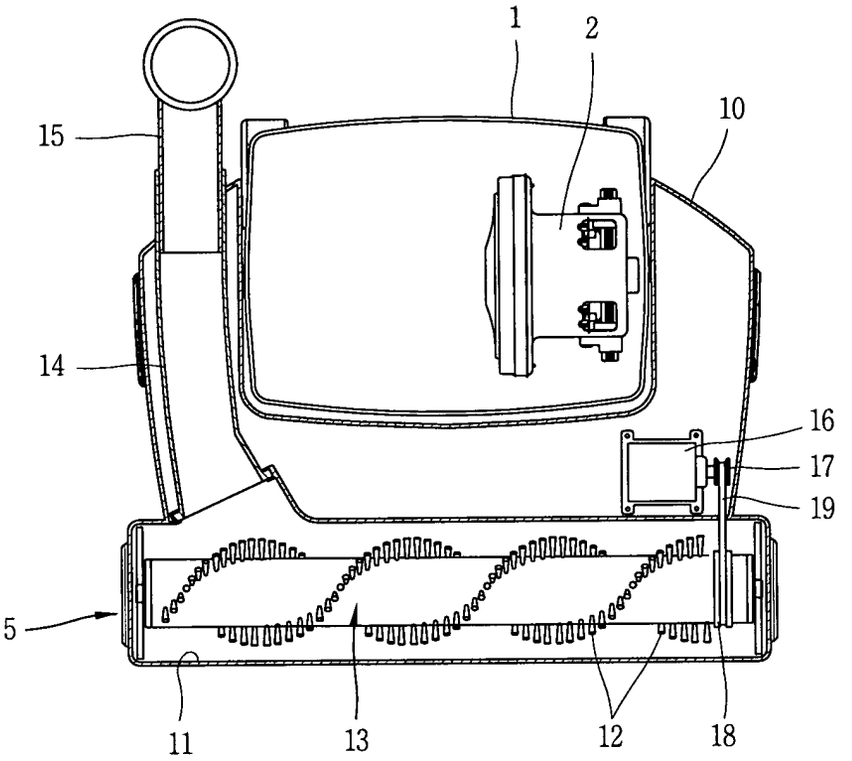

FIG. 3

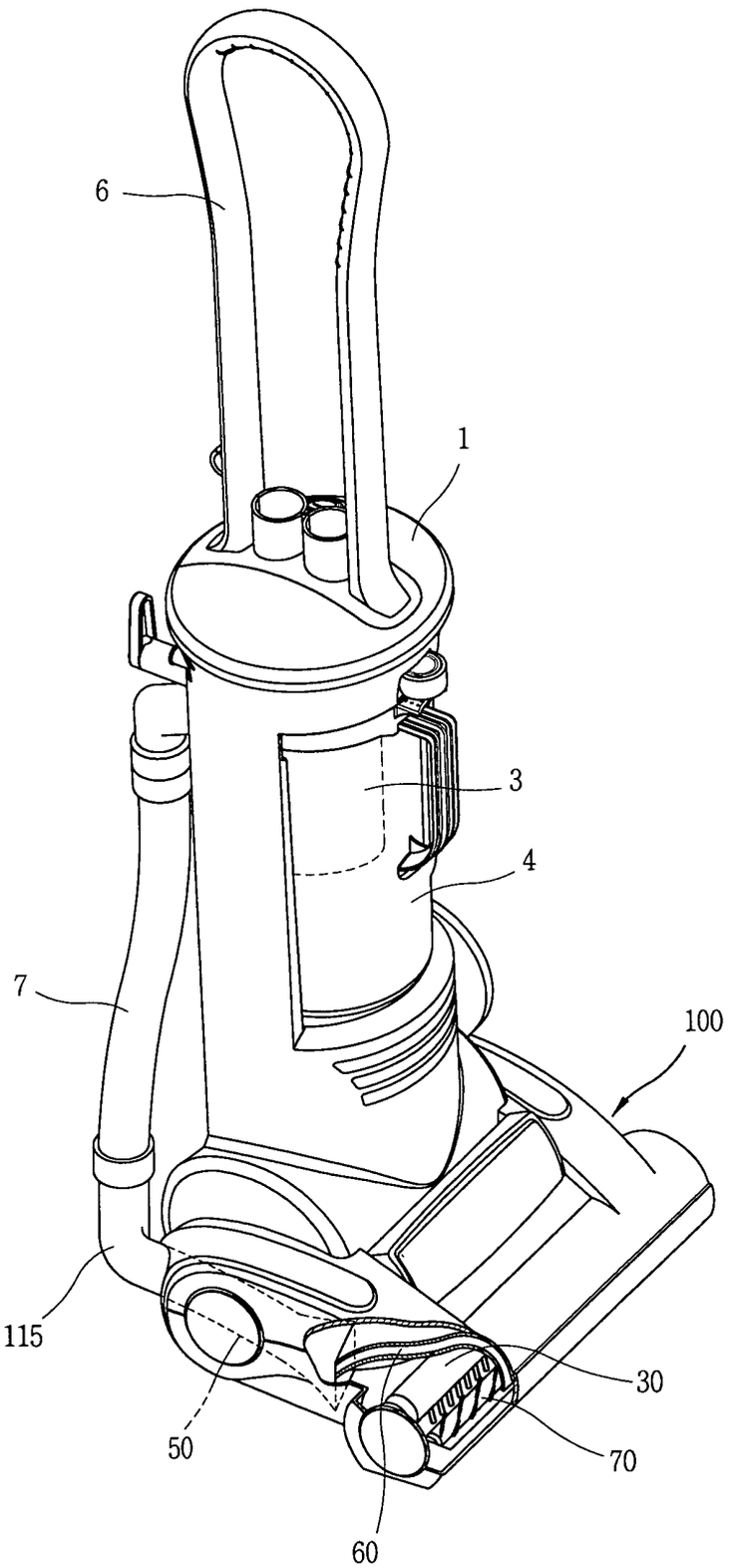

FIG. 4

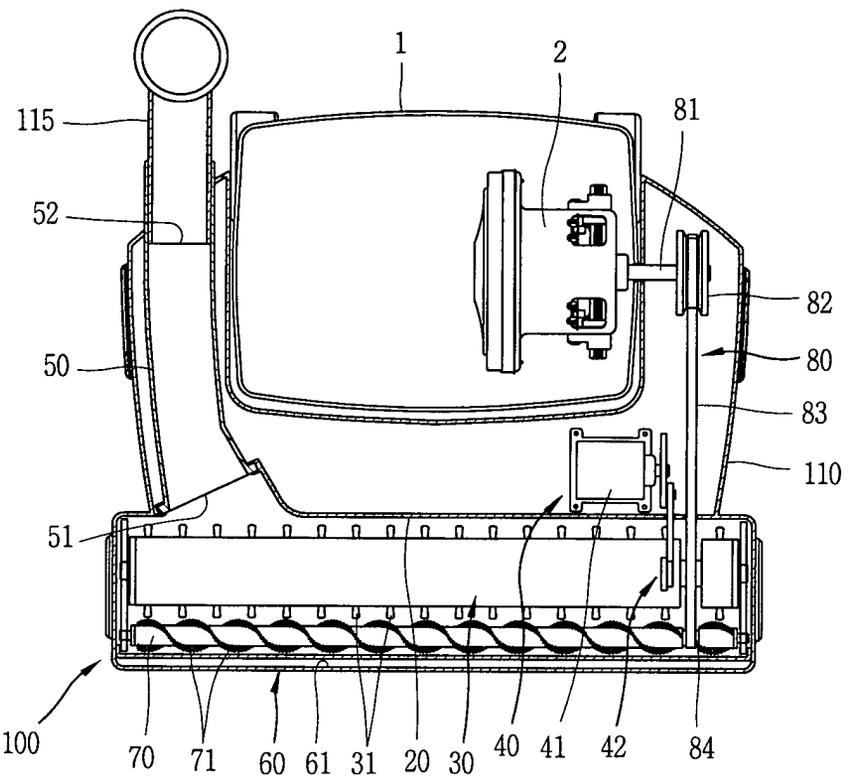

FIG. 5

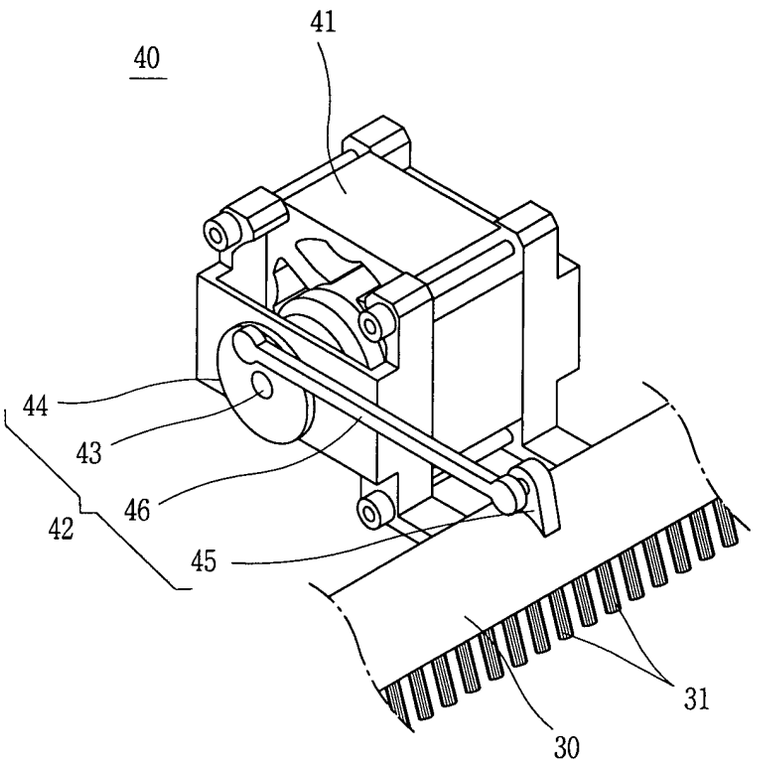

FIG. 6

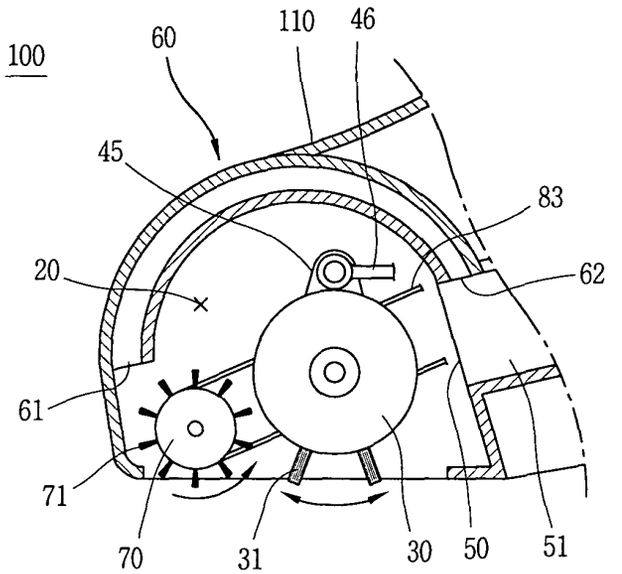
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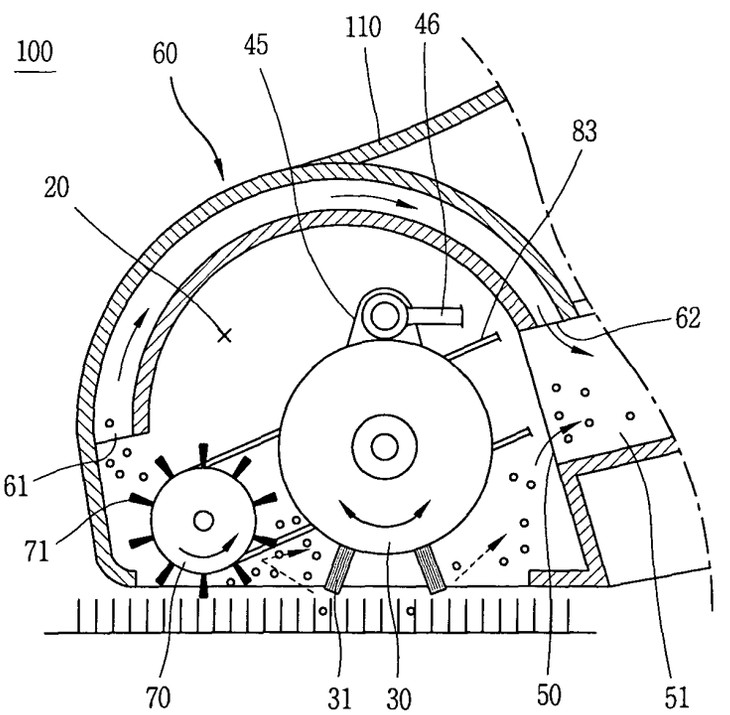
FIG. 7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EUROPEAN SEARCH REPORT

Application Number
EP 05 29 0288

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 September 2005	Bourseau, A-M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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