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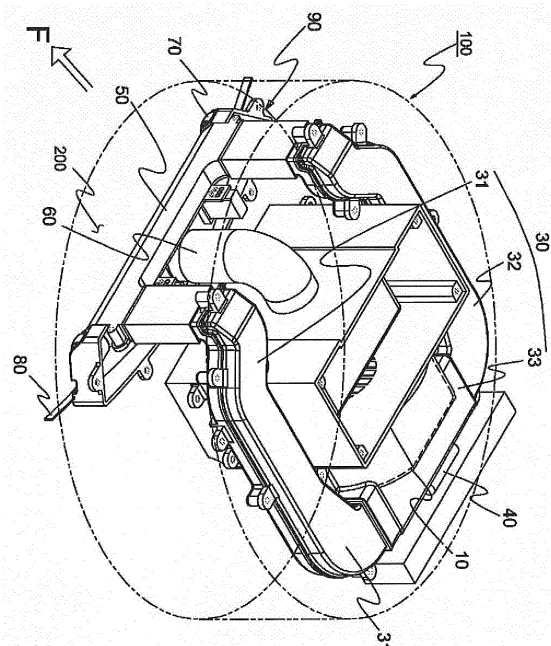
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(54) **EXHAUST AIR FEEDBACK ROBOT CLEANER EQUIPPED WITH A DISINFECTANT ANION GENERATOR**

(57) Disclosed is an exhaust air feedback robot cleaner equipped with a disinfectant anion generator, including a suction motor to intake not only air but also dust from a to-be-cleaned surface through a suction unit installed at the bottom surface and a dust collector to trap dust so as to allow dust-free air to be discharged via the suction motor. In the robot cleaner, the disinfectant anion generator emits disinfectant anions to disinfect the air having been discharged via the suction motor, a spray nozzle installed at the front end of an intake port of the robot cleaner sprays the disinfected air toward the cleaning surface through an exhaust air feedback unit so that the dust on the to-be-cleaned surface may be scattered and disinfected, and finally the air, together with the dust, is sucked in by the suction motor and circulated again to the exhaust air feedback unit.

**【FIG. 1】**



## Description

[Technical Field]

**[0001]** The present invention relates to an exhaust air feedback robot cleaner equipped with a disinfectant anion generator, and more particularly to an exhaust air feedback robot cleaner equipped with a disinfectant anion generator which supplies anions emitted from an anion generator to exhaust air emitted from a suction motor or an impeller installed in a robot cleaner and circulates and sprays the anion-containing exhaust air to a surface to be cleaned with a spray nozzle unit, so that it can disinfect dust in the robot cleaner as well as the surface to be cleaned.

[Background Art]

**[0002]** Robot cleaners generally travel under their own propulsion all around a section to be cleaned and suck foreign matter such as dust from the floor without the intervention of a user, automatically cleaning the section to be cleaned. Moreover, when the power of the robot cleaner has almost run out, it moves to a charging position by itself so that the power can be charged. After that, when the power has been charged, it returns to the position where the cleaning was stopped and continues to perform cleaning.

**[0003]** Such a robot cleaner is designed to remove foreign matter from a surface to be cleaned while traveling around in a predetermined traveling pattern on the section to be cleaned by itself. However, when the foreign matter adheres to the surface to be cleaned or to the surface of a carpet, it is usually found that the robot cleaner just travels along the traveling pattern without perfectly removing the foreign matter.

**[0004]** Moreover, the size and weight of the robot cleaner are limited due to the places where the robot cleaner will be used. That is, the robot cleaner should be manufactured to be small and lightweight so as to move easily. Accordingly, it cannot be equipped with a suction motor of a large capacity, so that it is difficult to increase the suction force. Therefore, foreign matter is not likely to be perfectly removed by the robot cleaner.

**[0005]** Such a problem is especially serious in vacuum suction robot cleaners. Such a robot cleaner drags around the foreign matter rather than remove it by suction. This results in an increase in the area to be cleaned.

**[0006]** In order to resolve the problem caused by the insufficient suction force due to the use of a small motor, a suction and brush type cleaner has been put into use that combines a vacuum sucking system and a brush system. In the suction and brush type, a brush first pushes up foreign matter inside a robot cleaner and then the pushed-up foreign matter is sucked up by the vacuum sucking system. Accordingly, the foreign matter on the to-be-cleaned surface, which can be brought into contact with the brush, can be removed. However, it is difficult to remove the foreign matter sticking to the other areas because the foreign matter in the other areas is removed only by the vacuum sucking system. Moreover, in the suction and brush type, a suction port is located at the top of the brush. This is also one of the reasons for the suction force being weak. Accordingly, the foreign matter that could not be removed by the brush may still be left behind.

**[0007]** As described above, the suction and brush type is designed to complement for the drawback of the vacuum sucking system by using the brush but this is not a fundamental solution to the remaining foreign matter. Moreover, due to the addition of the brush system, an additional part is necessary, which results in an increase in cost and causes maintenance problems.

**[0008]** In conventional robot cleaners, dust is sucked up through a suction port along with air and collected up by a dust collector, and after which, the dust-free air cools a suction motor and is then discharged out of the robot cleaner through an exhaust air port. Due to the flow of exhaust air, a problem arises in that the foreign matter that has accumulated near the robot cleaner is scattered around.

**[0009]** Conventional robot cleaners remove the foreign matter by sucking the dust or dirt off the floor (the surface to be cleaned) while traveling around. However, since the scattering dust remains in the air after the removal of the foreign matter, there are various problems such as having a negative impact on a user's respiration.

[Disclosure]

[Technical Problem]

**[0010]** In order to resolve the problems described above, one object of the invention is to provide an exhaust air feedback robot cleaner equipped with an disinfectant anion generator that is installed in the exhaust air feedback robot cleaner, so that a surface to be cleaned or exhaust air which is to be sprayed onto the surface to be cleaned can both be disinfected.

**[0011]** Another object of the invention is to provide an exhaust air feedback robot cleaner equipped with a disinfectant anion generator which increases the anion content in the circulating air to be sprayed to a surface to be cleaned by discharging anions to the circulating air by an exhaust air circulation mechanism, thereby enhancing the effect of disin-

fecting the surface to be cleaned.

**[0012]** Further object of the invention is to provide an exhaust air feedback robot cleaner equipped with a disinfectant anion generator, in which the disinfectant anion generator is installed between a suction motor and left and right passages so that anions can be sprayed onto the surface, which is to be cleaned, by suction force generated by a drive motor.

**[0013]** Yet another object of the invention is to provide an exhaust air feedback robot cleaner equipped with a disinfectant anion generator in which circulating exhaust air contains anion and air is uniformly sprayed onto a surface to be cleaned, so that foreign matter on the surface to be cleaned to be uniformly dispersed and the effect of disinfecting both the surface to be cleaned and the foreign matter can be enhanced.

**[0014]** Yet a further object of the invention is to provide an exhaust air feedback robot cleaner equipped with a disinfectant anion generator which makes foreign matter on a surface to be cleaned to escape from the surface by the action of circulating exhaust air and prevents the escaping foreign matter from being scattered, thereby being capable of effectively removing the foreign matter and enhancing the efficiency of disinfection.

**[0015]** Yet still further object of the invention is to provide an exhaust air feedback robot cleaner equipped with a disinfectant anion generator in which when circulation of exhaust air is applied to a robot cleaner, a circulation path of a suction air is modified so that the exhaust air can contain anions, which results in an enhanced disinfecting effect and an improved circulation path for the exhaust air.

[Technical Solution]

**[0016]** The present invention relates to a robot cleaner in which foreign matter on a surface to be cleaned is sucked along with air through a suction unit provided at the bottom surface of the robot cleaner by a suction motor, the sucked foreign matter is collected by a dust collector, and the dust-free air is discharged through a drive motor, in which the air having been discharged through the suction motor is disinfected by disinfectant anions discharged from the disinfectant anion generator, the anion-containing air is sprayed, toward the surface to be cleaned by a spray nozzle installed at a front end of a suction port of the robot cleaner, through an exhaust air circulating unit so that foreign matter on the to-be-cleaned surface can escape from the to-be-cleaned surface and can be disinfected, and finally the air is sucked along with the foreign matter by the drive motor so as to be circulated into the exhaust air circulating unit.

**[0017]** According to the invention, the disinfectant anion generator is connected with the exhaust air circulating unit of the exhaust air circulation type robot cleaner so that the air sucked by the exhaust air circulating unit may contain anions. After that, the anion-containing air is sprayed toward the surface to be cleaned and is returned to be circulated. In this way, the anion content in the circulating air is continuously increased, and as a result the disinfection efficiency inside and outside of the robot cleaner is improved.

**[0018]** According to the invention, since the disinfectant anions are discharged by strong air circulation force of the circulating exhaust air, the effect of disinfecting the surface to be cleaned is enhanced. Therefore, floating substances such as dust mites which have been hidden in a carpet or the like can be removed, improving the residential environment.

**[0019]** Moreover, the invention can achieve both the efficient removal of foreign matter by the circulation of exhaust air and the disinfection and removal of viruses, germs, and bacteria at the same time by performing a cleaning operation once.

**[0020]** According to the invention, foreign matter is sucked and removed by two kinds of removal mechanism, that is, the spraying force of circulating air and the suction force of a suction motor. Accordingly, a suction motor with a small capacity can be applied to a robot cleaner, which results in a small and lightweight robot cleaner being realized.

**[0021]** According to the invention, when the anion-containing circulating air is sprayed from the front end of the suction port by the spray nozzle, an air curtain may be formed. Thanks to this mechanism, the robot cleaner has many effects, for example, it is possible to prevent foreign matter from being scattered outside the robot cleaner.

[Description of Drawings]

**[0022]**

FIG. 1 is an exemplary diagram illustrating a configuration of the present invention; and  
FIG. 2 is an exemplary diagram illustrating a configuration of a bottom surface according to the present invention.

\* Explanation of letters and numerals in relevant portions of drawings.

|       |                              |       |                   |
|-------|------------------------------|-------|-------------------|
| (10): | Suction motor                | (20): | Dust collector    |
| (30): | Exhaust air circulating unit |       |                   |
| (31): | Left air passage             | (32): | Right air passage |

(continued)

|        |                              |        |                           |
|--------|------------------------------|--------|---------------------------|
| (33):  | Housing                      | (60):  | Suction port              |
| (40):  | Disinfectant anion generator | (80):  | Scattering prevention bar |
| (50):  | Spray nozzle                 | (100): | Robot cleaner             |
| (70):  | Wheel                        |        |                           |
| (90):  | Suction unit                 |        |                           |
| (200): | To-be-cleaned Surface        |        |                           |

[Mode for Invention]

**[0023]** FIG. 1 is an exemplary diagram illustrating a configuration according to the present invention and FIG. 2 is an exemplary diagram illustrating a configuration of the bottom surface according to the present invention. The present invention relates to an exhaust air feedback robot cleaner 100 in which foreign matter on a surface to be cleaned are sucked through a suction port when a suction motor 10 is in operation, the sucked foreign matter is collected by a dust collector 20, and the foreign matter-free air is sprayed onto the surface to be cleaned by an exhaust air circulating unit 30.

**[0024]** The air discharged through the suction motor 10 is disinfected by disinfectant anions discharged from a disinfectant anion generator 40, is sprayed toward a to-be-cleaned surface 200 from a spray nozzle 50 installed at a front end of the suction port of the robot cleaner through the exhaust air circulating unit 30 so that foreign matter on the to-be-cleaned surface can be disinfected and can escape, and is then sucked along with the foreign matter by the suction motor 10 to be circulated to the exhaust air circulating unit 30.

**[0025]** That is, according to the present invention, the foreign matter on the to-be-cleaned surface are sucked through the suction port 60 formed at the bottom surface of the robot cleaner 100 by the suction motor 10, the sucked foreign matter is collected by the dust collector 20, and the foreign matter-free air is exhausted through the suction motor 10.

**[0026]** The robot cleaner 100 is configured to include the exhaust air circulating unit 30, which includes left and right air passages 31 and 32 so that the exhaust air exhausted through the suction motor 10 is introduced into the exhaust air circulating unit 30, the disinfectant anion generator 40 which is connected with and located between the left and right air passages 31 and 32 of the exhaust air circulating unit, the spray nozzle 50 connected with ends of the left and right passages 31 and 32 of the exhaust air circulating unit and installed in the robot cleaner in a manner of facing the to-be-cleaned surface 200, and the suction port 60 installed in the robot cleaner 100 so as to be located at a rear end of the spray nozzle 50.

**[0027]** The exhaust air circulating unit 30 is installed inside the robot cleaner 100 to send the exhaust air, from which the foreign matter has been removed by the dust collector, to the spray nozzle 50. The exhaust air circulating unit 30 includes a housing 33 which is connected with the dust collector 20 and encloses the suction motor 10 therein. The exhaust air circulating unit 30 further includes the left and right air passages 31 and 32 having respective one ends connected with both sides of the housing 30 so that the air passages 31 and 32 can communicate with the housing, and having the respective other ends connected with the spray nozzle 50.

**[0028]** The exhaust air circulating unit 30 mentioned above is disclosed in detail in Korean Patent Registration No. 0869822 which was applied for and registered by the inventor of the present application. Accordingly, the description thereon will not be redundantly given herein.

**[0029]** The disinfectant anion generator 40 is installed between the housing of the exhaust air circulating unit and the left and right air passages so that the disinfectant anions can be discharged into the left and right air passages 31 and 32.

**[0030]** That is, the disinfectant anions, which have been discharged from the disinfectant anion generator, disinfect the exhaust air, which has been free from the foreign matter by the action of the dust collector 20 and which has been exhausted and moved through the left and right passages by the action of the circulation of the exhaust air, and are then discharged to the to-be-cleaned surface from the spray nozzle 50.

**[0031]** The spray nozzle 50 uniformly sprays the exhaust air and the anions transported through the exhaust air circulating unit 30 to the to-be-cleaned surface, and it is installed at the ends of the left and right air passages 31 and 32 of the exhaust air circulating unit in a manner to face the to-be-cleaned surface.

**[0032]** The spray nozzle 50 is installed in the suction unit 90 and located at the front end of the suction port 60. That is, in the suction unit 90, the spray nozzle 50 is located on the front side in an advancing direction F of the robot cleaner and the suction port 60 is installed on the rear side.

**[0033]** In the suction unit 90, a scattering prevention bar 80 which prevents the exhaust air and the disinfectant anions from scattering is provided behind the suction port 60. The suction unit 90 is further provided with wheels 70 that enable the suction unit 90 to move.

**[0034]** According to the present invention configured in the manner described above, when the robot cleaner performs a cleaning operation while traveling around along a cleaning pattern, dust, foreign matter, and air sucked through the

suction unit are sent to the dust collector, the foreign matter and the dust are collected by the dust collector, and the air free from the dust and foreign matter is discharged to the exhaust air circulating unit in which a drive motor is installed. The air discharged into the exhaust air circulating unit is disinfected by anions discharged from the disinfectant anion generator, and the disinfected exhaust air and the discharged anions are sprayed together to the to-be-cleaned surface by the spray nozzle.

**[0035]** In this way, when the exhaust air and the disinfectant anions are sprayed onto the to-be-cleaned surface, the foreign matter attached to the to-be-cleaned surface can escape due to the strong spraying force of the exhaust air and at the same time the to-be-cleaned surface and the dust are disinfected by the discharged disinfectant anion. The foreign matter and the dust which have been dispersed and disinfected are sent back to the dust collector through the suction port by the drive force of the suction motor, that is, they are recirculated.

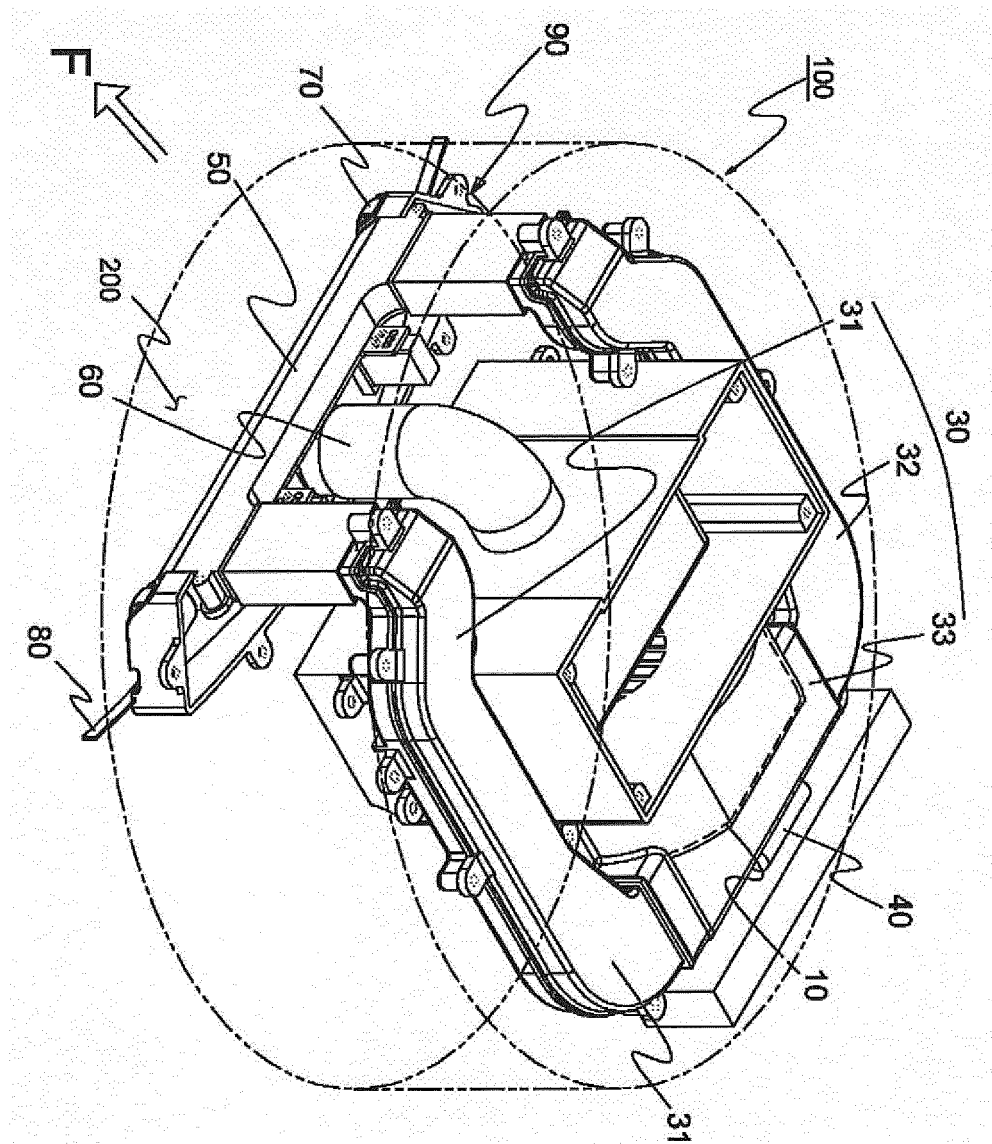
**[0036]** The anions sprayed to the to-be-cleaned surface through the spray nozzle are sucked through the suction unit and are then resprayed onto the to-be-cleaned surface along with the anions discharged from the disinfectant anion generator. Accordingly, the disinfection capacity is increased.

**[0037]** The present invention is not limited to specific preferred embodiments but can be embodied in various forms by people ordinarily skilled in the art without departing from the spirit of the invention and such modifications may fall within the scope of the claims.

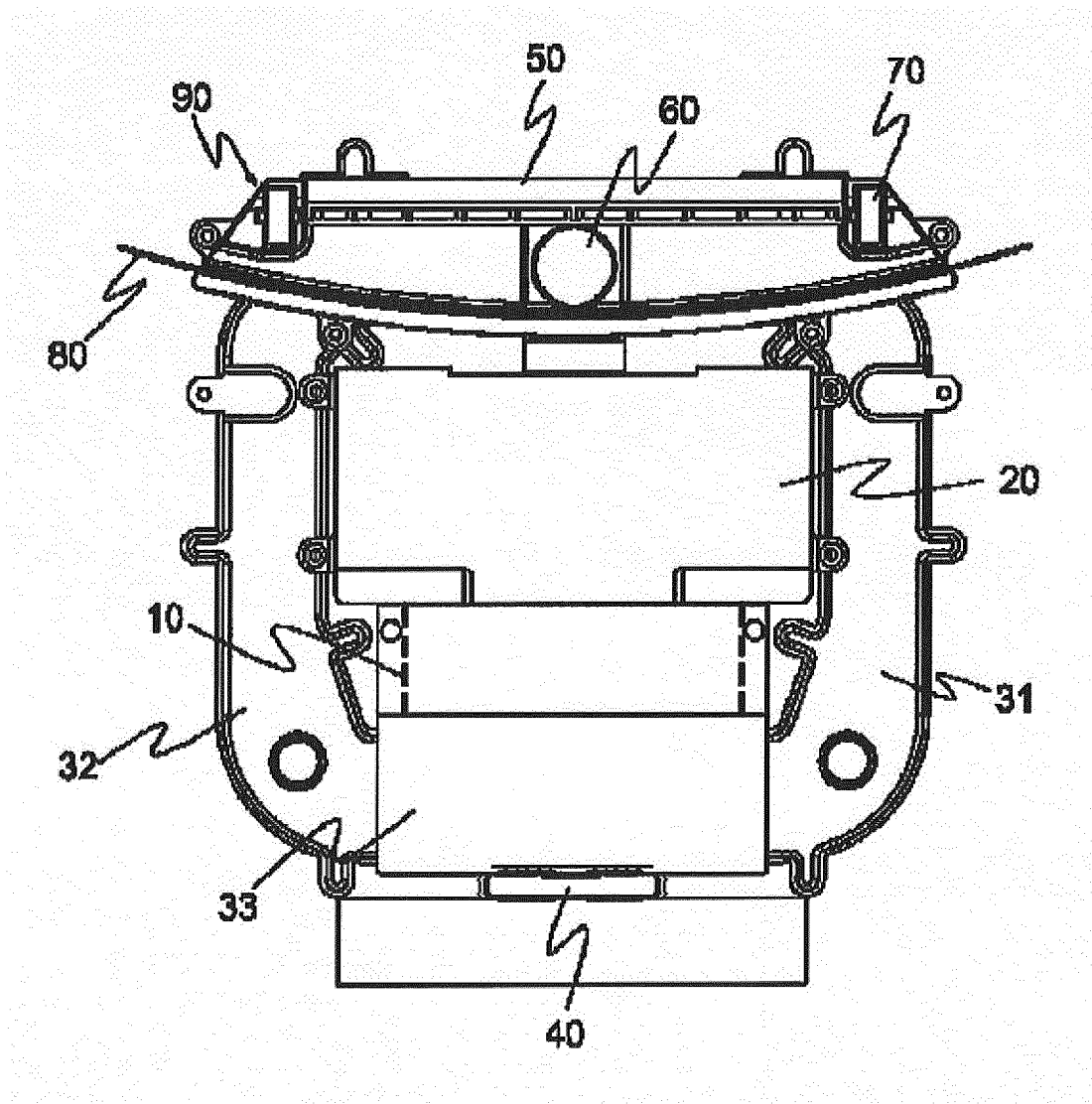
## Claims

1. An exhaust air feedback robot cleaner configured such that foreign matter on a to-be-cleaned surface are sucked along with air through a suction unit installed on a bottom surface by a suction motor, the sucked foreign matter is collected by a dust collector, and air free from the foreign matter is discharged through a drive motor, wherein the air discharged through the suction motor is disinfected by disinfectant anions discharged from a disinfectant anion generator, is then sprayed through an exhaust air circulating unit toward the to-be-cleaned surface by a spray nozzle installed at a front end of a suction port of the robot cleaner to cause the foreign matter on the to-be-cleaned surface to escape and be disinfected, and is finally sucked along with the foreign matter by the suction motor so as to be circulated into the exhaust air circulating unit.
2. The exhaust air feedback robot cleaner according to claim 1, wherein the anions sprayed onto the to-be-cleaned surface through the spray nozzle are sucked through the suction unit, and are then re-sprayed onto the to-be-cleaned surface along with the anions discharged from the disinfectant anion generator, so that a disinfection capacity is increased.

【FIG. 1】



【FIG. 2】



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- KR 0869822 [0028]