

DESCRIPTION

Title of the Invention:

AIR PURIFIER

Technical Field

[0001] The present invention relates to an air purifier provided with a cleaning device which cleans a filter.

Background Art

[0002] Patent Document 1 listed below describes a conventional air purifier. This air purifier has a casing having an inlet and an outlet. Inside the casing, there is provided an air channel connecting the inlet to the outlet, and in the air channel, there is disposed a fan. A pre-filter (a filter) is disposed to face the inlet.

[0003] In the air purifier having this configuration, when operation is started, the fan is driven to take in air from a room through the inlet. The air taken in through the inlet flows through the pre-filter, which removes dust from the air, and the resulting air is discharged through the outlet. Thereby, it is possible to purify the air in the room.

[0004] Recently, there has been an increasing demand for air purifiers provided with a cleaning device which cleans the pre-filter. Patent Document 2 listed below discloses a cleaning device which cleans a filter disposed to face an inlet of a projector. This cleaning device is provided with a feed roll, a winding roll, a brush body, a feed-roll motor, a winding-roll motor, a brush-body motor, and a dust collecting box.

[0005] The feed roll has a sheet-shaped filter wound thereon. The winding roll rotates when it is driven by the winding-roll motor, and winds up the filter that has been drawn out from the feed roll. The brush body has a shaft body and brush bristles arranged radially on the shaft body, and is driven to rotate by the brush-body motor when the winding roll rotates, such that the brush bristles rub the filter to remove dust from the filter. The dust collecting box receives the dust removed from the filter by the brush body. The feed roll is driven to rotate by the feed-roll motor, and winds back the filter from the winding roll. In this manner, the dust is removed from the filter, and the filter is cleaned.

Citation List

Patent Documents

[0006] Patent Document 1: Japanese Patent Application Publication No. 2009-66466 (Page 8, Page 9, FIG. 1)

Patent Document 2: Japanese Patent No. 5627066 (Page 6, Page 7, FIG. 1, and FIG. 4)

Summary of the Invention

Technical Problem

[0007] However, the cleaning device disclosed in the above-listed Patent Document 2 is provided with the brush-body motor, separate from the winding-roll motor. This increases the number of parts in the cleaning device, and the provision of the cleaning device in the air purifier disadvantageously increases the cost of the air purifier.

[0008] The present invention aims to provide an air purifier capable of reducing its production cost.

Solution to Problem

[0009] To achieve the above object, according to one aspect of the present invention, an air purifier includes a casing having an inlet and an outlet, an air channel connecting the inlet to the outlet, a fan disposed in the air channel, a filter disposed to face the inlet; and a cleaning device which cleans the filter. Here, the cleaning device includes a feed roll on which is wound the filter, which is sheet-shaped, a winding roll which winds up the filter, a drive motor which drives the winding roll to rotate, and a brush body which is connected to the drive motor and which, when the winding roll rotates, rotates and slides on the filter on the winding roll.

[0010] In the air purifier configured as described above, it is preferable that a rotation direction of the winding roll and a rotation direction of the brush body be identical.

[0011] In the air purifier configured as described above, it is preferable that brush-bristle bundles be arranged at predetermined intervals in a helical fashion on a circumferential surface of a shaft via which the brush body is supported on the casing, and that a peripheral speed of the brush body be more than a peripheral speed of the winding roll.

[0012] In the air purifier configured as described above, it is preferable that the casing include a main body portion in which the fan is disposed and a cover portion which is

disposed to be attachable and detachable with respect to the main body portion and which has the inlet, and that the drive motor be disposed in the main body portion and the feed roll and the winding roll be disposed in the cover portion.

[0013] In the air purifier configured as described above, it is preferable that the air purifier further include a first intersecting-axis gear which has a fitting hole in which a rotation shaft of the drive motor is fitted, a second intersecting-axis gear which meshes with the first intersecting-axis gear, a first parallel-axis gear which rotates integrally with the second intersecting-axis gear and which is connected to the winding roll, and a second parallel-axis gear which meshes with the first parallel-axis gear and which is connected to the brush body.

[0014] In the air purifier configured as described above, it is preferable that between the brush body and the second parallel-axis gear, there be provided an internal gear which is integrally provided with the second parallel-axis gear, and a third parallel-axis gear which meshes with the internal gear, and that a rotation shaft of the brush body be disposed between a rotation shaft of the first parallel-axis gear and a rotation shaft of the second parallel-axis gear.

[0015] In the air purifier configured as described above, it is preferable that the filter include an air passing portion which is disposed to face the inlet while the cleaning device is out of operation, and a housed portion which is fed out from the feed roll while the cleaning roll is being driven, and that the housed portion have a pattern provided thereon to be visible through the inlet for the housed portion to be distinguished from the air passing portion.

[0016] In the air purifier configured as described above, it is preferable that the fan be kept out of operation while the cleaning device is being driven.

Advantageous Effects of Invention

[0017] According to the present invention, a brush body of a cleaning device is connected to a drive motor which drives a winding roll to rotate, such that the brush body rotates when the winding roll rotates, and slides along a filter on the winding roll. With this configuration, there is no need of providing a conventional brush-body motor to rotate the brush body, separately from the drive motor. Accordingly, it is possible to reduce the production cost of an air purifier.

Brief Description of the Drawings

[0018] FIG. 1 is a front view of an air purifier according to a first embodiment of the present invention;

FIG. 2 is a side sectional view of the air purifier according to the first embodiment of the present invention;

FIG. 3 is an exploded perspective view of a cleaning device of the air purifier according to the first embodiment of the present invention;

FIG. 4 is a plan view of a pre-filter of the air purifier according to the first embodiment of the present invention;

FIG. 5 is side sectional view of a feed roll of the cleaning device of the air purifier according to the first embodiment of the present invention;

FIG. 6 is a perspective view of a winding roll, a dust collection portion, and an inside of a gear unit of the cleaning device of the air purifier according to the first embodiment of the present invention;

FIG. 7 is an enlarged perspective view of the inside of the gear unit of the cleaning device of the air purifier according to the first embodiment of the present invention;

FIG. 8 is an exploded perspective view of a biasing portion of the cleaning device of the air purifier according to the first embodiment of the present invention;

FIG. 9 is side view of a support member of a cover portion of an air purifier according to a second embodiment of the present invention, illustrating a state before a feed roll is mounted on the support member;

FIG. 10 is side view of the support member of the cover portion of the air purifier according to the second embodiment of the present invention, illustrating a state after the feed roll is mounted on the support member;

FIG. 11 is side view of a support member of a cover portion of an air purifier according to a third embodiment of the present invention, illustrating a state before a feed roll is mounted on the support member;

FIG. 12 is side view of the support member of the cover portion of the air purifier according to the third embodiment of the present invention, illustrating a state after the feed roll is mounted on the support member;

FIG. 13 is a plan view of a pre-filter of an air purifier according to a fourth embodiment of the present invention; and

FIG. 14 is a perspective view of a pressing member of an air purifier according to a fifth embodiment of the present invention.

Description of Embodiments

[0019] <First Embodiment>

Hereinafter, with reference to the drawings, embodiments of the present invention will be described. FIG. 1 and FIG. 2 are a front view and a side sectional view, respectively, of an air purifier according to a first embodiment. Here, arrows S in the figures each indicate a flow of air. The air purifier 1 has a casing 2 which has an inlet 3 and outlets 4 and 5, and which is placed on a room floor or the like. The casing 2 has a main body portion 20 and a cover portion 21. The cover portion 21 is disposed to be detachable and attachable with respect to a rear face of the main body portion 20, and has the inlet 3 formed therein. The main body portion 20 has the outlets 4 and 5 formed in an upper portion of a front face thereof and in a top face thereof, respectively.

[0020] At the outlets 4 and 5, there are provided wind deflectors 14 and 15, respectively, which change wind direction. The wind deflector 14 is a flat plate, and is supported on a swing shaft portion (not shown), which is provided on the wind deflector 14, to be swingable in an up-down direction. On a lower surface of the wind deflector 14, a plurality of vertical louvers 14a, each provided in a suspended manner, are aligned in a left-right direction. Such ones of the plurality of vertical louvers 14a as are located in opposite end parts of the wind deflector 14 are inclined outward in the left-right direction toward the front side.

[0021] The wind deflector 15 is a flat plate, and is supported on a swing shaft portion 15b, which is provided on a front portion of the wind deflector 15, to be swingable in the up-down direction. At a lower surface of the wind deflector 15, a plurality of vertical louvers 15a, each provided in a suspended manner, are aligned in the left-right direction. Such ones of the plurality of vertical louvers 15a as are located in opposite end parts of the wind deflector 15 are inclined outward in the left-right direction toward the rear side.

[0022] The wind deflectors 14 and 15 respectively keep the outlets 4 and 5 shut when the air purifier 1 is out of operation, and open when the air purifier 1 is in operation.

[0023] Inside the casing 2, there is provided an air channel 8 which connects the inlet 3 and the outlets 4 and 5. Inside the air channel 8, there are provided, in order from the inlet

3 toward the outlets 4 and 5 (from upstream to downstream of air flow), a pre-filter 6 (a filter), a deodorization filter 7, a dust collection filter 9, a humidifier 200, a fan 10, an ion generator 11, and a damper 12.

[00024] The air channel 8 has a first branch channel 8a and a second branch channel 8b, into which the air channel 8 branches at a position downstream of the ion generator 11. The first branch channel 8a and the second branch channel 8b communicate with the outlets 4 and 5, respectively. A sectional area of an air flow passage of the first branch channel 8a is smaller than a sectional area of an air flow passage of the second branch channel 8b.

[00025] The damper 12 is formed in a thin-plate shape, and is supported by a swing shaft portion 12a to be swingable in the up-down direction. The damper 12 is capable of swinging from a position where it closes the first branch channel 8a (see FIG. 2) in a direction for opening the first branch channel 8a (in a counterclockwise direction in FIG. 2). By means of the damper 12, a flow rate balance between the first branch channel 8a and the second branch channel 8b is changed.

[00026] The fan 10 is formed with a centrifugal fan, such as a sirocco fan, and is driven by a motor 10a to take in air in the axial direction and discharge air in the circumferential direction.

[00027] The pre-filter 6 is formed of a mesh sheet of polypropylene or the like, and is disposed on the cover portion 21 so as to face the inlet 3. By means of the pre-filter 6, it is possible to capture large dust in intake air.

[00028] The deodorization filter 7 is formed in a honeycomb shape, and is capable of deodorizing air by adsorbing odor components in the air.

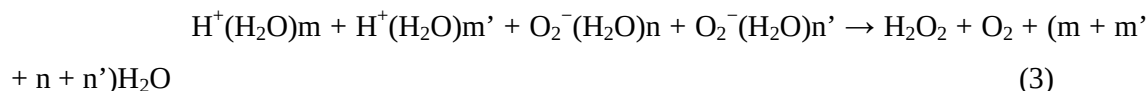
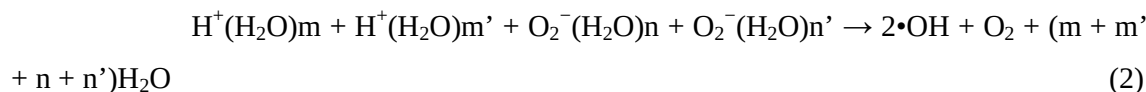
[00029] The dust collection filter 9 is a HEPA filter, where a frame member (not shown) is bonded on a filtering member (not shown) by a hot-melt method. By means of the dust collection filter 9, it is possible to capture minute dust and fine particles having a diameter smaller than a predetermined dimension (3 μm , for example), such as PM 2.5, existing in the air.

[00030] The humidifier 200 has a humidification filter 202 of which a lower portion is dipped in water in a tray 201, and thereby humidifies air passing through the humidification filter 202. As a result, humidified air is discharged through the outlets 4 and 5.

[00031] The ion generator 11 has an ion generation surface 11a where ions are generated on application of a high voltage thereto, and the ion generation surface 11a faces an

interior of the air channel 8. The voltage applied to the ion generation surface 11a has an alternating waveform or an impulse waveform. In a case where a positive voltage is applied to the ion generation surface 11a, mainly plus ions $H^+(H_2O)_m$ are generated, and in a case where a negative voltage is applied to the ion generation surface 11a, mainly minus ions $O_2^-(H_2O)_n$ are generated. Here, m and n are integers. $H^+(H_2O)_m$ and $O_2^-(H_2O)_n$ agglomerate on surfaces of bacteria, odor components, and the like floating in the air so as to enclose them.

[0032] Then, as shown in Formulae (1) to (3), by collision on surfaces of microorganisms and the like, $[•OH]$ (hydroxyl radical) and H_2O_2 (hydrogen peroxide), which are active species, are produced and agglomerate on the surfaces of bacteria and so on floating in the air to destroy them. Here, m' and n' are integers. Accordingly, by generating plus ions and minus ions and discharging them through the outlets 4 and 5, it is possible to remove bacteria and odor from inside the room.



[0034] The main body portion 20 has an operation portion 19 provided on a front portion of an upper surface thereof. The operation portion 19 has a plurality of buttons (not shown) for a user to operate to make operation settings of the air purifier 1. By operating the buttons, the user can change the flow rate, the direction, etc. of air discharged through the outlets 4 and 5.

[0035] Furthermore, the cover portion 21 is provided with a cleaning device 30 which cleans the pre-filter 6. FIG. 3 is an exploded perspective view of the cleaning device 30. The cleaning device 30 has a feed roll 40, a winding roll 50, a gear unit 60, a biasing portion 70, a brush body 80, a dust collection portion 90, and a drive motor 100 (see FIG. 2).

[0036] The feed roll 40 and the winding roll 50 are respectively disposed at an upper portion and a lower portion of the cover portion 21, each holding one of opposite ends of the pre-filter 6. The pre-filter 6 is wound on the feed roll 40 when the cleaning device 30 is out of operation, and is fed out from the feed roll 40 and wound up by the winding roll 50 when the cleaning device 30 is in operation.

[0037] The feed roll 40 has a shaft 41 which extends in the left-right direction, and the shaft 41 has caps 48 fitted one to each of opposite end portions thereof. The caps 48 are rotatably supported by support members 49 which are disposed on an upper end portion of an inner surface of the cover portion 21. In this manner, the feed roll 40 is disposed to be rotatable about a rotation axis extending in the left-right direction. Furthermore, one end (a right end) of the feed roll 40 is connected via the cap 48 to the biasing portion 70.

[0038] The winding roll 50 has a shaft 51 which extends in the left-right direction, and the shaft 51 has caps 58 fitted one to each of opposite end portions thereof. The left and right caps 58 are rotatably supported by a support member 59 and a gear unit 60, which are disposed on a lower end portion of the inner surface of the cover portion 21. In this manner, the feed roll 50 is disposed to be rotatable about a rotation axis extending in the left-right direction.

[0039] FIG. 4 is a plan view of the pre-filter 6. The pre-filter 6 has bar members 6a disposed one at each of opposite ends thereof in a winding direction W, the bar members 6a each extending in the left-right direction and respectively supported by the feed roll 40 and the winding roll 50. Furthermore, the pre-filter 6 further has an air passing portion 6b which is disposed to face the inlet 3 when the cleaning device 30 is out of operation, and a housed portion 6c which is fed out from the feed roll 40 when the cleaning device 30 is in operation.

[0040] The housed portion 6c has a pattern 6g provided thereon to be visible through the inlet 3 for the housed portion 6c to be distinguished from the air passing portion 6b. In the present embodiment, the pattern 6g is a set of red letters saying, "Cleaning in Progress". However, there is no particular limitation to the pattern 6g, and the pattern 6g may be, for example, a striped pattern or the like that is different in color from the air passing portion 6b.

[0041] FIG. 5 is a side sectional view of the feed roll 40. Here, the winding roll 50 has a configuration similar to that of the feed roll 40, and thus a description will be given of the feed roll 40 as a representative of them. The shaft 41, which constitutes a shaft portion of the feed roll 40, has a core member 41a and a sleeve 41d.

[0042] The core member 41a is a sectionally C-shaped member formed by extrusion molding of metal such as aluminum, and has a groove portion 41b extending in the axial direction on a circumferential surface thereof. The groove portion 41b has opposing inner wall surfaces 41c, which are inclined such the circumferential width of the groove portion 41b wider on an outer circumference side than on an inner circumference side. The inner wall

surfaces 41c of the groove portion 41b support a circumferential surface of the bar member 6a of the pre-filter 6.

[0043] The sleeve 41d is a resin molded product which is C-shaped in section, with an opening portion 41e extending in the axial direction, and the sleeve 41d is externally fitted to the core member 41a. The pre-filter 6, having the bar member 6a supported on the groove portion 41b, is inserted through the opening portion 41e. The opening portion 41e of the sleeve 41d has a width that is less than a diameter of the bar member 6a, and thus the bar member 6a supported in the core member 41a is prevented from coming off. At this time, two opposing end portions of the sleeve 41d in the circumferential direction elastically press the bar member 6a, such that the bar member 6a is elastically held between the groove portion 41b and the sleeve 41d of the core member 41a.

[0044] Furthermore, a force applied in a direction of opening the opening portion 41e of the sleeve 41d (the left-right direction in FIG. 5) causes the sleeve 41d to be deformed elastically. Via the thereby widened opening portion 41e, the bar member 6a of the pre-filter 6 is detachable and attachable with respect to the shaft 41. Likewise, the bar member 6a at the lower end portion of the pre-filter 6 is detachable and attachable with respect to the shaft 51. In this way, it is possible to detach the pre-filter 6 from the cleaning device 30 with ease for replacement of the pre-filter 6, for example.

[0045] In FIG. 3, the brush body 80 is disposed at the dust collection portion 90 which is detachably and attachably mounted on the cover portion 21. The brush body 80 has a shaft 81, of which opposite axial end portions are supported by the dust collection portion 90, and, as will be described later, when the cleaning device 30 is in operation, the brush body 80 rotates to remove dust on the pre-filter 6. The shaft 81 has a spur gear 68 provided at one end (a right end) thereof, and brush-bristle bundles 82 are arranged at predetermined intervals in a helical fashion on a circumferential surface of the shaft 81.

[0046] The dust collection portion 90 has a lid portion 91, a container 92, and a comb portion 93, and is disposed to be detachable and attachable with respect to the cover portion 21. The container 92 is formed of a transparent resin, has an open upper face, and supports the brush body 80 on its opposite side portions. The lid portion 91 has an opening portion 91a that is open from left to right ends of the lid portion 91, and the lid portion 91 covers the upper face of the container 92. The brush-bristle bundles 82 of the brush body 80 are exposed to outside through the opening portion 91a. The comb portion 93 extends in the

left-right direction, and is disposed in the container 92 with its teeth pointed upward. The brush-bristle bundles 82 of the brush body 80 come into contact of the teeth of the comb portion 93 when the brush body 80 rotates. The comb portion 93 removes, from the brush-bristle bundles 82, dust that has adhered to the brush-bristle bundles 82.

[0047] The dust removed by the brush body 80 from the pre-filter 6 and dust removed by the comb portion 93 from the brush body 80 are accumulated in the container 92. At this time, since the container 92 is formed of a transparent resin, it is possible for the user to easily grasp how much dust has been accumulated in the container 92.

[0048] The drive motor 100 (see FIG. 2) is disposed in the main body portion 20 of the casing 2, with a rotation shaft (not shown) of the drive motor 100 projecting rearward from a rear surface of the main body portion 20.

[0049] Furthermore, in front of the pre-filter 6, a pressing member 22 is disposed at a predetermined distance from the pre-filter 6. The pressing member 22 is mounted to be detachable and attachable with respect to the cover portion 21. The pressing member 22 has a rectangular frame 22a formed of a synthetic resin such as ABS. Inside the frame 22a, there are provided a rib 22b extending in the up-down direction, and a plurality of (in the present embodiment, three) ribs 22c extending in the left-right direction and arranged side by side in the up-down direction. As a result, the pressing member 22 has a plurality of columns and rows of windows. With the pressing member 22, it is possible to stably dispose the pre-filter 6 along the inlet 3, and to prevent slack of the pre-filter 6 caused by the flow of intake air.

[0050] In the pressing member 22, at a middle portion of a right-side end portion of the frame 22a, there is provided a magnet 23. The main body portion 20 has a Hall element (not shown) disposed at a position therein opposite the magnet 23. By means of the Hall element, the air purifier 1 is capable of judging whether the cover portion 21 is attached to the main body portion 20. In a case where it is found that the cover portion 21 is not attached to the main body portion 20, the air purifier 1 prevents the fan 10 from operating. Thereby, the air purifier 1 avoids performing an air discharge operation in a state where the cover portion 21 is not attached to the main body portion 20.

[0051] Furthermore, the gear unit 60 and the biasing portion 70 are disposed at one end portion (a right end portion) of the cover portion 21. As a result, on the inner surface of the cover portion 21, a space SP is provided between the gear unit 60 and the biasing portion 70. At the space SP, there is stuck a tape-shaped member 300 on which information

regarding usage instructions of the air purifier 1 is described. The information includes information regarding how to detach the pre-filter 6 from the cleaning device 30 and information regarding how to operate a later-described handle 73 of the biasing portion 70.

[0052] Thus, the user can visually recognize the information when he/she has detached the cover portion 21 from the main body portion 20, and thus can easily know how to remove the pre-filter 6 from the cleaning device 30 and how to operate the handle 73 of the biasing portion 70. This helps make the air purifier 1 more convenient.

[0053] FIG. 6 is a perspective view of the winding roll 50, the dust collection portion 90, and an inside of the gear unit 60 of the cleaning device 30. FIG. 7 is an enlarged perspective view of the inside of the gear unit 60. The gear unit 60 has a bevel gear 61 (a first intersecting-axis gear), a bevel gear 62 (a second intersecting-axis gear), a spur gear 63 (a first parallel-axis gear), a spur gear 64 (a second parallel-axis gear), an internal gear 65, a spur gear 66, and a spur gear 67, which are all disposed in a housing 60a (see FIG. 3). The housing 60a is screw-fastened to the cover portion 21 (see FIG. 3).

[0054] The bevel gear 61 is disposed with its axial direction parallel to a front-rear direction, and has, in a shaft thereof, a fitting hole 61a in which a rotation shaft (not shown) of the drive motor 100 (see FIG.2) is to be fitted. The bevel gear 62 is disposed with its axial direction parallel to the left-right direction, and meshes with the bevel gear 61. The spur gear 63 is integrally and concentrically formed with the bevel gear 62.

[0055] A shaft portion 63a of the spur gear 63 has a fitting hole (not shown) in which a projection portion 58a (see FIG. 3) of the cap 58 is fitted. In this manner, the spur gear 63 and the bevel gear 62 are connected to the winding roll 50.

[0056] The spur gear 64 is disposed under the spur gear 63, and meshes with the spur gear 63. The internal gear 65 is provided integral with the spur gear 64. The spur gear 66 meshes with the internal gear 65. The spur gear 67 is integrally and concentrically formed with the spur gear 66. The spur gear 68, which is provided at one end of the shaft 81 of the brush body 80, meshes with the spur gear 67.

[0057] When the drive motor 100 is driven, the winding roll 50 is caused to rotate via the bevel gear 61 and the bevel gear 62. Furthermore, rotation of the spur gear 63, which is integral with the bevel gear 62, causes the brush body 80 to rotate via the spur gear 64, the internal gear 65, the spur gear 66, the spur gear 67, and the spur gear 68. Since the spur gear 63, which is integral with the bevel gear 62, meshes with the spur gear 64, which is connected

to the brush body 80, it is possible to easily rotate the brush body 80, which is disposed parallel to the winding roll 50.

[0058] At this time, since the internal gear 65 is provided which is integral with the spur gear 64, it is possible to dispose the spur gear 68, which is on a rotation axis of the brush body 80, between a rotation shaft (the shaft portion 63a) of the spur gear 63 and a rotation shaft of the spur gear 64. This makes it easy to dispose the brush body 80, which slides on the pre-filter 6 on the winding roll 50, close to the winding roll 50.

[0059] Here, the bevel gears 61 and 62 may be intersecting-axis gears. Furthermore, the spur gears may be parallel-axis gears, and they may be helical gears or the like.

[0060] FIG. 8 is an exploded perspective view of the biasing portion 70 of the cleaning device 30. The biasing portion 70 has housings 78 and 79, which are screw-fastened to each other, and a rotation body 71 (a first rotation body) and a rotation body 72 (a second rotation body), which are housed in the housings 78 and 79. One axial end face of the rotation body 71 is provided with a holding portion 71a projecting therefrom, and the other axial end face of the rotation body 71 is provided with a groove portion 71b. A locking portion 48a of the cap 48 is fitted in the groove portion 71b. Thereby, the rotation body 71 locks the shaft portion of the feed roll 40, and the feed roll 40 is connected to the biasing portion 70.

[0061] The rotation body 72 holds a spiral spring 75 in an inside thereof on the rotation body 71 side. One end (an inner end) of the spiral spring 75 is held by the holding portion 71a of the rotation body 71, and the other end (an outer end) of the spiral spring 75 is fitted to an inner circumferential surface of the rotation body 72. When the rotation body 71 rotates clockwise with respect to the rotation body 72 as seen from the right side face of the rotation body 71 (as seen in an arrow A direction), biasing force of the spiral spring 75 increases with the rotation of the rotation body 71. That is, when the rotation body 72 rotates clockwise with respect to the rotation body 71 as seen in the arrow A direction, the biasing force of the spiral spring 75 decreases with the rotation of the rotation body 72.

[0062] The rotation body 72 has a plurality of teeth 72a disposed at predetermined intervals on an outward-side (right-side) outer circumferential surface thereof in the axial direction. Inside the housing 78, a stopper 77 is pivotally supported, and the stopper 77 is biased by a torsion coil spring 77a in a direction for pressing the rotation body 72. With this configuration, clockwise rotation of the rotation body 72 as seen in the arrow A direction,

which is a rotation that reduces the biasing force of the spiral spring 75, is restricted by engagement of the stopper 77 with the teeth 72a.

[0063] In a right side face of the housing 78, an opening portion 78a is provided, and the handle 73, which is cylindrical, is disposed so as to cover the opening portion 78a. Inside the housing 78, there is disposed a flange portion 73a, which has a diameter that is larger than that of the opening portion 78a. Via the opening portion 78a, the handle 73 and the flange portion 73a are screw-fastened to each other to be spaced from an outer wall of the housing 78 in the axial direction by a predetermined distance. In this manner, the handle 73 is rotatably attached to the housing 78.

[0064] Inside the housing 78, a connection member 74 is disposed inward (leftward) of the flange portion 73a in the axial direction. Between the rotation body 72 and the connection member 74, a compression spring 76 is disposed to bias the connection member 74 outward (rightward) in the axial direction. The connection member 74 has a plurality of cut portions 74c formed on a circumferential surface thereof at predetermined intervals. The rotation body 72 has a plurality of ribs 72c formed on an axially outer end portion thereof in the axial direction to extend radially, and the ribs 72c fit in the cut portions 74c. Thereby, the connection member 74 rotates integrally with the rotation body 72.

[0065] The connection member 74 has a diameter that is larger than those of the flange portion 73a and the opening portion 78a. The connection member 74 is provided with a plurality of slope portions 74a and a plurality of ribs 74b formed at predetermined intervals on an outer (right-side) face thereof in the axial direction. The slope portions 74a are formed to be gradually higher in the counterclockwise direction as seen in the arrow A direction. The ribs 74b are adjacent to top portions of the slope portions 74a and extend radially, and the ribs 74a are formed to be higher than the top portions of the slope portions 74a.

[0066] Furthermore, the flange portion 73a is provided with a plurality of ribs 73b on an inner (left-side) face thereof in the axial direction, and the ribs 73b extend radially and engage with the ribs 74b. The housing 78 is provided with a projection portion (not shown) formed on an inner wall surface thereof, and the projection portion engages with the ribs 74b.

[0067] When the handle 73 is turned clockwise as seen in the arrow A direction, the ribs 74b come into engagement with the ribs 73b, and also with the projection portion of the housing 78. In this manner, the turning of the handle 73 is restricted.

[0068] On the other hand, when the handle 73 is turned counterclockwise as seen in

the arrow A direction, the ribs 73b are caused to slide on the slope portions 74a. As a result, the connection member 74 moves inward in the axial direction against the biasing force of the compression spring 76, and the ribs 74b moves away from the projection portion of the housing 78 in the axial direction. In this way, it is possible to turn the handle 73, such that the ribs 74b engage with the ribs 73b, and the rotation body 72 rotates in a direction for increasing the biasing force of the spiral spring 75. That is, the rotation body 72 is operated to rotate via the handle 73.

[0069] In the air purifier 1 having the above configuration, when the operation portion 19 is operated to start the operation of the air purifier 1, a judgment is made on whether the cover portion 21 is attached to the main body portion 20. In a case where it is found that the cover portion 21 is attached to the main body portion 20, the fan 10 and the ion generator 11 are driven. Thereby, air is taken in from inside the room through the inlet 3, and flows through the air channel 8. At this time, the pre-filter 6 catches large-sized pieces of dust floating in the air. Furthermore, the deodorization filter 7 deodorizes the air, and the dust collection filter 9 catches small-sized pieces of dust and fine particles such as PM2.5.

[0070] Then, the ion generator 11 generates ions and releases the ions into the air. The air, which contains the ions, is discharged into the room through one or both of the outlets 4 and 5. In this way, the air discharge operation of the air purifier 1 is performed, so that the air in the room is purified.

[0071] Next, a description will be given of how the cleaning device 30 operates. At a predetermined timing, the cleaning device 30 is driven and caused to start its cleaning operation. The cleaning operation is started when, for example, accumulated operation time of the air purifier 1 in a predetermined period exceeds a predetermined length of time. While the cleaning device 30 is being driven, the fan 10 is kept out of operation.

[0072] When the cleaning device 30 is driven, the drive motor 100 rotates to cause the bevel gear 61 (see FIG. 6 and FIG. 7) to rotate counterclockwise as seen from the front. The bevel gear 62 and the spur gear 63 rotate clockwise as seen from the right side faces thereof (as seen in the arrow A direction). As a result, the winding roll 50 is caused to rotate clockwise as seen from the right side face thereof, to draw the pre-filter 6 from the feed roll 40 to wind it up.

[0073] The spur gear 64, the internal gear 65, the spur gear 66, and the spur gear 67 rotate counterclockwise as seen from the right side faces thereof, and the spur gear 68 rotates

clockwise as seen from the right side face thereof. As a result, the brush body 80 rotates clockwise as seen from the right side face thereof. At this time, the brush-bristle bundles 82 of the brush body 80 slide on the pre-filter 6 on the winding roll 50. Thereby, dust on the pre-filter 6 is removed and collected in the container 92.

[0074] At this time, the rotation direction of the winding roll 50 and that of the brush body 80 are identical. Thus, the brush-bristle bundles 82 of the brush body 80 slide on the pre-filter 6 in a direction reverse to the direction in which the pre-filter 6 moves. This makes it possible for the brush body 80 to securely remove dust on the pre-filter 6.

[0075] Furthermore, it is desirable that the peripheral speed of the brush body 80 be more than that of the winding roll 50. Then, it is possible for the circumferential contact length of the brush-bristle bundles 82 to be longer than the contact interval of the brush-bristle bundles 82 on the pre-filter 6, and thus it is possible for the brush-bristle bundles 82 to touch the pre-filter 6 without leaving any part of the pre-filter 6 untouched by the brush-bristle bundles 82.

[0076] The brush-bristle bundles 82 on the shaft 81 is combed by the comb portion 93 while the shaft 81 is rotating, and thereby dust that has adhered to the brush-bristle bundles 82 is removed and falls into the container 92.

[0077] When the pre-filter 6 is wound up on the winding roll 50, the rotation body 71 (see FIG. 8) of the biasing portion 70 connected to the feed roll 40 rotates clockwise as seen from the right side face thereof (as seen in the arrow A direction). As a result, the spiral spring 75 is wound to increase its biasing force.

[0078] At this time, the pattern 6g (see FIG. 4) on the housed portion 6c of the pre-filter 6 moves downward to become visible through the inlet 3. This makes it possible for the user to easily know that the cleaning device 30 is in operation. Thus, it is possible to prevent the user from erroneously thinking that the fan 10 has stopped because of some trouble. Here, the fan 10 may be driven at a low speed during the operation of the cleaning device 30.

[0079] When the amount of rotation of the drive motor 100 reaches a predetermined value, the drive motor 100 is caused to rotate reversely. As a result, the bevel gear 61 rotates in a direction (in the present embodiment, in the clockwise direction) reverse to the direction in which it rotates to wind up the pre-filter 6. At this time, the winding roll 50 and the brush body 80 rotate counterclockwise as seen from the right side faces thereof.

[0080] At the time when the winding up of the pre-filter 6 by the winding roll 50 is finished, the biasing force has become larger than before the winding up. Thus, the reverse rotation of the drive motor 100 causes the spiral spring 75 to exert its restoring force, which causes the rotation body 71 to rotate counterclockwise as seen from the right side face thereof. As a result, the pre-filter 6 is wound back on the feed roll 40.

[0081] When the amount of rotation of the drive motor 100 reaches a predetermined value, the drive motor 100 is stopped. This completes the cleaning operation of the cleaning device 30.

[0082] Here, a sensor may be provided to detect the outer diameter of the winding roll 50. With such a sensor, it is possible to reversely rotate the drive motor 100 on detecting that the outer diameter of the winding roll 50 after winding up the pre-filter 6 has become larger than a predetermined value. Also, it is possible to stop the drive motor 100 on detecting that the diameter of the winding roll 50 has become smaller than a predetermined value.

[0083] After the cleaning operation by the cleaning device 30 is finished, it is possible for the user to detach the dust collection portion 90 from the cover portion 21 to throw away the dust collected in the container 92.

[0084] Furthermore, in replacing the pre-filter 6, the feed roll 40, to which one end of the pre-filter 6 is attached, is mounted on the cover portion 21. Then, the lower end of the pre-filter 6 is attached to the winding roll 50.

[0085] At this time, there is a case where the pre-filter 6 is loose between the feed roll 40 and the winding roll 50. In such a case, when the user turns the handle 73 of the biasing portion 70 counterclockwise as seen from the right side face thereof (as seen in the arrow A direction), the rotation bodies 71 and 72 rotate counterclockwise as seen from the right side faces thereof. As a result, the pre-filter 6 is wound up on the feed roll 40, and thereby it is possible to tighten the pre-filter 6. Accordingly, when the fan 10 is driven, it is possible for air taken in through the inlet 3 to securely pass through the pre-filter 6.

[0086] According to the present embodiment, the brush body 80 is connected to the drive motor 100, which drives the winding roll 50 to rotate, and, when the winding roll 50 rotates, the brush body 80 also rotates to slide on the pre-filter 6 (a filter) on the winding roll 50. This eliminates the need of the brush-member motor, which is provided in the conventional example, to rotate the brush body 80 in addition to the drive motor 100.

Accordingly, it is possible to reduce the production cost of the air purifier 1.

[0087] Furthermore, the winding roll 50 and the brush body 80 rotate in the same direction. As a result, the brush body 80 slides on the pre-filter 6 in a direction reverse to the direction in which the pre-filter 6 moves. Thus, it is possible for the brush body 80 to securely remove dust on the pre-filter 6.

[0088] Furthermore, it is desirable that the peripheral speed of the brush body 80 be more than the peripheral speed of the winding roll 50. Then, it is possible for the circumferential contact length of the brush-bristle bundles 82 to be longer than the contact interval of the brush-bristle bundles 82 on the pre-filter 6, and thus it is possible for the brush-bristle bundles 82 to touch the pre-filter 6 without leaving any part of the pre-filter 6 untouched by the brush-bristle bundles 82. Thus, it is possible to remove dust on the pre-filter 6 more securely.

[0089] Furthermore, the drive motor 100 is disposed in the main body portion 20 of the casing 2, and the feed roll 40 and the winding roll 50 are disposed on the cover portion 21. This makes it easy to replace the pre-filter 6 by detaching the main body portion 20 from the cover portion 21. Here, even though the air purifier 1 is provided with the cleaning device 30, depending on where the air purifier 1 is placed (for example, if placed where grease and oil stains are common like a kitchen), the pre-filter 6 may suffer clogging. Even in such a case, it is possible to detach the pre-filter 6 with ease for thorough cleaning.

[0090] Furthermore, the bevel gear 61 (the first intersecting-axis gear), which has the fitting hole 61a in which the rotation shaft of the drive motor 100 is fitted, the bevel gear 62 (the second intersecting-axis gear), which meshes with the bevel gear 61, the spur gear 63 (the first parallel-axis gear), which rotates integral with the bevel gear 62 and is connected to the winding roll 50, and the spur gear 64 (the second parallel-axis gear), which meshes with the spur gear 63 and is connected to the brush body 80, are provided. This makes it possible to easily achieve the rotation of the winding roll 50 and the brush body 80 with the single drive motor 100.

[0091] Furthermore, since the spur gear 63, which is connected to the winding roll 50, is disposed closer to the drive motor 100 than the spur gear 64, which is connected to the brush body 80, it is possible to reduce attenuation of the drive force transmitted to the winding roll 50. This makes it possible to securely rotate the winding roll 50, which is biased by the biasing portion 70 via the pre-filter 6, against the biasing force by means of the

drive motor 100.

[0092] Furthermore, the internal gear 65, which is provided integral with the spur gear 64, and the spur gear 66 (the third parallel-axis gear), which meshes with the internal gear 65, are provided between the brush body 80 and the spur gear 64, and the rotation shaft of the brush body 80 is disposed between the rotation shaft of the spur gear 63 and the rotation shaft of the spur gear 64. This makes it easy to dispose the brush body 80, which slides on the pre-filter 6 on the winding roll 50, close to the winding roll 50.

[0093] Furthermore, the pre-filter 6 has the air passing portion 6b, which is disposed to face the inlet 3 when the cleaning device 30 is out of operation, and the housed portion 6c, which is fed out from the feed roll 40 when the cleaning device 30 is in operation. Moreover, provided on the housed portion 6c is the pattern 6g, which is visible through the inlet 3 for the housed portion 6c to be distinguished from the air passing portion 6b. This makes the movement of the pre-filter 6 easily recognizable visually, and thus, the user is able to easily recognize when the pre-filter 6 is being cleaned by the cleaning device 30.

[0094] Furthermore, the fan 10 is kept out of operation while the cleaning device 30 is being driven. In this way, it is possible to prevent dust from being sucked and moved to downstream of the pre-filter 6 immediately after being removed from the pre-filter 6. Furthermore, the pattern 6g helps prevent the user from erroneously thinking that the fan 10 has stopped because of some trouble.

[0095] Furthermore, the biasing portion 70 of the cleaning device 30 has the spiral spring 75, which, when the pre-filter 6 is wound up, biases the rotation shaft of the feed roll 40 in the direction reverse to the direction in which the winding roll 50 is wound up. With this configuration, when the drive motor 100 is reversely rotated after the winding up of the pre-filter 6 by the winding roll 50 is finished, the restoring force of the spiral spring 75 causes the pre-filter 6 to be wound back on the feed roll 40. Thus, there is no need of providing, separately from the drive motor 100, a motor for rotating the feed roll 40 in the direction reverse to the winding direction W of the winding roll 50. As a result, it is possible to further reduce the production cost of the air purifier 1. Furthermore, the use of the spiral spring 75 makes it possible to wind up the pre-filter 6 on the winding roll 50 over a long distance while biasing the pre-filter 6. This helps increase the degree of freedom in designing the size of the pre-filter 6.

[0096] Furthermore, the biasing portion 70 has the rotation body 71 (the first rotation

body) which locks the shaft portion of the feed roll 40 and to which one end of the spiral spring 75 is fitted, the rotation body 72 (the second rotation body) to which the other end of the spiral spring 75 is fitted and of which rotation in the direction for reducing the biasing force of the spiral spring 75 is restricted, and the handle 73 which is operated to rotate the rotation body 72. With this configuration, when the handle 73 is operated with the feed roll 40 attached to the cover portion 21, the pre-filter 6 is wound in the direction reverse to the winding direction W. As a result, the pre-filter 6 becomes less loose to allow air containing dust to securely pass through the pre-filter 6.

[0097] Furthermore, the biasing portion 70 includes the connection member 74, which is disposed between the handle 73 and the rotation body 72 and which restricts the rotation of the handle 73 in the direction for reducing the biasing force of the spiral spring 75, and the connection member 74 rotates integrally with the rotation body 72. With this configuration, it is possible to securely prevent the rotation body 72 from rotating in the direction for reducing the biasing force of the spiral spring 75.

[0098] Furthermore, the shaft 41 of the feed roll 40 includes the core member 41a having the groove portion 41b and the sleeve 41d which is a sectionally C-shaped elastic member externally fitted to the core member 41a, such that the bar member 6a of the pre-filter 6 is elastically held between the sleeve 41d and the groove portion 41b. With this configuration, it is possible to easily detach the bar member 6a from the shaft 41 by widening the opening portion 41e of the sleeve 41d. Furthermore, the sleeve 41d helps prevent the bar member 6a from coming off from the shaft 41. This applies to the winding roll 50 as well.

[0099] Furthermore, the core member 41a of the feed roll 40 is a metal member, and the sleeve 41d is a resin molded product. This applies to the winding roll 50 as well. This makes it possible to easily attach and detach the bar member 6a with respect to the shafts 41 and 51 while securing sufficient strength of the shaft 41 and 51.

[0100] <Second Embodiment>

Next, a description will be given of a second embodiment of the present invention. FIG. 9 is a side view of a support member of a cover portion of an air purifier according to the present embodiment. For convenience of description, the same signs are given to portions similar to those in the first embodiment described in FIG. 1 to FIG. 8 referred to above. The present embodiment is different from the first embodiment in configuration of the support member 49 of the cover portion 21. The other portions are

similar to those in the first embodiment.

[0101] In the cover portion 21, the support member 49 (see FIG. 3) disposed to the right of the feed roll 40 has a swing plate 400 provided at a front end portion thereof; the swing plate 400 is made of resin and swingable in the up-down direction. The swing plate 400 has a shaft portion 401, which is disposed to be displaced rearward from a center of the swing plate 400 in the front-rear direction. With this configuration, in a case where, as illustrated in FIG. 9, the feed roll 40 is not mounted on the support member 49, the front end portion of the swing plate 400 projects more frontward than the support member 49. Hence, when the user tries to attach the cover portion 21 to the main body portion 20 in a state where the feed roll 40 is not attached to the cover portion 21, the front end portion of the swing plate 400 interferes with the main body portion 20. This makes it possible to easily prevent the user from forgetting to attach the feed roll 40 to the cover portion 21.

[0102] On the other hand, when the feed roll 40 is mounted on the support member 49 as illustrated in FIG. 10, the feed roll 40 strikes against a rear end portion of the swing plate 400 to cause the swing plate 400 to swing upward. As a result, the front end portion of the swing plate 400 retracts rearward, and thus, in attaching the cover portion 21 to the main body portion 20, interference between the swing plate 400 and the main body portion 20 is prevented.

[0103] The present embodiment achieves effects similar to those achieved by the first embodiment.

[0104] <Third Embodiment>

Next, a third embodiment of the present invention will be described. FIG. 11 is a side view of a support member of a cover portion of an air purifier according to the present embodiment. For convenience of description, the same signs are given to portions similar to those in the first embodiment described in FIG. 1 to FIG. 8 referred to above. The present embodiment is different from the first embodiment in configuration of the support member 49 of the cover portion 21. The other portions are similar to those in the first embodiment.

[0105] The support member 49 has a stationary portion 49a and a movable portion 49b. The movable portion 49b has a spring 49c disposed at a rear end portion thereof, and one end of the spring 49c is fitted to a front face of the cover portion 21. Here, the support member 49 is configured such that, in a state where the spring 49c is extended, a front end

portion of the movable portion 49b projects more frontward than the stationary portion 49a. With this configuration, in a case where, as illustrated in FIG. 11, the feed roll 40 is not mounted on the support member 49, the front end portion of the movable portion 49b projects more frontward than the stationary portion 49a. Hence, when the user tries to attach the cover portion 21 to the main body portion 20 in a state where the feed roll 40 is not attached to the cover portion 21, the front end portion of the movable portion 49b interferes with the main body portion 20. This makes it possible to easily prevent the user from forgetting to attach the feed roll 40 to the cover portion 21.

[0106] On the other hand, when the feed roll 40 is mounted on the support member 49 as illustrated in FIG. 12, the feed roll 40 contacting the stationary portion 49a causes the movable portion 49b to move rearward. As a result, the front end portion of the movable body 49b retracts rearward, and thus, in attaching the cover portion 21 to the main body portion 20, interference between the movable portion 49b and the main body portion 20 is prevented.

[0107] The present embodiment achieves effects similar to those achieved by the first embodiment.

[0108] Note that, in the second embodiment and the third embodiment, a photo interrupter (not shown) may be provided instead of the magnet 23 and the Hall element of the first embodiment. The photo interrupter has a light emitting portion and a light receiving portion, which are disposed opposite to each other. In a case where the light receiving portion detects that light traveling from the light emitting portion toward the light receiving portion has been blocked by the swing plate 400 of the second embodiment or the movable portion 49b of the third embodiment, both projecting more frontward than the support member 49, the fan 10 is prohibited from being driven. In this manner, the blowing operation of the air purifier 1 is prevented when the cover portion 21 is not attached to the main body portion 20.

[0109] <Fourth Embodiment>

Next, a fourth embodiment of the present invention will be described. FIG. 13 is a plan view of a pre-filter of an air purifier according to the present embodiment. For convenience of description, the same signs are given to portions similar to those in the first embodiment described in FIG. 1 to FIG. 8 referred to above. The present embodiment is different from the first embodiment in configuration of the pre-filter 6. The other portions

are similar to those in the first embodiment.

[0110] The pre-filter 6 is sheet shaped and includes a first region A1 to a fourth region A4, which are aligned in the winding direction W. The first region A1 is a region where the mesh density is low, the second region A2 is a region where the mesh density is high, the third region A3 is a region where activated charcoal is applied to the mesh, and the fourth region A4 is a region where a fragrance is applied to the mesh.

[0111] Furthermore, the air purifier 1 has a dust sensor (not shown) or an odor sensor (not shown). The dust sensor detects dust concentration in the air of a room. The odor sensor detects odor component concentration in the air of a room.

[0112] In the air purifier 1 configured as described above, for example, when it is judged, based on a detection result of the dust sensor, that the dust concentration in the air is low, the drive motor 100 is driven to cause the winding roll 50 to rotate to bring the first region A1 to a position facing the inlet 3. This allows the air purifier 1 to perform its blowing operation with an improved efficiency. Furthermore, for example, when it is judged, based on a detection result of the dust sensor, that the dust concentration in the air is high, the drive motor 100 is driven to cause the winding roll 50 to rotate to bring the second region A2 to the position facing the inlet 3. Here, it is possible to determine which region should face the inlet 3 based on the lengths of the first region A1 to the fourth region A4 in the winding direction W and the rotation amount of the drive motor 100.

[0113] In a case where it is judged, based on a detection result of the odor sensor, that the odor component concentration in the air is high, the drive motor 100 is driven to cause the winding roll 50 to rotate to bring the third region A3 or the fourth region A4 to the position facing the inlet 3.

[0114] Thus, of the regions in the pre-filter 6, one that is suitable to the condition of the air in the room is disposed to face the inlet 3, and this helps improve the usability of the air purifier 1.

[0115] The present embodiment achieves effects similar to those achieved by the first embodiment. Furthermore, the pre-filter 6 includes the first region A1 to the fourth region A4, which are aligned in the winding direction W. With this configuration, of the regions in the pre-filter 6, one that is suitable to the condition of the air in the room is disposed to face the inlet 3, and this helps improve the usability of the air purifier 1.

[0116] Here, the user may select one of the first region A1 to the fourth region A4 by

operating the operation portion 19.

[0117] <Fifth Embodiment>

Next, a fifth embodiment of the present invention will be described. FIG. 14 is a perspective view of a pressing member of an air purifier according to the present embodiment. For convenience of description, the same signs are given to portions similar to those in the first embodiment described in FIG. 1 to FIG. 8 referred to above. The present embodiment is different from the first embodiment in configuration of the pressing member 22. The other portions are similar to those in the first embodiment.

[0118] The pressing member 22 of the present embodiment has the pre-filter 6 which has only the rib 22b which extends in the winding direction W (the up-down direction in the present embodiment), and does not have a rib extending in a direction (the left-right direction in the present embodiment) orthogonal to the winding direction W. With this configuration, it is possible to prevent dust from being caused to fall by sliding, on the pre-filter 6, of a rib extending in the direction orthogonal to the winding direction W.

[0119] Note that the present embodiment achieves effects similar to those achieved by the first embodiment.

[0120] In the first embodiment to the fifth embodiment, the feed roll 40 and the winding roll 50 are disposed in the cover portion 21, but they may be disposed in the main body portion 20 instead of in the cover portion 21.

[0121] In the cleaning operation performed in the air purifier 1 of any one of the first to fifth embodiments, the winding-up speed of the winding roll 50 and the winding-back speed of the feed roll 40 may be equal or different. For example, when the winding-up speed of the winding roll 50 is less than the winding-back speed of the feed roll 40, it is possible to raise the winding-back speed while removing dust on the pre-filter 6 to thereby reduce time for the cleaning operation.

Industrial Applicability

[0122] The present invention is applicable to an air purifier including a cleaning device which cleans a filter.

List of Reference Signs

[0123] 1 air purifier

2	casing
3	inlet
4, 5	outlet
6	pre-filter (filter)
6a	bar member
6b	air passing portion
6c	housed portion
6g	pattern
7	deodorization filter
8	air channel
8a	first branch channel
8b	second branch channel
9	dust collection filter
10	fan
11	ion generator
12	damper
14, 15	wind deflector
20	main body portion
21	cover portion
22	pressing member
23	magnet
30	cleaning device
40	feed roll
41	shaft
41a	core member
41d	sleeve
50	winding roll
60	gear unit
61	bevel gear (first intersecting-axis gear)
62	bevel gear (second intersecting-axis gear)
63	spur gear (first parallel-axis gear)
64	spur gear (second parallel-axis gear)

65	internal gear
66	spur gear (third parallel-axis gear)
70	biasing portion
71	rotation body (first rotation body)
71a	holding portion
72	rotation body (second rotation body)
72a	ratchet
73	handle
74	connection member
75	spiral spring
76	compression spring
77	stopper
77a	torsion coil spring
78, 79	housing
80	brush body
81	shaft
82	bristle bunch
90	dust collection portion
91	lid portion
91a	opening portion
92	container
93	comb portion
100	drive motor
200	humidifier
201	tray
202	humidification filter
300	tape-shaped member
400	swing plate
401	shaft portion
SP	space

CLAIMS

- [Claim 1] An air purifier comprising:
a casing having an inlet and an outlet;
an air channel connecting the inlet to the outlet;
a fan disposed in the air channel;
a filter disposed to face the inlet; and
a cleaning device which cleans the filter,
wherein
the cleaning device comprises
a feed roll on which is wound the filter, which is sheet-shaped,
a winding roll which winds up the filter,
a drive motor which drives the winding roll to rotate, and
a brush body which is connected to the drive motor and which,
when the winding roll rotates, rotates and slides on the filter on the winding roll.
- [Claim 2] The air purifier according to claim 1,
wherein
a rotation direction of the winding roll and a rotation direction of the
brush body are identical.
- [Claim 3] The air purifier according to claim 2,
wherein
brush-bristle bundles are arranged at predetermined intervals in a
helical fashion on a circumferential surface of a shaft via which the brush body is
supported on the casing, and
a peripheral speed of the brush body is more than a peripheral speed of
the winding roll.
- [Claim 4] The air purifier according to any one of claims 1 to 3,
wherein

the casing comprises

a main body portion in which the fan is disposed, and

a cover portion which is disposed to be attachable and detachable with respect to the main body portion and which has the inlet, and

the drive motor is disposed in the main body portion and the feed roll and the winding roll are disposed in the cover portion.

[Claim 5] The air purifier according to claim 4, further comprising:

a first intersecting-axis gear which has a fitting hole in which a rotation shaft of the drive motor is fitted;

a second intersecting-axis gear which meshes with the first intersecting-axis gear;

a first parallel-axis gear which rotates integrally with the second intersecting-axis gear and which is connected to the winding roll; and

a second parallel-axis gear which meshes with the first parallel-axis gear and which is connected to the brush body.

[Claim 6] The air purifier according to claim 5,

wherein

between the brush body and the second parallel-axis gear, there are provided

an internal gear which is integrally provided with the second parallel-axis gear, and

a third parallel-axis gear which meshes with the internal gear, and

a rotation shaft of the brush body is disposed between a rotation shaft of the first parallel-axis gear and a rotation shaft of the second parallel-axis gear.

[Claim 7] The air purifier according to any one of claims 1 to 6,

wherein

the filter comprises

an air passing portion which is disposed to face the inlet while

the cleaning device is out of operation, and

a housed portion which is fed out from the feed roll while the cleaning roll is being driven, and

the housed portion has a pattern provided thereon to be visible through the inlet for the housed portion to be distinguished from the air passing portion.

[Claim 8] The air purifier according to claim 7,
wherein

the fan is kept out of operation while the cleaning device is being driven.