(12) STANDARD PATENT (11) Application No. **AU 2005220262 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Exhaust hood

(51) International Patent Classification(s)
F24C 15/20 (2006.01)

(21) Application No: **2005220262** (22) Date of Filing: **2005.10.10**

(30) Priority Data

(31) Number	(32) Date	(33) Country
2004-106349	**2004.12.15**	**KR**

(43) Publication Date: **2006.06.29**
(43) Publication Journal Date: **2006.06.29**
(44) Accepted Journal Date: **2007.07.26**

(71) Applicant(s)
LG Electronics Inc.

(72) Inventor(s)
Baek, Seung Jo;Lee, Je Jun;Song, Sung Bae;Sohn, Sang Bum

(74) Agent / Attorney
Freehills Patent & Trade Mark Attorneys, GPO Box 128, Melbourne, VIC, 3000

(56) Related Art
US4346692

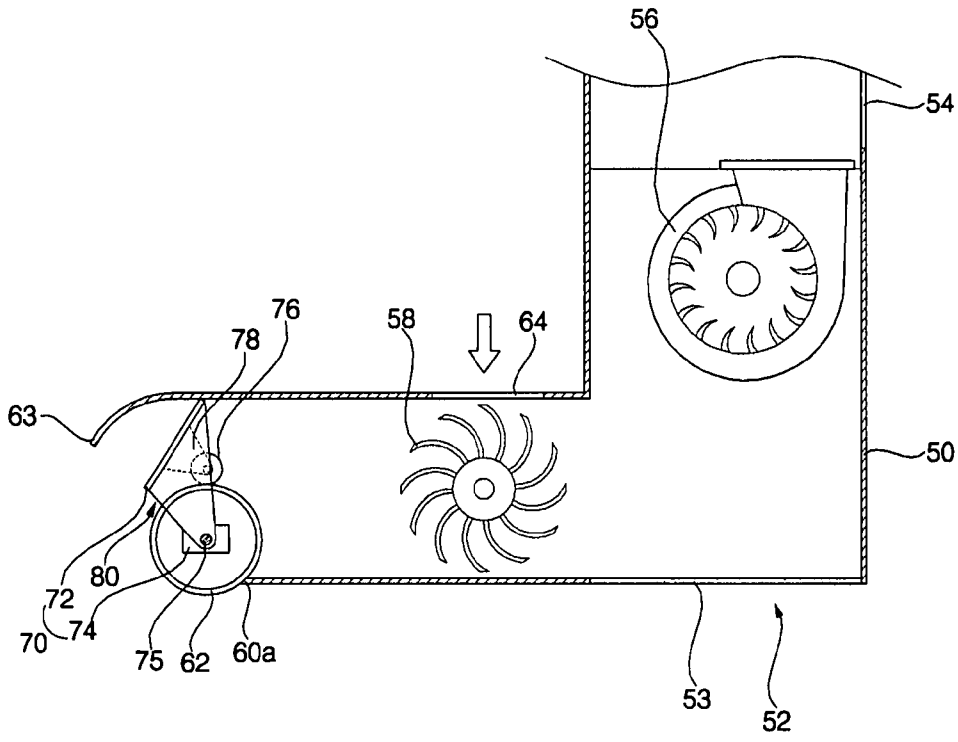
2005220262 10 Oct 2005

ABSTRACT OF THE DISCLOSURE

Disclosed herein is an exhaust hood. The flow of air discharged from a nozzle unit of a hood body out of a kitchen is changed by a ring-shaped rod and a louver, which are disposed in the nozzle unit of the hood body. Consequently, the present invention has the effect of selectively accomplishing air-curtain effect of preventing contaminated air from diffusing in front of a cooking table and Coanda effect of collecting contaminated air away from an inlet port of the hood body.

2005220262 10 Oct 2005

FIG. 2



2005220262 10 Oct 2005

P/00/011
Regulation 3.2

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title: **Exhaust hood**

The following statement is a full description of this invention, including the best method of performing it known to us:

2005220262 10 Oct 2005

EXHAUST HOOD

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an exhaust hood, and, more particularly, to an exhaust hood that allows flow of air to be changed based on the user's circumstances for selectively accomplishing air-curtain effect and Coanda effect, whereby the convenience of the exhaust hood is improved.

Description of the Related Art

Each kitchen is generally provided with a cooking table, on which a heating unit, such as an electric heater or a gas cooker, for applying heat to food such that the food is cooked, for example, boiled or baked, is disposed.

When food is cooked at high temperature generated by the heating unit disposed on the cooking table, the food gives off odors. The odors are generated by oil particles and aerosol particles floating in the air while the food is cooked. Especially in a poorly ventilated kitchen, the odors generated from the food may prevent the chef from concentrating and may thus cause injury. For this reason, an exhaust hood is disposed above the cooking table for exhausting the odors and

2005220262 10 Oct 2005

contaminated substances.

FIG. 1 is a view schematically showing a conventional exhaust hood 10 for kitchens.

As shown in FIG. 1, the conventional exhaust hood 10 for kitchens is disposed above a cooking table 2, on which food is cooked, while being fixed to a mounting wall 4 and a ceiling 6.

The exhaust hood 10 comprises: a hood body 12 forming the appearance of the exhaust hood 10, the hood body 12 being provided with an inlet port 14 and an outlet port 16; an exhaust fan 18 for suctioning air into the hood body 12 and discharging the air out of the kitchen; a motor (not shown) for driving the exhaust fan 18; a filter 20 disposed in the inlet port 14 of the hood body 12 for purifying air when the air is suctioned through the inlet port 14; and an exhaust pipe (not shown) connected to the outlet port 16 of the hood body 12 for guiding air discharged through the outlet port 16 out of the kitchen.

The operation of the conventional exhaust hood with the above-stated construction will now be described.

When the exhaust hood 10 is operated while food is cooked on the cooking table 2, the exhaust fan 18 is rotated by the motor. As a result, contaminated air generated while the food is cooked, such as gas and grease fumes, is introduced into the hood body 12 through the inlet port 14 by

a suction force of the exhaust fan 18.

As it is introduced into the hood body 12 through the inlet port 14, the contaminated air passes through the filter 20, by which the contaminated substances are filtered out. Consequently, the purified air is discharged out of the kitchen through the outlet port 16 and the exhaust pipe.

With the conventional exhaust hood, however, air present in front of the inlet port 14 or at both sides of the inlet port 14 is not satisfactorily suctioned into the hood body 12 although air present below the inlet port 14 of the hood body 12 is satisfactorily suctioned into the hood body 12. As a result, contaminated air diffuses throughout the kitchen.

In order to solve the above problem, the other fan is disposed in front of the hood body of the exhaust hood for injecting air in front of the cooking table to isolate a user from the cooking table (air-curtain effect), or the hood body of the exhaust hood is modified such that the front end of the hood body is curved to cause air to flow along the curved front end of the hood body (Coanda effect). In this way, the suction force and collecting efficiency in front of the exhaust hood are improved.

In this case, however, either the air-curtain effect or the Coanda effect is individually used, and therefore, the efficiency of the exhaust hood is limited.

2005220262 10 Oct 2005

SUMMARY OF THE INVENTION

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide an exhaust hood that is capable of effectively collecting contaminated air generated at a cooking table in a kitchen for preventing the contaminated air from diffusing about the kitchen and other dwelling areas.

In accordance with the present invention, the above and other objects can be accomplished by the provision of an exhaust hood comprising: a hood body disposed above a cooking table in a kitchen, the hood body being provided with an inlet port and an outlet port; an exhaust fan mounted to one side in the hood body for suctioning air into the hood body through the inlet port and discharging the air out of the kitchen through the outlet port; an auxiliary fan mounted to the other side in the hood body; a nozzle unit disposed at the front part of the hood body for discharging air blown by the auxiliary fan into the kitchen; a guide unit mounted to the nozzle unit, the guide unit having a curved part for guiding air such that air around the curved part of the guide unit flows along the curved part of the guide unit; and an air flow changing unit disposed between the nozzle unit and the guide unit such that the air flow changing unit can be rotated along the curved part of the guide unit for changing flow of air

discharged from the nozzle unit.

Preferably, the air flow changing unit comprises: a louver disposed in the nozzle unit while being spaced a predetermined distance from the guide unit, the louver and the guide unit together defining a discharging slit therebetween such that air is discharged from the nozzle unit through the discharging slit.

Preferably, the air flow changing unit further comprises: a motor for rotating the louver.

Preferably, the louver comprises: a guide part for guiding flow of air; and connection parts attached to both ends of the guide part, the connection parts being connected to a rotary shaft of the motor.

Preferably, the guide unit is a ring-shaped rod mounted to a lower part of the nozzle unit.

Preferably, the ring-shaped rod is formed in a hollow shape such that the motor is mounted in the ring-shaped rod.

Preferably, the air flow changing unit is provided with at least one roller that is in rolling contact with the curved part of the guide unit.

Preferably, the at least one roller comprises: a plurality of rollers attached to the lower surface of the air flow changing unit while being spaced a predetermined length from each other in the longitudinal direction thereof.

Preferably, the rollers are rotatably connected to the

2005220262 10 Oct 2005

air flow changing unit.

Preferably, the hood body is provided with an auxiliary inlet port, the auxiliary inlet port being disposed the auxiliary fan for allowing air to be introduced into the hood body therethrough by the auxiliary fan.

According to the present invention, the flow of air discharged from the nozzle unit out of the kitchen is changed by the guide unit and the air flow changing unit disposed in the nozzle unit of the hood body. Consequently, the present invention has the effect of selectively accomplishing an air-curtain effect for preventing contaminated air from diffusing in front of the cooking table and a Coanda effect for collecting contaminated air away from the inlet port of the hood body, and therefore, improving the convenience of the exhaust hood.

Also, the number of rotations of the auxiliary fan can be changed such that the number of rotations of the auxiliary fan is increased to increase the speed of the nozzle unit for accomplishing the air-curtain effect, and the number of rotations of the auxiliary fan is decreased to decrease the speed of the nozzle unit for accomplishing the Coanda effect. Consequently, the present invention has the effect of more efficiently accomplishing the air-curtain effect and the Coanda effect.

Also, the contaminated air is collected irrespective of

the performance of the exhaust fan. Consequently, the present invention has the effect of improving collection efficiency.

Also, the guide unit is a ring-shaped rod mounted to the nozzle unit, the air flow changing unit comprises a louver disposed in the nozzle unit while being spaced a predetermined distance from the ring-shaped rod, and the louver is rotated by the stepping motor. Consequently, the present invention has the effect of easily controlling the position of the louver and easily operating the louver.

Furthermore, the air flow changing unit is provided with a plurality of rollers, which are in rolling contact with the curved part of the guide unit. Consequently, the present invention has the effect of preventing the air flow changing unit from being lowered, maintaining the balance of the air flow changing unit, and reducing friction between the air flow changing unit and the guide unit.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a view schematically showing a conventional exhaust hood for kitchens;

FIG. 2 is a sectional view showing an exhaust hood for kitchens according to a preferred embodiment of the present invention;

FIG. 3 is a view schematically illustrating air-curtain effect of the exhaust hood for kitchens according to a preferred embodiment of the present invention shown in FIG. 2; and

FIG. 4 is a view schematically illustrating Coanda effect of the exhaust hood for kitchens according to a preferred embodiment of the present invention shown in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now, a preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings.

FIG. 2 is a sectional view showing an exhaust hood for kitchens according to a preferred embodiment of the present invention, FIG. 3 is a view schematically illustrating air-curtain effect of the exhaust hood for kitchens according to a preferred embodiment of the present invention shown in FIG. 2, and FIG. 4 is a view schematically illustrating Coanda effect of the exhaust hood for kitchens according to a preferred embodiment of the present invention shown in FIG. 2.

As shown in FIGS. 2 to 4, the exhaust hood according to

2005220262 10 Oct 2005

the present invention comprises: a hood body 50 disposed above a cooking table (not shown), the hood body 50 being provided with an inlet port 52 and an outlet port 54; an exhaust fan 56 mounted to one side in the hood body 50 for suctioning air into the hood body 50 through the inlet port 52 and discharging the air out of the kitchen through the outlet port 54; an auxiliary fan 58 mounted to the other side in the hood body 50; a nozzle unit 60 disposed at the front part of the hood body 50 for discharging air blown by the auxiliary fan 58 into the kitchen; a guide unit mounted to the nozzle unit 60, the guide unit having a curved part for guiding air such that air around the curved part of the guide unit flows along the curved part of the guide unit; and an air flow changing unit 70 disposed between the nozzle unit 60 and the guide unit such that the air flow changing unit 70 can be rotated along the curved part of the guide unit for changing flow of air discharged from the nozzle unit 60.

In the inlet port 52 is mounted a filter 53 for purifying air when the air is suctioned through the inlet port 52. To the outlet port 54 is connected an exhaust pipe (not shown), which forms a passage through which the suctioned air is discharged out of the kitchen.

In the hood body 50 is mounted an exhaust fan motor (not shown) for driving the exhaust fan 56.

The auxiliary fan 58 may be a cross-flow fan or a thin

centrifugal fan. The auxiliary fan 58 is configured such that the number of rotations of the auxiliary fan 58 can be changed.

At the hood body 50 is formed an auxiliary inlet port 64 for allowing air to be introduced into the hood body 50 therethrough. The auxiliary inlet port 64 is disposed above the auxiliary fan 58.

In the illustrated embodiment, the auxiliary inlet port 64 is disposed above the auxiliary fan 58, although the auxiliary fan 58 may suction air through the filter 53 mounted in the inlet port 52 and blow the air to the nozzle unit 60.

The guide unit is a ring-shaped rod 62 mounted to a lower part 61 of the nozzle unit 60. An upper part 63 of the nozzle unit 60 is curved by a predetermined length such that the upper part 63 of the nozzle unit 60 corresponds to the outer circumferential surface of the ring-shaped rod 62.

The air flow changing unit 70 comprises: a louver 72 disposed in the nozzle unit 60 while being spaced a predetermined distance from the ring-shaped rod 62; and a motor 74 for rotating the louver 72.

Between the louver 72 and the ring-shaped rod 62 is defined a discharging slit 80, through which air having passed through the nozzle unit 60 from the auxiliary fan 58 is discharged.

The louver 72 comprises: a guide part 82 for guiding

flow of air; and connection parts 84 attached to both ends of the guide part 82, the connection parts 84 being connected to a rotary shaft 75 of the motor 74.

Preferably, the motor 74 is a stepping motor that is capable of controlling the rotation angle of the louver 72.

The ring-shaped rod 62 is formed in a hollow shape such that the motor 74 is mounted in the ring-shaped rod 62. The rotary shaft 75 of the motor 74 extends in the longitudinal direction of the ring-shaped rod 62.

The connection parts 84 are bent from both ends of the guide part 82 toward the ring-shaped rod 62 such that the connection parts 84 are connected to the rotary shaft 75 of the motor 74.

The louver 72 is provided with at least one roller 76 that is in rolling contact with the outer circumferential surface of the ring-shaped rod 62. Preferably, a plurality of rollers 76 are attached to the lower surface of the louver 72 while being spaced a predetermined length from each other in the longitudinal direction thereof.

Specifically, the rollers 76 are rotatably connected to the connection members 78 formed at the lower surface of the louver 72 while extending toward the rollers 76. At the connection members 78 are formed insertion holes, through which rotary shafts 77 of the rollers 76 are inserted, respectively.

2005220262 10 Oct 2005

The operation of the exhaust hood with the above-stated construction according to the present invention will now be described.

When the exhaust fan 56 is operated while food is cooked on the cooking table, contaminated air in the kitchen is introduced into the hood body 50 through the inlet port 52, and is then discharged out of the kitchen through the outlet port 54.

At this time, the auxiliary fan 58 may be operated either to interrupt flow of air between a user and the cooling table (air-curtain effect) or to guide flow of air such that the air flows along the ring-shaped rod 62 for improving collecting efficiency at the inlet port 52 (Coanda effect).

To accomplish the air-curtain effect, the motor 74 is operated to rotate the louver 72 such that the louver 72 is placed at the front end of the nozzle unit 60.

When the motor 74 is operated, the louver 72 is rotated toward the front end of the nozzle unit 60 about the rotary shaft 75 of the motor 74.

When the louver 72 is moved forward along the ring-shaped rod 62 by the roller 76, and therefore, the upper side of the louver 72 is placed at the end of the upper part 63 of the nozzle unit 60, the operation of the motor 74 is stopped.

As a result, the discharging slit 80 defined between the louver 72 and the ring-shaped rod 62 is horizontally located,

and therefore, air blown by the auxiliary fan 58 is vertically discharged downward toward the cooking table through the discharging slit 80.

At this time, it is preferable that the number of rotations of the auxiliary fan 58 be increased to increase the speed of the nozzle unit 60.

The air vertically discharged downward from the discharging slit 80 isolates the user from the cooking table, and therefore, smoke or odor generated during cooking is prevented from diffusing in front of the cooking table.

To accomplish the Coanda effect, the motor 74 is operated to rotate the louver 72 such that the louver 72 is placed at the top of the ring-shaped rod 62.

As a result, the discharging slit 80 defined between the louver 72 and the ring-shaped rod 62 is located at the top of the ring-shaped rod 62, and therefore, air blown by the auxiliary fan 58 is discharged, while being tilted, to the top surface of the ring-shaped rod 62.

At this time, it is preferable that the number of rotations of the auxiliary fan 58 be decreased to decrease the speed of the nozzle unit 60 to approximately 5 m/s.

The air discharged, while being tilted, to the top surface of the ring-shaped rod 62 flows along the outer circumferential surface of the ring-shaped rod 62. As a result, negative pressure is created around the ring-shaped

rod 62.

The phenomenon in which fluid flows along a curve is called the Coanda phenomenon, which is caused due to viscosity of fluid.

As the negative pressure is created around the ring-shaped rod 62, air away from the hood body 50 is collected to the inlet port 52 along the bottom surface of the ring-shaped rod 62.

Specifically, contaminated air away from the inlet port 52 of the hood body 50 is suctioned into the inlet port 52, and therefore, collection efficiency is improved.

As described above, the air-curtain effect and the Coanda effect are selectively used by changing the position of the louver 72 based on the user's circumstances.

As apparent from the above description, the flow of air discharged from the nozzle unit out of the kitchen is changed by the guide unit and the air flow changing unit disposed in the nozzle unit of the hood body. Consequently, the present invention has the effect of selectively accomplishing air-curtain effect of preventing contaminated air from diffusing in front of the cooking table and Coanda effect of collecting contaminated air away from the inlet port of the hood body, and therefore, improving the convenience of the exhaust hood.

Also, the number of rotations of the auxiliary fan can be changed such that the number of rotations of the auxiliary

fan is increased to increase the speed of the nozzle unit for accomplishing the air-curtain effect, and the number of rotations of the auxiliary fan is decreased to decrease the speed of the nozzle unit for accomplishing the Coanda effect. Consequently, the present invention has the effect of more efficiently accomplishing the air-curtain effect and the Coanda effect.

Also, the contaminated air is collected irrespective of the performance of the exhaust fan. Consequently, the present invention has the effect of improving the collection efficiency.

Also, the guide unit is a ring-shaped rod mounted to the nozzle unit, the air flow changing unit comprises a louver disposed in the nozzle unit while being spaced a predetermined distance from the ring-shaped rod, and the louver is rotated by the stepping motor. Consequently, the present invention has the effect of easily controlling the position of the louver and easily operating the louver.

Furthermore, the air flow changing unit is provided with a plurality of rollers, which are in rolling contact with the curved part of the guide unit. Consequently, the present invention has the effect of preventing the air flow changing unit from being lowered, maintaining the balance of the air flow changing unit, and reducing friction between the air flow changing unit and the guide unit.

2005220262 10 Oct 2005

Although the preferred embodiment of the present invention has been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

2005220262 04 Jul 2007

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An exhaust hood comprising:

a hood body disposed above a cooking table in a kitchen, the hood body being provided with an inlet port and an outlet port;

an exhaust fan mounted to one side in the hood body for suctioning air into the hood body through the inlet port and discharging the air out of the kitchen through the outlet port;

an auxiliary fan mounted to other side in the hood body;

a nozzle unit disposed at the front part of the hood body for discharging air blown by the auxiliary fan into the kitchen;

a guide unit mounted to the nozzle unit, the guide unit having a curved part for guiding air such that air around the curved part of the guide unit flows along the curved part of the guide unit;

an air flow changing unit disposed between the nozzle unit and the guide unit such that the air flow changing unit can be rotated along the curved part of the guide unit for changing flow of air discharged from the nozzle unit; and

wherein the air flow changing unit includes a louver disposed in the nozzle unit while being spaced a predetermined distance from the guide unit, the louver and the guide unit together defining a discharging slit therebetween such that air is discharged from the nozzle unit through the discharging slit.

2. The hood as set forth in claim 1, wherein the air flow changing unit further comprises:

a motor for rotating the louver.

2005220262 04 Jul 2007

3. The hood as set forth in claim 2, wherein the louver comprises:

a guide part for guiding flow of air; and

connection parts attached to both ends of the guide part, the connection parts being connected to a rotary shaft of the motor.

4. The hood as set forth in claim 3, wherein the guide unit is a ring-shaped rod mounted to a lower part of the nozzle unit.

5. The hood as set forth in claim 4, wherein the ring-shaped rod is formed in a hollow shape such that the motor is mounted in the ring-shaped rod.

6. The hood as set forth in any one of claims 1 to 5, wherein the air flow changing unit is provide with at least one roller that is in rolling contact with the curved part of the guide unit.

7. The hood as set forth in claim 6, wherein the at least one roller comprises:

a plurality of rollers attached to the lower surface of the air flow changing unit while being spaced a predetermined length from each other in the longitudinal direction thereof.

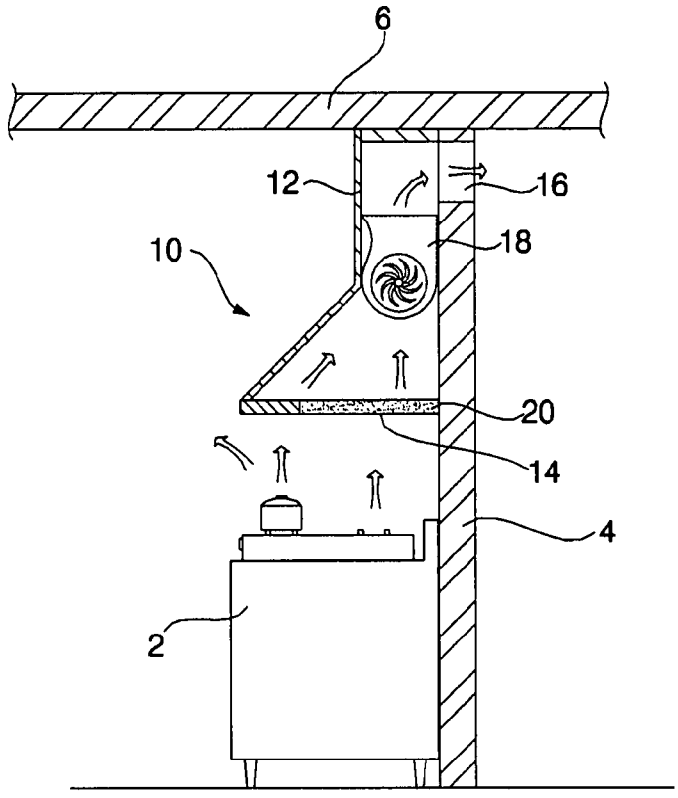
8. The hood as set forth in claim 7, wherein the rollers are rotatably connected to the air flow changing unit.

9. The hood as set forth in claim 8, wherein the hood body is provided with an auxiliary inlet port, the auxiliary inlet port being disposed above the auxiliary fan for allowing air to be introduced into the hood body therethrough by the auxiliary fan.

10. An exhaust hood substantially as hereinbefore described with reference to Figures 2 to 4 of the accompanying drawings.

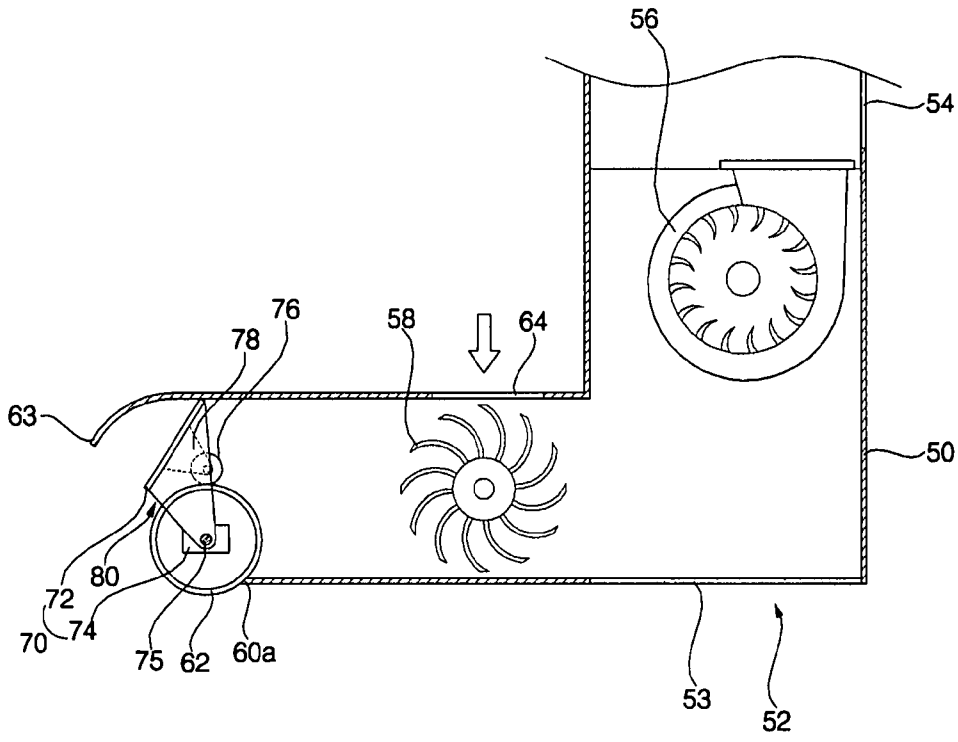
2005220262 10 Oct 2005

FIG. 1 (Prior Art)



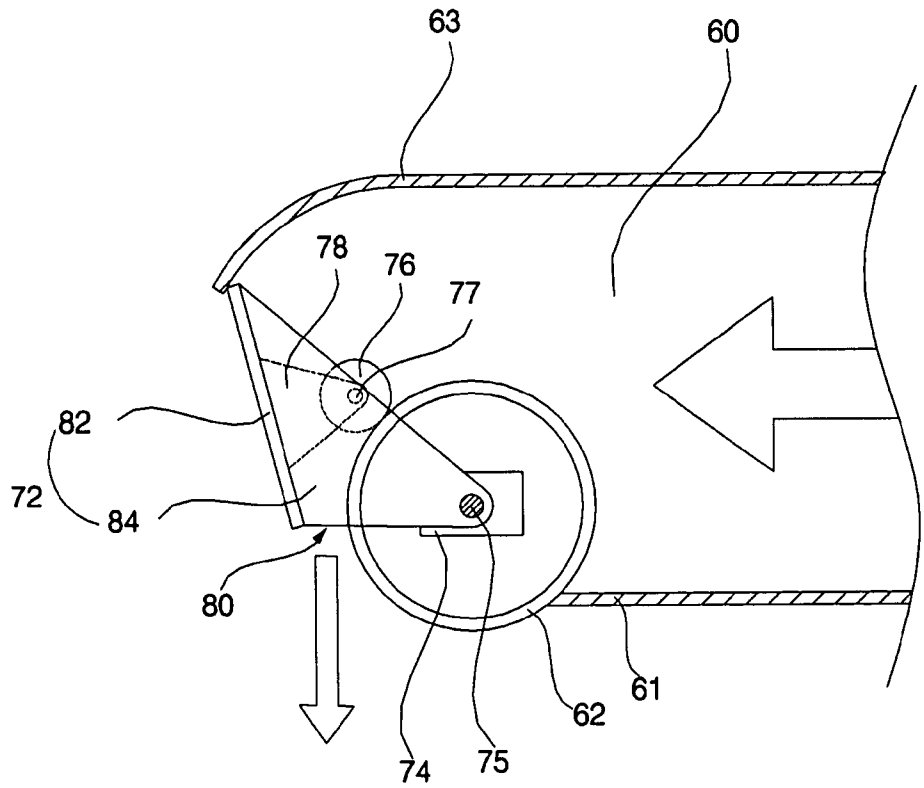
2005220262 10 Oct 2005

FIG. 2



2005220262 10 Oct 2005

FIG. 3



2005220262 10 Oct 2005

FIG. 4