

Description

Title of Invention

INSECT TRAP AND AIR TREATMENT DEVICE

5 Technical Field

[0001]

The present invention relates to (i) an insect catching device and (ii) an air treatment device including the insect trap.

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Background Art

[0002]

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In recent years, there have been an increasing number of weather conditions where powdery matters such as PM (Particulate Matter) 2.5 are contained in an atmosphere. Enhanced awareness of health damage prevention has led to wide use of air purifiers in general households. In regions where humidity tends to be high, such as Japan having a rainy season, dehumidifiers are widely used among general households, offices, and the like. Worldwide, infections transmitted through insects, particularly mosquitos, are increasing. This has led to increasing demands for insect catching devices for use in general households and the like.

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[0003]

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Meanwhile, in view of convenience, air purifiers having

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an ability to catch insects are proposed as disclosed in Patent Literature 1. According to the configuration disclosed in Patent Literature 1, an insect catching part for catching insects is provided at an air passage between (i) an inlet through which air is taken in and (ii) a filter by which the air taken in through the inlet is filtered. With this configuration of Patent Literature 1, it is possible to prevent scattering, toward the outside the device, of (i) scales of insects caught and (ii) dust from dead insects.

Citation List

[Patent Literature]

[0004]

[Patent Literature 1]

PCT International Publication No. WO2015/111246
(Publication Date: July 30, 2015)

Summary of Invention

Technical Problem

[0005]

According to the configuration disclosed in Patent Literature 1, insects and the like caught by the insect catching part become visible when the insect catching part is removed from a housing of an insect catching unit so as to be replaced. Therefore, according to the configuration disclosed

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in Patent Literature 1, there may be a risk of causing an uncomfortable feeling, depending on a user.

[0006]

The present invention has been made in view of the problem, and it is an object of the present invention to provide (i) an insect catching device which does not cause a user to feel uncomfortable in a case where an insect catching part is to be replaced and (ii) an air treatment device including the insect catching device.

Solution to Problem

[0007]

In order to attain the object, an insect catching device in accordance with an aspect of the present invention includes: a housing having an opening; an insect catching member which is provided in the housing and which has a sheet-like form having (i) a front surface at which an insect is to be caught and (ii) a rear surface which covers the opening; and a protruding part which is provided on the rear surface so that the protruding part can be grabbed, at the opening, from an outside of the housing while the rear surface is covering the opening.

[0008]

In order to attain the object, an insect catching device in accordance with another aspect of the present invention includes: a housing having an opening; an insect catching

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member which is provided in the housing and which has a sheet-like form having (i) a front surface at which an insect is to be caught and (ii) a rear surface, a protruding part which is provided to the insect catching member so that the protruding part can be grabbed, at the opening, from an outside of the housing while the insect catching member is fixed in the housing; and a cover sheet which covers the front surface of the insect catching member, one end part of the cover sheet being fixed to at least one of (i) the front surface, (ii) a side of the protruding part, on which side the front surface is located, and (iii) a part between the front surface and the protruding part, and the cover sheet being configured to be attached to the front surface in a case where the protruding part is pulled from the outside of the housing.

Advantageous Effects of Invention

[0009]

With aspects of the present invention, it is advantageously possible to prevent an uncomfortable feeling of a user in a case where an insect catching part is to be replaced.

Brief Description of Drawings

[0010]

Fig. 1 is a perspective view illustrating an appearance of an air purifier to which an air treatment device in

accordance with Embodiment 1 of the present invention is applied.

Fig. 2 is a longitudinal sectional view of the air purifier illustrated in Fig. 1.

5 Fig. 3 is a perspective view showing that a covering member illustrated in Fig. 1 is viewed from an inner side.

(a) of Fig. 4 is a perspective view illustrating a protruding part. (b) of Fig. 4 is a perspective view illustrating a first variation of the protruding part. (c) of Fig. 4 is a perspective view illustrating a second variation of the protruding part. (d) of Fig. 4 is a cross-sectional view illustrating an insect catching sheet in accordance with an implementation example of a structure illustrated in (c) of Fig. 4.

15 Fig. 5 is a cross-sectional view taken along the line A-A shown in Fig. 3.

Fig. 6 is a view illustrating, in detail, (i) an opening and a protruding part of the air purifier illustrated in Fig. 2 and (ii) a region in the vicinity of the opening and the protruding part.

Fig. 7 is a view showing that, in the state illustrated in Fig. 6, the protruding part is being pulled from the outside of a covering member.

Fig. 8 is a view showing that, in the state illustrated in Fig. 7, the protruding part is being pulled from the outside of

a covering member.

Fig. 9 is a perspective view illustrating a variation of the example shown in Fig. 3.

Fig. 10 is a perspective view illustrating an appearance of an air purifier to which an air treatment device in accordance with Embodiment 2 of the present invention is applied.

Fig. 11 is a perspective view illustrating a variation of a lid part of the air purifier illustrated in Fig. 10.

Fig. 12 is a longitudinal sectional view illustrating an air purifier to which an air treatment device in accordance with Embodiment 3 of the present invention is applied.

Fig. 13 is a view illustrating, in detail, (i) an opening and a protruding part of the air purifier illustrated in Fig. 12 and (ii) a region in the vicinity of the opening and the protruding part. Fig. 13 shows that, in the state illustrated in Fig. 12, the protruding part is being pulled from the outside of a covering member.

Description of Embodiments

[0011]

The following description will discuss embodiments of the present invention with reference to Figs. 1 through 13.

[0012]

[Embodiment 1]

Embodiment 1 of the present invention will be described below with reference to the drawings. Embodiment 1 will discuss an example in which an air treatment device of the present invention is applied to an air purifier. Fig. 1 is a perspective view illustrating an appearance of an air purifier in accordance with Embodiment 1. Fig. 2 is a longitudinal sectional view of the air purifier illustrated in Fig. 1. In the drawings discussed below, white arrows indicate the flow of air.

[0013]

(External structure of air purifier)

As illustrated in Fig. 1, the air purifier 1 is structured so as to be placed on a floor surface of, for example, a living room. The air purifier 1 includes (i) a main body housing 2 having a substantially elliptic transverse section and (ii) a covering member 3. The main body housing 2 and the covering member 3 constitute a housing of the air purifier 1. The covering member 3 is removably attached to a back surface side of the main body housing 2. To an inner surface of the covering member 3, an insect catching sheet (insect catching member) 31 is attached. The insect catching sheet 31 has a front surface having an adhesive face. A back surface of the main body housing 2 and an outer surface of the covering member 3 each have black color. Dark colors such as black tend to be preferred by insects such as mosquitos.

Therefore, by causing the back surface of the main body housing 2 and the outer surface of the covering member 3 to have dark color, it is possible to easily attract insects to a region in the vicinity of the covering member 3.

5 [0014]

At a peripheral part of a top surface of the main body housing 2, a sleeve part 12 made of a transparent resin is provided. At a front part of the top surface of the main body housing 2, an operation section 6 is provided. The operation
10 section 6 includes a plurality of buttons (not illustrated). A user operates the buttons to set an operation of the air purifier 1. For example, the user turns on/off the operation of the air purifier 1, changes a volume of air blown by an air blower 10 (described later), and turns on/off the discharge
15 device 11 (described later).

[0015]

Across the covering member 3 and an attachment plate 34 (described later), an opening 201 is made. The opening 201 is made so as to (i) overlap the insect catching sheet 31
20 and (ii) be open at a center part of the insect catching sheet 31. A shape of the opening 201 is rectangular in a plan view. The opening 201 has a width greater than that of the insect catching sheet 31. The insect catching sheet 31 has a protruding part 202. The protruding part 202 extends from
25 the inside of the covering member 3 through the opening 201.

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This allows a user to grab the protruding part 202, at the opening 201, from the outside of the covering member 3.

[0016]

(Internal structure of air purifier)

5 As illustrated in Figs. 1 and 2, the covering member 3 has a plurality of inlets (air inlet) 4. The back surface of the main body housing 2 has an inflow port 20. Between the covering member 3 and the back surface of the main body housing 2, an insect catching space (air passage) 25 is
10 provided. The inlets 4 of the covering member 3 and the inflow port 20 of the main body housing 2 are in communication with each other through the insect catching space 25. Note that Fig. 1 shows that the inlet 4 of the main body housing 2 are partly visible through the inlets 4 of the
15 covering member 3.

[0017]

 As illustrated in Fig. 2, the top surface of the main body housing 2 has an outlet (air outlet) 5. In the main body housing 2, an air transfer passage 7 is provided. The inlets 4
20 and the outlet 5 communicate with each other through the insect catching space 25, the inflow port 20, and the air transfer passage 7.

[0018]

 From the inflow port 20 toward the outlet 5 in the air
25 transfer passage 7, that is, from the upstream side toward

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the downstream side in terms of the flow of air, the following are provided in this order: a prefilter (air processing section) 8, an HEPA filter (air processing section) 9, an air blower 10, and a discharge device (air processing section) 11.

5 [0019]

The air blower 10 is a centrifugal fan that axially takes air in and then discharges the air around a circumference of the centrifugal fan. The air blower 10 is provided at a lower part of the main body housing 2. The air blower 10 includes
10 (i) a motor 10a and (ii) a fan wheel 10b attached to a rotation axis of the motor 10a. According to the air purifier 1, the air blower 10 is thus provided at the lower part of the main body housing 2. This allows an area of a passage of an air stream, which is formed by the air blower 10, to gradually increase
15 without causing a vertical length of the main body housing 2 to be long. An air stream volume of the air blower 10 can be set to a plurality of levels, such as "very low", "low", "medium", and "high", by an operation on the operation section 6. Alternatively, the air blower 10 can be an axial fan.

20 [0020]

The prefilter 8 is formed by causing a polypropylene mesh to melt so as to adhere to a rectangular frame which (i) is made of synthetic resin such as ABS and (ii) has a plurality of rows and a plurality of columns of windows. The prefilter 8
25 is formed so that the mesh has openings which are sized so as

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to prevent insects such as mosquitos and flies from passing therethrough. The prefilter 8 collects large particles of dust in an air.

[0021]

5 The HEPA filter 9 is formed by causing, with use of a hot melt adhesive, a frame member 9b to adhere to a filtering material 9a so as to cover the filtering material 9a. With the HEPA filter 9, it is possible to collect fine dust in the air, which fine dust contains fine particulate matters such as PM
10 2.5. Note that a deodorization filter, which contains an adsorbing material such as activated carbon, can be provided between the prefilter 8 and the HEPA filter 9. In such a case, it is possible to adsorb odor components in the air so as to deodorize the air.

15 [0022]

 The discharge device 11 includes an electrode (not illustrated) at which corona discharge occurs in response to application of high voltage. The electrode faces the inside of the air transfer passage 7. The discharge causes active
20 species, such as ions, electrons, and radicals, to be generated. Note that the ions can be entirely negative ions, entirely negative ions, or a mixture of positive ions and negative ions. According to Embodiment 1, voltages having an alternating waveform or an impulse waveform are applied
25 to the electrode. In a case where a voltage applied to the

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electrode is a positive voltage, positive ions are generated. In a case where a voltage applied to the electrode is a negative voltage, negative ions are generated. The discharge device 11 generates positive ions and/or negative ions and sends the ions out of the outlet 5. This causes bacteria and odor in the living room to be removed.

[0023]

(Covering member and insect catching sheet)

Fig. 3 is a perspective view in which the covering member 3 is viewed from an inner surface side (main body housing 2 side). (a) of Fig. 4 is a perspective view illustrating the protruding part. (b) of Fig. 4 is a perspective view illustrating a first variation of the protruding part. (c) of Fig. 4 is a perspective view illustrating a second variation of the protruding part. (d) of Fig. 4 is a cross-sectional view illustrating an insect catching sheet in accordance with an implementation example of a structure illustrated in (c) of Fig. 4. For simplicity of comparisons between the examples, (a) through (c) of Fig. 4 each illustrate only a structure of a rear surface 31R. Fig. 5 is a cross-sectional view taken along the line A-A illustrated in Fig. 3. The covering member 3 has, for example, an engagement piece (not illustrated) to be engaged with an engagement hole (not illustrated) of the main body housing 2. This allows the covering member 3 to be attached to and removed from the main body housing 2. The

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covering member 3 is curved so as to protrude rearwards. At each of lateral end parts of the covering member 3, a plurality of inlets 4 (five inlets 4 in Embodiment 1) are vertically provided so that the inlets 4 at both the lateral end parts are arranged parallel to each other. Alternatively, it is possible to have one inlet 4.

[0024]

The insect catching sheet 31 is configured by, for example, providing an adhesive agent 33 over a surface of a base material sheet 32. The insect catching sheet 31 is attached to the attachment plate 34 or is engaged with the attachment plate 34 by an engagement part (not illustrated). Alternatively, it is possible that, without providing the attachment plate 34, the insect catching sheet 31 is directly attached to the covering member 3 or is directly engaged with the covering member 3 by an engagement part (not illustrated). The insect catching sheet 31 can be substantially as hard as a thick paper, or can be softer than a thick paper. The attachment plate 34 has an opening 204 which is part of the opening 201. The insect catching sheet 31 and the attachment plate 34 each have black color. Examples of the base material sheet 32 encompass a paper and a resin film. Examples of the adhesive agent 33 encompass, but are not particularly limited to, an acrylic adhesive agent.

[0025]

The adhesive agent 33 can be water-soluble. Examples of a material for the water-soluble adhesive agent 33 encompass dextrin, polyvinyl alcohol, polyvinyl pyrrolidone, starch, and gum arabic. This makes it possible to remove the covering member 3 from the main body housing 2 and, with use of water or the like, wash off insects, dust, and the like that are attached to the front surface of the adhesive agent 33. It is therefore possible to cause the insect catching sheet 31 to be replaced less frequently.

[0026]

The insect catching sheet 31 and the attachment plate 34 each have dark color such as black in order to cause insects to be easily attracted to the insect catching sheet 31.

[0027]

The insect catching sheet 31 has a form of a sheet having (i) the front surface 31F and (ii) the rear surface 31R. The front surface 31F serves as an adhesive face so as to catch insects. Meanwhile, the rear surface 31R is attached to the attachment plate 34 (or attached to the covering member 3 if no attachment plate 34 is provided) or is engaged with the attachment plate 34 by an engagement part (not illustrated) (or engaged with the covering member 3 if no attachment plate 34 is provided). This causes the rear surface 31R to cover the opening 201.

[0028]

The rear surface 31R of the insect catching sheet 31 has the protruding part 202. The protruding part 202 can be formed by processing a part of the rear surface 31R (i.e. can be formed by a part of the rear surface) or can be attached (as a member separate from the insect catching sheet 31) to the rear surface 31R. However, in view of the strength by which the protruding part 202 is fixed to the insect catching sheet 31, the protruding part 202 is more preferably formed by processing a part of the rear surface 31R.

[0029]

As illustrated in (a) of Fig. 4, the protruding part 202 can be formed by (i) forming a U-shaped notch 214 in the vicinity of a center part of the rear surface 31R and (ii) raising a part of the rear surface 31R along the notch 214.

[0030]

The first variation of the protruding part 202 as illustrated in (b) of Fig. 4 is possible. Specifically, a protruding part 202A can be formed by (i) forming a vertically-long U-shaped notch 214A in the vicinity of the center part of the rear surface 31R and (ii) raising a part of the rear surface 31R along the notch 214A.

[0031]

The second variation of the protruding part 202 as illustrated in (c) of Fig. 4 is possible. Specifically, it is

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possible to apply a protruding part 202B which is attached to the rear surface 31R. The protruding part 202B is made of, for example, polypropylene resin. In such a case, as illustrated in (d) of Fig. 4, the protruding part 202B has a T-shaped part 215 at an end part thereof. The T-shaped part 215 is fixed by being sandwiched between the base material sheet 32 and the adhesive agent 33.

[0032]

The insect catching sheet 31 also has a crease 203 which helps the insect catching sheet 31 to bend so that the front surface 31F is located on an inner side of the bending. Because of the presence of the crease 203, the insect catching sheet 31 can easily be bent with the front surface 31F located on the inner side. According to the example shown in Fig. 3, the opening 201 and the crease 203 overlap each other. In this case, the opening 201 overlaps a bent part of the insect catching sheet 31. This allows the insect catching sheet 31, which is being bent, to pass through the opening 201 smoothly.

[0033]

The attachment plate 34 is attached to the covering member 3 by, for example, a method described below. As illustrated in Fig. 3, (i) engagement holes 34a are made at four corners (at least at upper two corners or the four corners) of the attachment plate 34, (ii) a lateral pair of

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hooked engagement pieces (not illustrated) are provided at an upper part of the inner surface of the covering member 3 so as to protrude, and (iii) a lateral pair of support parts 34b, each of which is L-shaped when viewed from the front, are provided at a lower part of the inner surface of the covering member 3. The support parts 34b have respective grooves (not illustrated) into which the attachment plate 34 is to be inserted.

[0034]

With this configuration, the attachment plate 34, i.e., the insect catching sheet 31, can be removably attached to the covering member 3 by (i) engaging the engagement holes 34a of the attachment plate 34 with the corresponding engagement pieces of the covering member 3 and (ii) placing lateral end parts of the lower part of the attachment plate 34 into the corresponding support parts 34b. This causes the insect catching sheet 31 to face the prefilter 8. In a case where no attachment plate 34 is to be provided, the base material sheet 32 of the insect catching sheet 31 is attached to the covering member 3 as in the case where the attachment plate 34 is attached to the covering member 3.

[0035]

Note that the insect catching space 25 (see Fig. 2) can be provided with an attracting light source 21. The attracting light source 21 is, for example, an ultraviolet light-emitting

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diode. The ultraviolet light-emitting diode emits ultraviolet rays having a wavelength of approximately 365 nm which attracts insects such as mosquitos. The attracting light source 21 makes it easy to attract insects, such as mosquitos, to the insect catching space 25.

[0036]

Note that on the inner surface of the covering member 3 (see Fig. 3), it is possible to provide an odor generating section 22 which generates an odorant that attracts insects. Examples of the odorant encompass, but are not limited to, a lactic acid. The odor generating section 22 makes it easy to attract insects, such as mosquitos, to the insect catching space 25. Note that a location at which to provide the odor generating section 22 is not limited to the inner surface of the covering member 3, the location is inside the insect catching space 25. For example, the odor generating section 22 can be provided on the back surface of the main body housing 2.

[0037]

Alternatively, it is possible to provide an odor generating section by causing the base material sheet 32 of the insect catching sheet 31 to contain an odorant. Alternatively, it is possible to provide an odor generating section by applying, to the base material sheet 32, the adhesive agent 33 and an odorant which are adjacently

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provided so as to form a zigzag pattern or a stripe pattern. Alternatively, it is possible to provide an odor generating section by causing the adhesive agent 33 of the insect catching sheet 31 to contain an odorant. In other words, the odor generating section can be provided by causing the insect catching sheet 31 to include an odorant. Alternatively, it is possible to provide an odor generating section by applying an odorant to the attachment plate 34.

[0038]

10 (Typical operation of air purifier)

A typical operation of the air purifier 1 configured as described will be described below. In a case where the air purifier 1 starts operating, the air blower 10 operates to generate a flow of air through the inlets 4, the insect catching space 25, the inflow port 20, the prefilter 8, the HEPA filter 9, the air transfer passage 7, the discharge device 11, and the outlet 5 in this order. In this case, the prefilter 8 removes large particles of dust in the air. The HEPA filter 9 removes fine dust in the air, which fine dust includes PM 2.5 or the like. The discharge device 11 ionizes the air. Therefore, air is (i) cleaned by the prefilter 8 and by the HEPA filter 9, (ii) ionized by the discharge device 11, and then (iii) sent out from the outlet 5 into the living room.

[0039]

25 (Insect catching operation of air purifier)

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An operation by the air purifier 1 to catch insects will be described next. Because of the flow of air into the inlets 4, a mosquito in the vicinity of the air purifier 1 enters the insect catching space 25 from one of the inlets 4. In so doing, in a case where the insect catching sheet 31 is heated by, for example, a heater (not illustrated) to a temperature with which to attract the mosquito having entered the insect catching space 25, the mosquito is attracted to the heat of the insect catching sheet 31 so as to be easily caught by the insect catching sheet 31.

[0040]

(Replacement of insect catching sheet)

Replacement of the insect catching sheet 31 will be outlined below with reference to Figs. 6 through 8. Fig. 6 is a view illustrating, in detail, (i) the opening 201 and the protruding part 202 of the air purifier 1 illustrated in Fig. 2 and (ii) a region in the vicinity of the opening 201 and the protruding part 202 (i.e. a region J in Fig. 2). Fig. 7 is a view showing that, in the state illustrated in Fig. 6, the protruding part 202 is being pulled from the outside of the covering member 3. Fig. 8 is a view showing that, in the state illustrated in Fig. 7, the protruding part 202 is being pulled from the outside of the covering member 3. In the drawings discussed below, black arrows indicate the direction in which the protruding part 202 is pulled.

[0041]

In a case where the insect catching sheet 31 is to be replaced, a user pulls the protruding part 202 from the outside of the covering member 3 as illustrated in Figs. 6 through 8. This causes the insect catching sheet 31 to be pulled out of the covering member 3 through the opening 201. In a case where the base material sheet 32 of the insect catching sheet 31 is engaged with the attachment plate 34 (or with the covering member 3), pulling the protruding part 202 weakens the engagement. This causes the insect catching sheet 31 to be detached from the attachment plate 34 (or from the covering member 3). In so doing, the insect catching sheet 31 bends at, for example, the crease 203 (see Fig. 3) so that the front surface 31F is located on the inner side of the bending. According to the insect catching sheet 31 which has been pulled out of the covering member 3, therefore, parts of the front surface 31F are attached to each other. This prevents the front surface 31F from being visible to the user.

[0042]

The air purifier 1 is configured so that in a case where the insect catching sheet 31 is removed from the covering member 3 to be replaced, insects and the like caught by the insect catching sheet 31 are not visible. With the air purifier 1, therefore, a user does not experience an uncomfortable feeling.

[0043]

As illustrated in Figs. 6 through 8, the inner wall of the opening 201 is, in a longitudinal sectional view, curled so as to form circular arcs along virtual circles 205 (i.e., given a so-called "R" value). This causes an end part of the inner wall of the opening 201, which end part faces the insect catching sheet 31, to be curved. Therefore, in a case where the insect catching sheet 31 is pulled out, the insect catching sheet 31 can slide on the end part. This prevents the insect catching sheet 31 from being stuck on the end part.

[0044]

As described above, the opening 201 is open at the center part of the insect catching sheet 31. Therefore, in a case where the insect catching sheet 31 is bent, one end of the front surface 31F reaches the other end of the front surface 31F. This causes the front surface 31F to be attached to end parts thereof, and therefore prevents insects and the like, which are caught at the end parts of the insect catching sheet 31, from being visible.

[0045]

(Shape of opening)

The opening 201 of the air purifier 1 has a rectangular shape in a plan view. Alternatively, an opening in accordance with an embodiment of the present invention can have other shapes in a plan view, examples of which shapes encompass

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a circular shape and various polygonal shapes. In other words, the opening 201 can have any shape, provided that the insect catching sheet 31 can pass through the opening 201.

5 [0046]

The crease 203 according to the air purifier 1 is a straight crease. Alternatively, a crease in accordance with an embodiment of the present invention can be in any of various shapes that help the insect catching sheet 31 to bend with the front surface 31F being located on the inner side of the bending.

[0047]

Fig. 9 is a perspective view illustrating a variation of the example shown in Fig. 3. In the example shown in Fig. 9, a covering member 3C has an opening 201A having a circular shape in a plan view. The insect catching sheet 31 has creases 203A. The creases 203A extend radially in respective eight directions from a part overlapping the opening 201A. The creases 203A are not limited to those extending in the eight directions, but can be those extending in four directions along diagonal lines of the insect catching sheet 31.

[0048]

[Embodiment 2]

25 Embodiment 2 of the present invention will be

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described below with reference to the drawings. Fig. 10 is a perspective view illustrating an appearance of an air purifier to which an air treatment device in accordance with Embodiment 2 of the present invention is applied. As for air purifier 1A illustrated in Fig. 10, the following description will discuss only parts which are different in configuration from the air purifier 1 illustrated in Fig. 1.

[0049]

The air purifier 1A illustrated in Fig. 10 differs from the air purifier 1 illustrated in Fig. 1 in that the air purifier 1A includes a covering member 3A instead of the covering member 3. The covering member 3A differs from the covering member 3 in that a lid part 206 for closing an opening 201 from the outside of the covering member 3A is provided in addition to the configuration of the covering member 3. The lid part 206 has a handle 207. A user can easily open and close the opening 201 with use of the lid part 206 by holding the handle 207.

[0050]

Fig. 11 is a perspective view illustrating a lid part 208 which is a variation of the lid part 206. The lid part 208 has (i) a recess 209 and (ii) a handle 210 which protrudes from the recess 209. A user can easily open and close an opening 201 with use of the lid part 208 by holding the handle 210.

[0051]

In a case where the opening 201 is closed with use of the lid part 206 or the lid part 208, the opening 201 and the protruding part 202 become invisible to a user. This allows an improvement in design.

5 [0052]

[Embodiment 3]

(Configuration of air purifier)

Embodiment 3 of the present invention will be described below with reference to the drawings. Fig. 12 is a longitudinal sectional view illustrating an air purifier to which an air treatment device in accordance with Embodiment 3 of the present invention is applied. As for air purifier 1B illustrated in Fig. 12, the following description will discuss only parts which are different in configuration from the air purifier 1 illustrated in Fig. 1.

15 [0053]

The air purifier 1B illustrated in Fig. 12 differs from the air purifier 1 illustrated in Fig. 1 in that the air purifier 1B includes a covering member 3B instead of the covering member 3. The covering member 3B differs from the covering member 3 in terms of the points described below.

20 [0054]

The covering member 3B has an opening 211. The opening 211 is made above an insect catching sheet 31. The opening 211 is sized so that a protruding part 212, which is

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provided to the insect catching sheet 31 inside the covering member 3B, can pass through the opening 211. The protruding part 212 is provided at an upper end of the insect catching sheet 31. The protruding part 212 extends from the inside of the covering member 3B through the opening 211. This allows a user to grab the protruding part 212, at the opening 211, from the outside of the covering member 3B.

[0055]

According to the air purifier 1B, one end part of the cover sheet 213 is fixed to (i) a front surface 31F and (ii) a front surface 31F side of the protruding part 212. The one end part of the cover sheet 213 can be fixed to only one of (i) the front surface 31F and (ii) the front surface 31F side of the protruding part 212. In a case where the front surface 31F and the protruding part 212 are spaced from each other, the one end part of the cover sheet 213 can be fixed to a part between the front surface 31F and the protruding part 212. In the example shown in Fig. 12, the cover sheet 213 is rolled from the other end part of the cover sheet 213. In this case, the cover sheet 213 can be held while a rolled part of the cover sheet 213 is wound around a core (not illustrated). Alternatively, in a case of a cover sheet 213 which easily remembers a bent shape, the cover sheet 213 can be held while not being wound around the core. The cover sheet 213 can be a film or the like which is coated with a release agent

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that substantially prevents the cover sheet 213 from peeling in a case where the cover sheet 213 covers the front surface 31F of the insect catching sheet 31. Note that the cover sheet 213 does not necessarily need to be coated with a release agent.

[0056]

(Replacement of insect catching sheet)

Replacement of the insect catching sheet 31 will be outlined below with reference to Fig. 13. Fig. 13 is a view illustrating, in detail, (i) the opening and the protruding part of the air purifier illustrated in Fig. 12 and (ii) a region in the vicinity of the opening and the protruding part (i.e. a region K in Fig. 12). Fig. 13 shows that, in the state illustrated in Fig. 12, the protruding part is being pulled from the outside of the covering member.

[0057]

In a case where the insect catching sheet 31 is to be replaced, a user pulls the protruding part 212 from the outside of the covering member 3B as illustrated in Fig. 13. This causes the insect catching sheet 31 to be pulled out of the covering member 3B through the opening 211. In so doing, the one end part of the cover sheet 213 becomes stuck on a wall of the opening 211. This causes the cover sheet 213 to be attached to the front surface 31F. According to the insect catching sheet 31 which has been pulled out of the

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covering member 3B, therefore, the cover sheet 213 is attached to the front surface 31F. This prevents the front surface 31F from being visible to the user.

[0058]

5 The air purifier 1B is configured so that in a case where the insect catching sheet 31 is removed from the covering member 3B to be replaced, insects and the like caught by the insect catching sheet 31 are not visible. Therefore, with the air purifier 1B also, a user does not experience an
10 uncomfortable feeling.

[0059]

(Combination with the configuration of Embodiment 1 and with the configuration of Embodiment 2)

15 A configuration of the protruding part 212 can be similar to that of the protruding part 202, the protruding part 202A, or the protruding part 202B (see Fig. 4). As in the case of the opening 201 (see Fig. 6), an end part of an inner wall of the opening 211, which end part faces the insect catching sheet 31, can be curved. The covering member 3B
20 can further include a lid part for closing the opening 211 from the outside of the covering member 3B (see Figs. 10 and 11).

[0060]

[Recap]

25 An insect catching device in accordance with Aspect 1

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of the present invention includes: a housing (main body housing 2, covering member 3) having an opening; an insect catching member (insect catching sheet 31) which is provided in the housing and which has a sheet-like form having (i) a front surface at which an insect is to be caught and (ii) a rear surface which covers the opening; and a protruding part which is provided on the rear surface so that the protruding part can be grabbed, at the opening, from an outside of the housing while the rear surface is covering the opening.

[0061]

According to the configuration, in a case where the insect catching member is to be replaced, a user pulls the protruding part from the outside of the housing. This causes the insect catching member to be pulled out of the housing through the opening. In so doing, the insect catching member bends so that the front surface is located on the inner side of the bending. According to the insect catching member which has been pulled out of the housing, therefore, parts of the front surface of the insect catching member are attached to each other. This prevents the front surface of the insect catching member from being visible to the user.

[0062]

According to the configuration, in a case where the insect catching member is removed from the housing to be replaced, insects and the like caught by the insect catching

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member are not visible. With the configuration, therefore, a user does not experience an uncomfortable feeling.

[0063]

An insect catching device in accordance with Aspect 2
5 of the present invention is configured so that in Aspect 1, the insect catching member has a crease which helps the insect catching member to bend so that the front surface is located on an inner side of bending.

[0064]

10 According to the configuration, the insect catching member is helped to bend at the crease so that the front surface is located on the inner side of the bending. This easily achieves a state in which the parts of the front surface of the insect catching member are attached to each other.

15 [0065]

An insect catching device in accordance with Aspect 3 of the present invention includes: a housing having an opening; an insect catching member which is provided in the housing and which has a sheet-like form having (i) a front
20 surface at which an insect is to be caught and (ii) a rear surface, a protruding part which is provided to the insect catching member so that the protruding part can be grabbed, at the opening, from an outside of the housing while the insect catching member is fixed in the housing; and a cover
25 sheet which covers the front surface of the insect catching

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member, one end part of the cover sheet being fixed to at least one of (i) the front surface, (ii) a side of the protruding part which, on which side the front surface is located, and (iii) a part between the front surface and the protruding part, and the cover sheet being configured to be attached to the front surface in a case where the protruding part is pulled from the outside of the housing.

[0066]

According to the configuration, in a case where the insect catching member is to be replaced, a user pulls the protruding part from the outside of the housing. This causes the insect catching member to be pulled out of the housing through the opening. In so doing, the one end part of the cover sheet becomes stuck on a wall of the opening. This causes the cover sheet to be attached to the front surface of the insect catching member. According to the insect catching member which has been pulled out of the housing, therefore, the cover sheet is attached to the front surface of the insect catching member. This prevents the front surface of the insect catching member from being visible to the user.

[0067]

According to the configuration, in a case where the insect catching member is removed from the housing to be replaced, insects and the like caught by the insect catching member are not visible. With the configuration, therefore, a

user does not experience an uncomfortable feeling.

[0068]

An insect catching device in accordance with Aspect 4 of the present invention is configured so that in any one of Aspects 1 through 3, the protruding part is formed by a part of the rear surface.

[0069]

With the configuration, it is possible to form the protruding part by processing a part of the rear surface of the insect catching member.

[0070]

An insect catching device in accordance with Aspect 5 of the present invention is configured so that in any one of Aspects 1 through 3, the protruding part is attached to the rear surface.

[0071]

According to the configuration, the protruding part is attached to the rear surface of the insect catching member. This allows the protruding part to be formed as a member separate from the insect catching member.

[0072]

An insect catching device in accordance with Aspect 6 of the present invention is configured so that in any one of Aspects 1 through 5, the opening has an inner wall whose end part facing the insect catching member is curved.

[0073]

According to the configuration, in a case where the insect catching member is pulled out, the insect catching member can slide on the insect catching member-side end part of the inner wall of the opening. This prevents the insect catching member from being stuck on the end part.

[0074]

An insect catching device in accordance with Aspect 7 of the present invention is configured so that in any one of Aspects 1 through 6, the housing has a lid part with which the opening is to be closed from the outside of the housing.

[0075]

According to the configuration, in a case where the opening is closed with use of the lid part, the opening and the protruding part become invisible to a user. This allows an improvement in design.

[0076]

An air treatment device in accordance with Aspect 8 of the present invention includes an insect catching device described in any one of Aspects 1 through 7.

[0077]

With the configuration, air treatment devices such as an air purifier and a dehumidifier, can bring about effects similar to those of the insect catching device.

[0078]

The present invention is not limited to the embodiments, but can be altered by a skilled person in the art within the scope of the claims. The present invention also encompasses, in its technical scope, any embodiment derived
5 by combining technical means disclosed in differing embodiments. Further, it is possible to form a new technical feature by combining the technical means disclosed in the respective embodiments.

10 Reference Signs List

[0079]

	1, 1A, 1B	Air purifier
	2	Main body housing (housing)
	3, 3A, 3B, 3C	Covering member (housing)
15	4	Inlet
	5	Outlet
	6	Operation section
	7	Air transfer passage
	8	Prefilter
20	9	HEPA filter
	10	Air blower
	11	Discharge device
	12	Sleeve part
	20	Inflow port
25	21	Attracting light source

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	22	Odor generating section
	25	Insect catching space
	31	Insect catching sheet (insect catching member)
5	31F	Front surface
	31R	Rear surface
	32	Base material sheet
	33	Adhesive agent
	34	Attachment plate
10	201, 201A, 211	Opening
	202, 202A, 202B, 212	Protruding part
	203, 203A	Crease
	204	Opening
	205	Circle
15	206, 208	Lid part
	207, 210	Handle
	209	Recess
	213	Cover sheet
	214, 214A	Notch
20	215	T-shaped part

Claims

Claim 1

An insect catching device comprising:

a housing having an opening;

5 an insect catching member which is provided in the housing and which has a sheet-like form having (i) a front surface at which an insect is to be caught and (ii) a rear surface which covers the opening; and

10 a protruding part which is provided on the rear surface so that the protruding part can be grabbed, at the opening, from an outside of the housing while the rear surface is covering the opening.

Claim 2

15 The insect catching device as set forth in claim 1, wherein

 the insect catching member has a crease which helps the insect catching member to bend so that the front surface is located on an inner side of bending.

20

Claim 3

An insect catching device comprising:

a housing having an opening;

25 an insect catching member which is provided in the housing and which has a sheet-like form having (i) a front

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surface at which an insect is to be caught and (ii) a rear surface,

a protruding part which is provided to the insect catching member so that the protruding part can be grabbed,
5 at the opening, from an outside of the housing while the insect catching member is fixed in the housing; and

a cover sheet which covers the front surface of the insect catching member,

one end part of the cover sheet being fixed to at least
10 one of (i) the front surface, (ii) a side of the protruding part, on which side the front surface is located, and (iii) a part between the front surface and the protruding part, and

the cover sheet being configured to be attached to the front surface in a case where the protruding part is pulled
15 from the outside of the housing.

Claim 4

The insect catching device as set forth in any one of claims 1 through 3, wherein

20 the protruding part is formed by a part of the rear surface.

Claim 5

the insect catching device as set forth in any one of
25 claims 1 through 3, wherein

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the protruding part is attached to the rear surface.

Claim 6

5 The insect catching device as set forth in any one of
claims 1 through 5, wherein

the opening has an inner wall whose end part facing the
insect catching member is curved.

Claim 7

10 An air treatment device comprising:
an insect catching device recited in any one of claims 1
through 6.