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(71) Applicant: **LG Electronics Inc.**
Yeongdeungpo-gu
Seoul 07336 (KR)

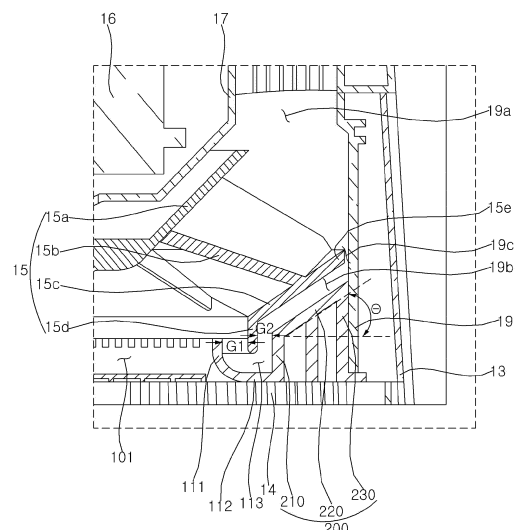
(72) Inventors:
• **KIM, Hoojin**
Seoul 08592 (KR)
• **PARK, Jeongtaek**
Seoul 08592 (KR)

(74) Representative: **Vossius & Partner**
Patentanwälte Rechtsanwälte mbB
Siebertstrasse 3
81675 München (DE)

(54) **AIR PURIFIER**

(57) The present disclosure relates to an air cleaner. An air cleaner according to an aspect of the present disclosure includes a case having an internal space and an intake port formed therein, a filter frame disposed inside the case, a filter attached/detached to/from the filter frame and disposed to face the intake port, a fan disposed above the filter and having a shroud forming a space between the fan and the filter frame, and a guide disposed between the filter frame and the shroud and inclined outward in the radial direction of the fan, thereby curbing occurrence of a vortex below the fan.

FIG. 5



EP 4 530 547 A1

Description

[Technical Field]

[0001] The present disclosure relates to an air cleaner, and more specifically, to an air cleaner with improved noise and air volume.

[Background Art]

[0002] An air cleaner is a device that removes foreign substances contained in sucked air and supplies purified air indoors.

[0003] A fan for sucking/discharging air and a filter through which the air sucked by the fan passes are disposed inside the case of an air cleaner.

[0004] The air cleaner may be equipped with a filter frame to/from which the filter is attached/detached for cleaning and replacing the filter. The fan disposed inside the case is spaced apart from the filter frame to avoid interference with the filter frame.

[0005] However, the conventional air cleaner has a problem in that air vortex occurs between the fan and the filter frame that are spaced apart from each other. The air vortex occurring inside the case causes noise and deteriorates the performance of the air cleaner.

[Disclosure]

[Technical Problem]

[0006] An object of the present disclosure is to solve the above-described problems and other problems.

[0007] Another object of the present disclosure is to provide an air cleaner with an increased amount of air discharged.

[0008] Another object of the present disclosure is to provide an air cleaner with reduced noise.

[0009] Another object of the present disclosure is to provide an air cleaner that curbs occurrence of vortex.

[0010] Another object of the present disclosure is to simplify a structure of a filter frame.

[0011] Another object of a present disclosure is to guide a flow direction of air blown by a fan.

[0012] The objects of the present disclosure are not limited to the objects mentioned above, and other objects that are not mentioned will be clearly understood by those skilled in the art from the description below.

[Technical Solution]

[0013] To accomplish the above-described objects, an air cleaner according to one aspect of the present disclosure includes a case having an internal space and including an intake port.

[0014] The air cleaner includes a filter frame disposed inside the case.

[0015] The air cleaner includes a filter attached/de-

tached to/from the filter frame and disposed to face the intake port.

[0016] The air cleaner includes a fan disposed above the filter and having a shroud forming a space between the fan and the filter frame.

[0017] The air cleaner includes a guide disposed between the filter frame and the shroud and inclined to the outer side of the fan in a radial direction, thereby curbing occurrence of a vortex between the filter frame and the shroud.

[0018] The filter frame may include an opening facing the fan in a vertical direction.

[0019] The guide may be disposed outside the opening in a radial direction.

[0020] The filter frame may include an inner rim surrounding the opening.

[0021] The filter frame may include an inner plate extending from the inner rim to the outer side of the opening in a radial direction and connected to the guide.

[0022] The guide may include a first wall disposed on the outer side of the opening in a radial direction.

[0023] The guide may include a second wall extending from the first wall to be inclined to the outer side of the fan in a radial direction.

[0024] The fan may include a hub disposed above the opening.

[0025] The fan may include blades extending from the hub to the outer side of the fan in a radial direction.

[0026] The fan may include a shroud disposed on the outer side of the blades in a radial direction and disposed on an upper side of the guide.

[0027] The shroud may be inclined upward toward the outer side of the fan in a radial direction.

[0028] The guide may include a second wall extending parallel to the shroud.

[0029] The fan may include a lower edge disposed between the inner rim and the guide.

[0030] A gap between the inner rim and the lower edge may be greater than a gap between the lower edge and the guide.

[0031] The fan may include an upper edge spaced apart from the inner side of a side wall of the case.

[0032] The guide may be disposed below a gap between the upper edge and the side wall.

[0033] The air cleaner may include a motor housing disposed above the fan.

[0034] The air cleaner may include a blowing passage formed between the motor housing and the side wall of the case.

[0035] The air cleaner may include a diffuser disposed in the blowing passage and extending in the vertical direction.

[0036] The guide may be disposed below the blowing passage and the diffuser.

[0037] The air cleaner may include a side wall spaced apart from the outer side of the fan in a radial direction,

[0038] The guide may be coupled to the side wall.

[0039] The guide may include a third wall coupled to

the side wall and facing a gap between the fan and the side wall in the vertical direction.

[0040] The filter frame may include a recess recessed downward between the inner rim and the guide.

[0041] The filter frame may include a plurality of protrusions spaced apart along the circumference of the inner rim.

[0042] The filter frame may include an outer plate disposed on the outer side of the guide in a radial direction and coupled to the side wall of the case.

[0043] The guide may include ribs protruding toward the outer plate.

[0044] The filter frame may include supporters extending downward from the outer plate.

[0045] A gap between the inner rim and the guide may be less than a horizontal width of the guide.

[0046] The filter frame may include an outer edge spaced apart from the outer side of the guide in a radial direction.

[0047] A gap between the guide and the outer edge may be less than the horizontal width of the guide.

[0048] The air cleaner may include a second body coupled to the upper side of the first body.

[0049] The first body may include a discharge port opening upward toward the second body.

[0050] The second body may include a lower wall spaced apart from an upper side of the discharge port and extending toward the outer side of the first body in a radial direction.

[0051] Specific details of other embodiments are included in the detailed description and drawings.

[Advantageous Effects]

[0052] According to at least one embodiment of the present disclosure, it is possible to increase the air volume of the air cleaner by curbing occurrence of vortex near the fan.

[0053] According to at least one embodiment of the present disclosure, it is possible to reduce noise of the air cleaner by curbing occurrence of vortex near the fan.

[0054] According to at least one embodiment of the present disclosure, it is possible to curb occurrence of vortex on the upper side of the filter frame through the guide structure of the filter frame.

[0055] According to at least one embodiment of the present disclosure, it is possible to guide a flow direction of air that has passed through the filter by forming one surface of the guide to be inclined.

[0056] The effects of the present disclosure are not limited to the effects mentioned above, and other effects that are not mentioned will be clearly understood by those skilled in the art from the description of the claims.

[Description of Drawings]

[0057]

FIG. 1 is a perspective view of an air cleaner according to an embodiment of the present disclosure.

FIG. 2 is a front view of the air cleaner according to the embodiment of the present disclosure.

FIG. 3 is a cross-sectional view of the air cleaner according to the embodiment of the present disclosure.

FIG. 4 is a partial cross-sectional view of the air cleaner according to the embodiment of the present disclosure.

FIG. 5 is a partial cross-sectional view of the air cleaner according to the embodiment of the present disclosure.

FIG. 6 shows a part of the air cleaner according to the embodiment of the present disclosure.

FIG. 7 is a cross-sectional view of a filter frame according to an embodiment of the present disclosure.

FIG. 8 is a graph illustrating the effect of the air cleaner according to an embodiment of the present disclosure.

FIG. 9 is a table illustrating the effects of the air cleaner according to an embodiment of the present disclosure.

FIG. 10 is a cross-sectional view of an air cleaner according to another embodiment of the present disclosure.

FIG. 11 is a cross-sectional view of an air cleaner according to another embodiment of the present disclosure.

[Mode for Disclosure]

[0058] Hereinafter, embodiments disclosed in the present specification will be described in detail with reference to the attached drawings. However, identical or similar components will be assigned the same reference numeral, and redundant descriptions thereof will be omitted.

[0059] The suffixes "module" and "unit" of elements herein are used for convenience of description and thus can be used interchangeably and do not have any distinguishable meanings or functions.

[0060] In the following description of the embodiments disclosed in the present specification, a detailed description of known functions and configurations incorporated herein will be omitted when it may obscure the subject matter of the present disclosure. In addition, the accompanying drawings are provided only for ease of understanding of the embodiments disclosed in the present specification, do not limit the technical spirit disclosed herein, and include all changes, equivalents and substitutes included in the spirit and scope of the present disclosure.

[0061] The terms "first" and/or "second" are used to describe various components, but such components are not limited by these terms. The terms are used to discriminate one component from another component.

[0062] When a component is "coupled" or "connected" to another component, it should be understood that a third component may be present between the two components although the component may be directly coupled or connected to the other component. When a component is "directly coupled" or "directly connected" to another component, it should be understood that no element is present between the two components.

[0063] An element described in the singular form is intended to include a plurality of elements unless the context clearly indicates otherwise.

[0064] An air cleaner 1 will be described with reference to FIG. 1 and FIG. 2.

[0065] FIG. 1 is a perspective view of the air cleaner 1. FIG. 2 is a front view of the air cleaner 1.

[0066] The air cleaner 1 may include a first body 10. The first body 10 may include an intake port 11. The intake port 11 may be formed along the circumference of the first body 10.

[0067] The first body 10 may include a discharge port 12. The discharge port 12 may be formed at the top of the first body 10. The discharge port 12 may be formed in a vertical direction.

[0068] The air cleaner 1 may include a second body 20. The second body 20 may be disposed above the first body 10. The second body 20 may be combined with the first body 10.

[0069] The second body 20 may face the discharge port 12. The second body 20 may have a larger outer diameter than the first body 10.

[0070] The second body 20 may include a lower wall 21. The lower wall 21 may face the discharge port 12. The lower wall 21 may extend to the outer side of the first body 10 in the radial direction. The lower wall 21 may be inclined upward. Air discharged through the discharge port 12 may spread to the outer side of the first body 10 in the radial direction along the lower wall 21.

[0071] The air cleaner 1 may include a discharge space 22. The discharge space 22 may be formed between the lower wall 21 and the discharge port 12.

[0072] The second body 20 may include a body edge 23. The body edge 23 may be located outside the outer circumferential surface of the first body 10. Air discharged through the discharge port 12 may flow toward the body edge 23 along the lower wall 21.

[0073] The air cleaner 1 will be described with reference to FIG. 3.

[0074] FIG. 3 is a cross-sectional view of the air cleaner 1 taken in the vertical direction.

[0075] The first body 10 may include a case 13. The case 13 may have an internal space.

[0076] The intake port 11 may be formed along the circumference of the case 13. Air outside the case 13 may be sucked into the case 13 through the intake port 11.

[0077] The air cleaner 1 may include a filter 14. The filter 14 may be disposed inside the case 13. The filter 14 may face the intake port 11.

[0078] The air cleaner 1 may include a fan 15. The fan

15 may be disposed inside the case 13. The fan 15 may be disposed above the filter 14. The fan 15 can suck air through the intake port 11 and blow the sucked air to the discharge port 12.

[0079] The air cleaner 1 may include a fan motor 16. The fan motor 16 may be combined with the fan 15. The fan motor 16 can rotate the fan 15.

[0080] The air cleaner 1 may include a motor housing 17. The motor housing 17 may be disposed inside the case 13. The motor housing 17 may accommodate the fan motor 16. The motor housing 17 may be disposed above the fan 15.

[0081] The air cleaner 1 may include a diffuser 18. The diffuser 18 may be disposed above the fan 15. The diffuser 18 may be disposed between the motor housing 17 and the case 13. The diffuser 18 may extend in the vertical direction. The diffuser 18 can guide the air blown by the fan 15 upward.

[0082] The air cleaner 1 may include a side wall 19. The side wall 19 may extend in the vertical direction. The side wall 19 may form the internal space of the case 13. The side wall 19 may be spaced apart from the outer side of the fan 15 in the radial direction. The side wall 19 may be spaced apart from the outer side of the motor housing 17 in the radial direction.

[0083] The air cleaner 1 may include a filter frame 100. The filter frame 100 may be disposed inside the case 13. The filter frame 100 may be disposed below the fan 15. The filter 14 can be attached/detached to/from the filter frame 100.

[0084] The air cleaner 1 may include a guide 200. The guide 200 may be disposed on the upper side of the filter frame 100. The guide 200 may be combined with filter frame 100. The guide 200 may be disposed below the fan 15. The guide 200 may extend in the circumferential direction of the first body 100.

[0085] The air cleaner 1 will be described with reference to FIG. 4.

[0086] FIG. 4 is a partial cross-sectional view of the air cleaner 1.

[0087] The filter 14 may be mounted on the filter frame 100. The filter frame 100 may provide a space where the filter 14 is attached and detached.

[0088] The filter frame 100 may include a cover 110. The cover 110 may be disposed on the upper side of the filter 14. The cover 110 may be disposed between the filter 14 and the fan 15.

[0089] The filter frame 100 may include an opening 101. The opening 101 may be formed at the center of the filter frame 100. The opening 101 may be formed in the vertical direction.

[0090] The filter 14 may be cylindrical. Air introduced through the intake port 11 formed along the circumference of the case 13 may flow toward the center of the cylindrical filter 14. The air that has passed through the filter 14 may flow upward by the fan 15 and pass through the opening 101.

[0091] The opening 101 may be formed in the cover

110. The cover 110 may have the opening 101 corresponding to the center of the filter 14.

[0092] The air that has passed through the opening 101 may be blown by the fan 15 and flow upward.

[0093] A blowing passage 19a may be formed between the motor housing 17 and the side wall 19. The blowing passage 19a may be formed on the fan 15. The air blown by the fan 15 may pass through the blowing passage 19a and be discharged to the discharge port 12 (refer to FIG. 1).

[0094] The diffuser 18 may be disposed in the blowing passage 19a. The diffuser 18 can guide the air in the blowing passage 19a upward. The diffuser 18 may extend in the vertical direction.

[0095] The fan 15 may include a shroud 15c. The shroud 15c may be disposed on the outer side of the opening 101 in the radial direction. The shroud 15c may be disposed between the opening 101 and the side wall 19.

[0096] The guide 200 may be disposed between the shroud 15c and the side wall 19. The guide 200 may be disposed between the opening 101 and the side wall 19.

[0097] The guide 200 may protrude from the cover 110 toward the fan 15. The guide 200 may be disposed between shroud 15c and the cover 110. The guide 200 may be inclined upward toward the side wall 19.

[0098] The guide 200 may extend in the circumferential direction of the air cleaner 1. The guide 200 may be annular. The guide 200 may extend in an annular shape around the opening 101. The guide 200 may surround the opening 101.

[0099] The air cleaner 1 will be described with reference to FIG. 5.

[0100] FIG. 5 is an enlarged view of part of the internal structure of the air cleaner 1 shown in FIG. 4.

[0101] The fan 15 may include a hub 15a. The hub 15a may be combined with the fan motor 16. The hub 15a may be disposed on the upper side of the opening 101.

[0102] The fan 15 may include blades 15b. The blades 15b may extend from the hub 15a to the outer side of the fan 15 in the radial direction. A plurality of blades 15b may be disposed to be spaced apart from each other in the rotation direction of the fan 15.

[0103] The fan 15 may include the shroud 15c. The shroud 15c may be spaced apart from the hub 15a to the outer side of the fan 15 in the radial direction. The blades 15b may extend between the hub 15a and the shroud 15c. The shroud 15c may be disposed between the opening 101 and the side wall 19. The shroud 15c may face the blowing passage 19a in the vertical direction.

[0104] The fan 15 may include a lower edge 15d. The lower edge 15d may form the bottom of the shroud 15c. The lower edge 15d may protrude downward from the shroud 15c. The lower edge 15d may be annular. The lower edge 15d may be disposed on the outer side of the opening 101 in the radial direction. The lower edge 15d may face the cover 110 in the vertical direction. The lower edge 15d may be disposed between the cover 110 and

the guide 200.

[0105] The fan 15 may include an upper edge 15e. The upper edge 15e may form the top of the shroud 15c. The upper edge 15e may face the side wall 19. The upper edge 15e may be spaced apart from the side wall 19. A gap 19c may be formed between the upper edge 15e and the side wall 19.

[0106] The cover 110 may include an inner rim 111. The inner rim 111 may be annular. The opening 101 may be formed inside the inner rim 111. The inner rim 111 may be disposed between the opening 101 and the lower edge 15d. The inner rim 111 may be disposed between the opening 101 and the guide 200.

[0107] The cover 110 may include an inner plate 112. The inner plate 112 may extend from the inner rim 111 in an outer radial direction. The inner plate 112 may face the lower edge 15d in the vertical direction. The inner plate 112 may be disposed between the inner rim 111 and the guide 200.

[0108] The cover 110 may include a recess 113. The recess 113 may be formed between the inner rim 111 and the guide 200. The recess 113 may be formed on the lower side of the lower edge 15d. Some of the air that has passed through the opening 101 may flow into the recess 113.

[0109] The guide 200 may protrude upward from the cover 110. The guide 200 may be spaced apart from the lower side of the shroud 15d. A space 19b may be formed between the guide 200 and the shroud 15c. Some of the air that has passed through the opening 101 may sequentially pass through the recess 113, the space 19b, and the gap 19c and flow into the blowing passage 19a. The guide 200 may be inclined upward toward the side wall 19.

[0110] The guide 200 may include a first wall 210. The first wall 210 may extend in the vertical direction. The first wall 210 may be spaced apart from the outer side of the inner rim 111 in the radial direction. The first wall 210 may be spaced apart from the outer side of the lower edge 15d in the radial direction. The lower edge 15d may be disposed between the inner rim 111 and the first wall 210.

[0111] The gap G1 between the inner rim 111 and the lower edge 15d may be greater than the gap G2 between the lower edge 15d and the first wall 210. Accordingly, noise due to flow friction between the inner rim 111 and the lower edge 15d can be curbed, and occurrence of vortex within the space 19b can be curbed.

[0112] The guide 200 may include a second wall 220. The second wall 220 may extend from the first wall 210 toward the side wall 19. The second wall 220 may be inclined upward toward the side wall 19. The second wall 220 may have an inclination angle θ with respect to the horizontal direction. The second wall 220 may face the lower surface of the shroud 15c. The space 19b may be formed between the shroud 15c and the second wall 220. The second wall 220 may extend parallel to the shroud 15c.

[0113] The guide 200 may include a third wall 230. The

third wall 230 may extend downward from the outer end of the second wall 220. The third wall 230 may extend in the vertical direction. The third wall 230 may face the side wall 19. The third wall 230 may be coupled to the side wall 19 and may be in contact therewith. The vertical height of the third wall 230 may be greater than the vertical height of the first wall 210. The third wall 230 may face the gap 19c in the vertical direction.

[0114] The air cleaner 1 will be described with reference to FIG. 6 and FIG. 7.

[0115] FIG. 6 is a perspective view of the filter frame 100 and the guide 200. FIG. 7 is a cross-sectional view of the structure shown in FIG. 6 taken in the vertical direction.

[0116] The cover 110 and the guide 200 may be integrated. The guide 200 may protrude upward from the upper surface of the cover 110.

[0117] The inner rim 111 may be spaced apart from the first wall 210. The inner plate 112 may extend between the inner rim 111 and the first wall 210. The recess 113 may be formed between the inner rim 111 and the first wall 210. The first wall 210 may be referred to as an "outer rim".

[0118] The cover 110 may include protrusions 114. The protrusions 114 may protrude upward from the inner rim 111. A plurality of protrusions 114 may be formed to be spaced apart in the direction in which the inner rim 111 extends. The protrusions 114 may be spaced apart from the first wall 210 in the radial direction.

[0119] The cover 110 may include an outer plate 115. The outer plate 115 may extend in an annular shape. The outer plate 115 may be disposed on the outer side of the guide 200 in the radial direction.

[0120] The cover 110 may include an outer edge 116. The outer edge 116 may extend in the circumferential direction of the cover 110. The outer edge 116 may have a ring shape. The outer edge 116 may be located in an outer radial direction of the guide 200.

[0121] The filter frame 100 may include a supporter 120. The supporter 120 may extend in the vertical direction. The supporter 120 may extend downward from the outer plate 115. A plurality of supporters 120 may be disposed to be spaced apart in the circumferential direction of the cover 110. A space 130 in which the filter 14 is disposed may be formed inside the plurality of supporters 120.

[0122] The filter frame 100 may include a mounting space 130. The mounting space 130 may be surrounded by the plurality of supporters 120. One side of the mounting space 130 may be open. The filter 14 may be inserted into the mounting space 130. The filter 14 may be pulled out from the mounting space 130.

[0123] The filter 14 may include a filter hole 14a. The filter 14 may include a filter outer wall 14b. Air introduced through the intake port 11 (refer to FIG. 1) may flow into the filter hole 14a through the outer filter wall 14b. The air flowing into the filter hole 14a may pass through the opening 101 and be blown by the fan 15 (refer to FIG.

5). The filter hole 14a may face the opening 101 in the vertical direction.

[0124] The first wall 210 may protrude upward from the inner plate 112. The inner rim 111 may be spaced apart from the inner side of the first wall 210 in the radial direction.

[0125] The second wall 220 may be spaced apart from the upper sides of the inner plate 111 and the outer plate 115.

10 [0126] The third wall 230 may be spaced apart from the inner side of the outer edge 116 in the radial direction. The outer plate 115 may extend between the third wall 230 and the outer edge 116.

[0127] The guide 200 may include ribs 240. The ribs 240 may be connected to the outer plate 115. The ribs 240 may protrude from the third wall 230 in an outer radial direction. The ribs 240 may couple the guide 200 and the outer plate 115. A plurality of ribs 240 may be disposed to be spaced apart along the circumference of the guide 200. The ribs 240 may be disposed on the upper side of the supporters 120. The ribs 240 may be disposed at positions corresponding to the supporters 120 in the vertical direction.

25 [0128] The supporters 120 may extend downward from the outer edge 116. The outer plate 115 may extend in the radial direction of the cover 110 to connect the first wall 210 and the outer edge 116.

[0129] The distance D1 between the inner rim 111 and the first wall 210 may be less than the radial width D2 of the second wall 220. The radial width D2 of the second wall 220 may be greater than the distance D3 between the third wall 230 and the outer edge 116.

30 [0130] The side wall 19 (refer to FIG. 5) may be disposed between third wall 230 and the outer edge 116. The side wall 19 (refer to FIG. 5) may extend in the vertical direction from one side of the third wall 230 and may be coupled to the upper surface of the outer plate 115.

35 [0131] According to the above-described structure, it is easy to combine the filter frame 100 and the side wall 19, and at the same time, it is possible to prevent the air passing through the opening 101 from forming a vortex between the shroud 15c and the guide 200.

[0132] The effects of the air cleaner 1 of the present disclosure will be described with reference to FIG. 8 and FIG. 9.

40 [0133] FIG. 8 is a graph showing comparison between the noise performances of a conventional air cleaner and the air cleaner 1 of the present disclosure. FIG. 9 is a table showing comparison between the air purifying performances of the conventional air cleaner and the air cleaner 1 of the present disclosure.

45 [0134] Referring to FIG. 8, regardless of the RPM of the fan, the noise generated by the air cleaner 1 of the present disclosure is smaller than the noise generated by the conventional air cleaner. In particular, when the RPM of the fan is 1850, the air cleaner 1 of the present disclosure produces about 0.5 dB less noise than the conventional air cleaner.

[0135] Referring to FIG. 9, when noise of 43 dB is generated, the RPM of the fan is 1840 in the case of the conventional air cleaner, whereas the RPM of the fan is 1850 in the case of the air cleaner 1 of the present disclosure. Accordingly, compared to the conventional air cleaner, the air cleaner 1 of the present disclosure can purify the air within an area equivalent to about 0.2 pyeong in the same noise environment.

[0136] An air cleaner 2 according to another embodiment of the present disclosure will be described with reference to FIG. 10.

[0137] FIG. 10 is a vertical cross-sectional view of the air cleaner 2 according to another embodiment of the present disclosure.

[0138] The air cleaner 2 may include a case 23. The case 23 may have an internal space.

[0139] The air cleaner 2 may include an intake port 21. The intake port 21 may be formed along the circumference of the case 23.

[0140] The air cleaner 2 may include a filter 24. The filter 24 may face the intake port 21 inside the case 23.

[0141] The air cleaner 2 may include a fan 25. The fan 25 may be disposed inside the case 23. The fan 25 may be disposed above the filter 24.

[0142] The air cleaner 2 may include a filter frame 100'. The filter 24 can be attached/detached to/from the filter frame 100'.

[0143] The air cleaner 2 may include a guide 200'. The guide 200' may be disposed between the filter frame 100' and the fan 25.

[0144] The description of the internal structure of the first body 10 with reference to FIG. 1 to FIG. 9 can be equally applied to the description of the intake port 21, the case 23, the filter 24, the fan 25, the filter frame 100', and the guide 200'. For example, the description of the filter frame 100 may be applied to the filter frame 100'. For example, the description of the guide 200 may be applied to the guide 200'.

[0145] The air cleaner 2 may include a first tower 29a. The air cleaner 2 may include a second tower 29b. The first tower 29a may extend upward from the case 23. The second tower 29b may extend upward from the case 23.

[0146] The first tower 29a may include a first discharge port 22a. The first discharge port 22a may extend long in the vertical direction.

[0147] The second tower 29b may include a second discharge port 22b. The second discharge port 22b may extend long in the vertical direction.

[0148] Air blown upward by the fan 25 may be discharged through the first and second discharge ports 22a and 22b.

[0149] The first tower 29a and the second tower 29b may be spaced apart from each other. A blowing space 22 may be formed between the first tower 29a and the second tower 29b. The blowing space 22 may be formed to be long in the vertical direction.

[0150] An air cleaner 3 according to another embodiment of the present disclosure will be described with

reference to FIG. 11.

[0151] FIG. 11 is a vertical cross-sectional view of the air cleaner 3 according to another embodiment of the present disclosure.

[0152] The air cleaner 3 may include a first body 3a. The air cleaner 3 may include a second body 3b. The first body 3a and the second body 3b may be disposed in the vertical direction. The air cleaner 3 may include a circulator 3c. The circulator 3c may be rotatably coupled to the upper part of the second body 3b.

[0153] The air cleaner 3 may include a case 33. The case 33 may have an internal space.

[0154] The air cleaner 3 may include an intake port 31. The intake port 31 may be formed in the circumferential direction of the case 33.

[0155] The air cleaner 3 may include a filter 34. The filter 34 may be disposed inside the case 33 to face the intake port 31.

[0156] The air cleaner 3 may include a fan 35. The fan 35 may be disposed inside the case 33. The fan 35 may be disposed above the filter 34.

[0157] The air cleaner 3 may include a filter frame 100". The filter 34 can be attached/detached to/from the filter frame 100".

[0158] The air cleaner 3 may include a guide 200". The guide 200" may be disposed between the filter frame 100" and the fan 35.

[0159] The description of the internal structure of the first body 10 with reference to FIG. 1 to FIG. 9 can be equally applied to the intake port 31, the case 33, the filter 34, the fan 35, the filter frame 100", and the guide 200". For example, the description of the filter frame 100 may be applied to the filter frame 100". For example, the description of the guide 200 may be applied to the guide 200".

[0160] The air cleaner 3 may include a discharge port 32. A plurality of discharge ports 32 may be formed at positions spaced apart from each other in the vertical direction. One of the plurality of discharge ports 32 may be formed between the first body 3a and the second body 3b. One of the plurality of discharge ports 32 may be formed at the top of the circulator 3c.

[0161] Although preferred embodiments of the present disclosure have been shown and described above, the present disclosure is not limited to the specific embodiments described above and various modifications can be made by those skilled in the art without departing from the gist of the present disclosure as claimed in the claims. Such modifications should not be understood individually from the technical idea or perspective of the present disclosure.

[0162] The present disclosure may be modified and implemented in various forms, and the scope of the present disclosure is not limited to the above-described embodiments. Therefore, if a modified embodiment includes elements of the claims of the present disclosure, it should be regarded as falling within the scope of the present disclosure.

[0163] Certain embodiments or other embodiments of the disclosure described above are not mutually exclusive or distinct from each other. Any or all elements of the embodiments of the disclosure described above may be combined with another or combined with each other in configuration or function.

[0164] For example, a configuration "A" described in one embodiment of the disclosure and the drawings and a configuration "B" described in another embodiment of the disclosure and the drawings may be combined with each other. Namely, although the combination between the configurations is not directly described, the combination is possible except in the case where it is described that the combination is impossible.

[0165] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. An air cleaner comprising:

a case having an internal space and including an intake port;
a filter frame disposed inside the case;
a filter attached/detached to/from the filter frame and disposed to face the intake port;
a fan disposed above the filter and having a shroud forming a space between the fan and the filter frame; and
a guide disposed between the filter frame and the shroud and inclined to the outer side of the fan in a radial direction.

2. The air cleaner of claim 1, wherein the filter frame includes an opening facing the fan in a vertical direction, and the guide is disposed outside the opening in a radial direction.

3. The air cleaner of claim 1, wherein the filter frame includes:

an opening facing the fan in the vertical direction;
an inner rim surrounding the opening; and
an inner plate extending from the inner rim to the outer side of the opening in a radial direction and

connected to the guide.

4. The air cleaner of claim 1, wherein the filter frame includes an opening facing the fan in the vertical direction, and the guide includes:

a first wall disposed on the outer side of the opening in a radial direction; and
a second wall extending from the first wall to be inclined to the outer side of the fan in a radial direction.

5. The air cleaner of claim 1, wherein the filter frame includes an opening facing the fan in the vertical direction, and the fan includes:

a hub disposed above the opening;
blades extending from the hub to the outer side of the fan in a radial direction; and
a shroud disposed on the outer side of the blades in a radial direction and disposed on an upper side of the guide.

6. The air cleaner of claim 1, wherein the shroud is inclined upward toward the outer side of the fan in a radial direction, and the guide includes a second wall extending parallel to the shroud.

7. The air cleaner of claim 1, wherein the filter frame includes:

an opening facing the fan in the vertical direction; and
an inner rim surrounding the opening and spaced apart from the guide, and
the fan includes a lower edge disposed between the inner rim and the guide.

8. The air cleaner of claim 7, wherein a gap between the inner rim and the lower edge is greater than a gap between the lower edge and the guide.

9. The air cleaner of claim 1, wherein the fan includes an upper edge spaced apart from the inner side of a side wall of the case, and the guide is disposed below a gap between the upper edge and the side wall.

10. The air cleaner of claim 1, further comprising:

a motor housing disposed above the fan;
a blowing passage formed between the motor housing and the side wall of the case; and
a diffuser disposed in the blowing passage and extending in the vertical direction, wherein the guide is disposed below the blowing passage and the diffuser.

11. The air cleaner of claim 1, further comprising a side wall spaced apart from the outer side of the fan in a radial direction, wherein the guide is coupled to the side wall.
12. The air cleaner of claim 11, wherein the guide includes a third wall coupled to the side wall and facing a gap between the fan and the side wall in the vertical direction.
13. The air cleaner of claim 1, wherein the filter frame includes:
- an opening facing the fan in the vertical direction;
 - an inner rim surrounding the opening; and
 - a recess recessed downward between the inner rim and the guide.
14. The air cleaner of claim 1, wherein the filter frame includes:
- an opening facing the fan in the vertical direction;
 - an inner rim surrounding the opening; and
 - a plurality of protrusions spaced apart along the circumference of the inner rim.
15. The air cleaner of claim 1, wherein the filter frame includes an outer plate disposed on the outer side of the guide in a radial direction and coupled to the side wall of the case.
16. The air cleaner of claim 1, wherein the filter frame includes an outer plate disposed on the outer side of the guide in a radial direction, and the guide includes ribs protruding toward the outer plate.
17. The air cleaner of claim 1, wherein the filter frame includes:
- an outer plate disposed on the outer side of the guide in a radial direction; and
 - supporters extending downward from the outer plate.
18. The air cleaner of claim 1, wherein the filter frame includes:
- an opening facing the fan in the vertical direction; and
 - an inner rim surrounding the opening and spaced apart from the guide, wherein a gap between the inner rim and the guide is less than a horizontal width of the guide.
19. The air cleaner of claim 1, wherein the filter frame includes an outer edge spaced apart from the outer side of the guide in a radial direction, wherein a gap between the guide and the outer edge is less than the horizontal width of the guide.
20. The air cleaner of claim 1, further comprising a second body coupled to the upper side of the first body, wherein the first body includes a discharge port opening upward toward the second body, and the second body includes a lower wall spaced apart from an upper side of the discharge port and extending toward the outer side of the first body in a radial direction.

FIG. 1

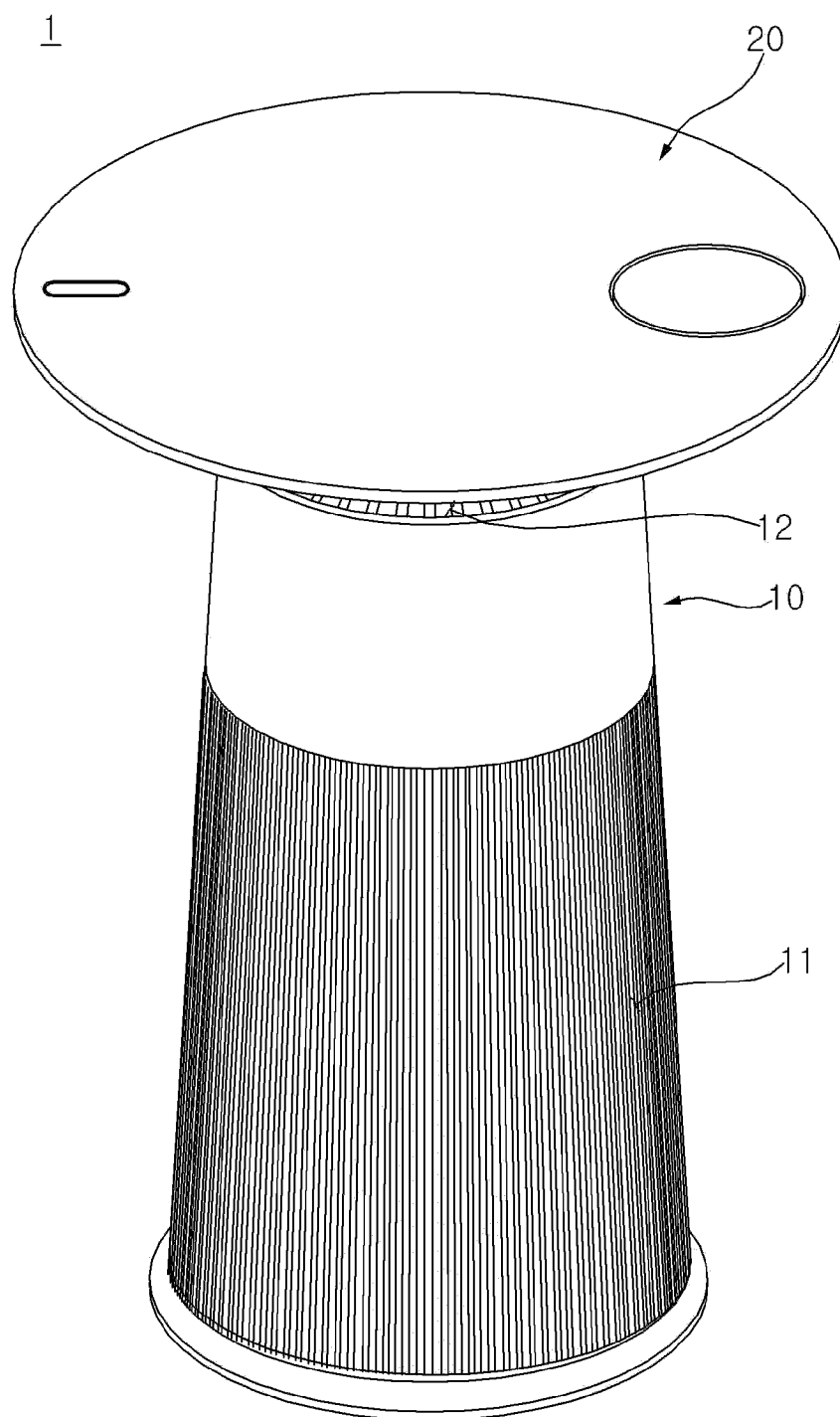


FIG. 2

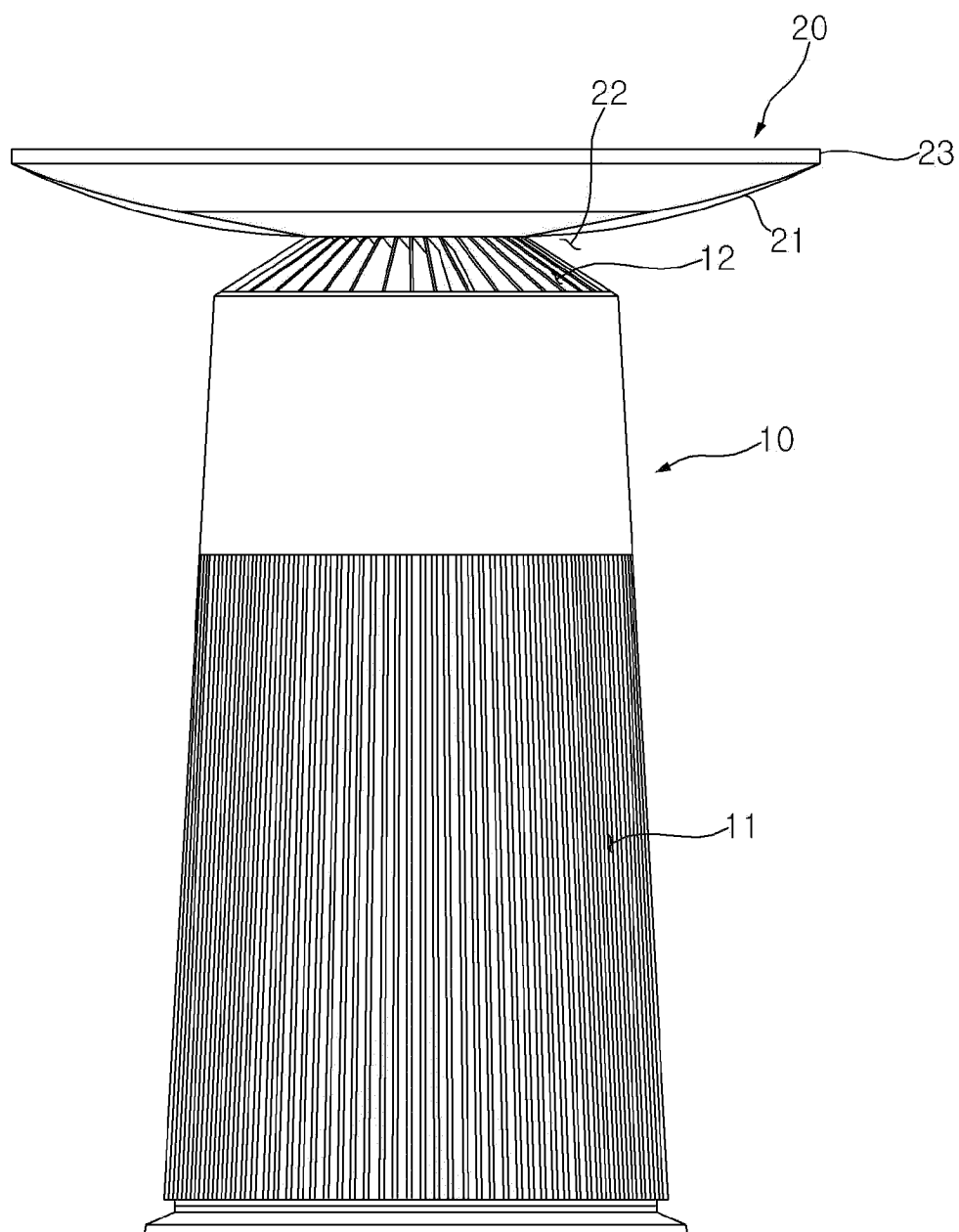


FIG. 3

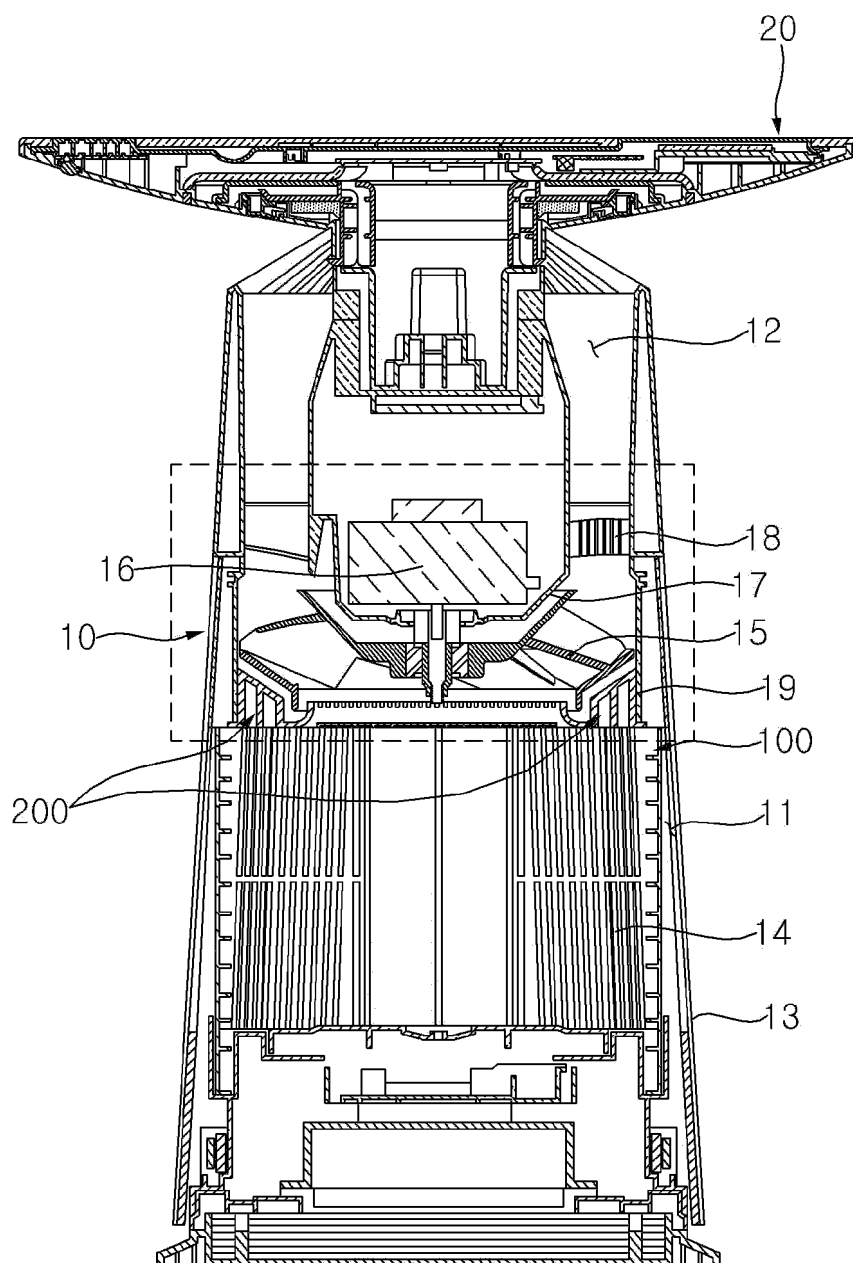


FIG. 4

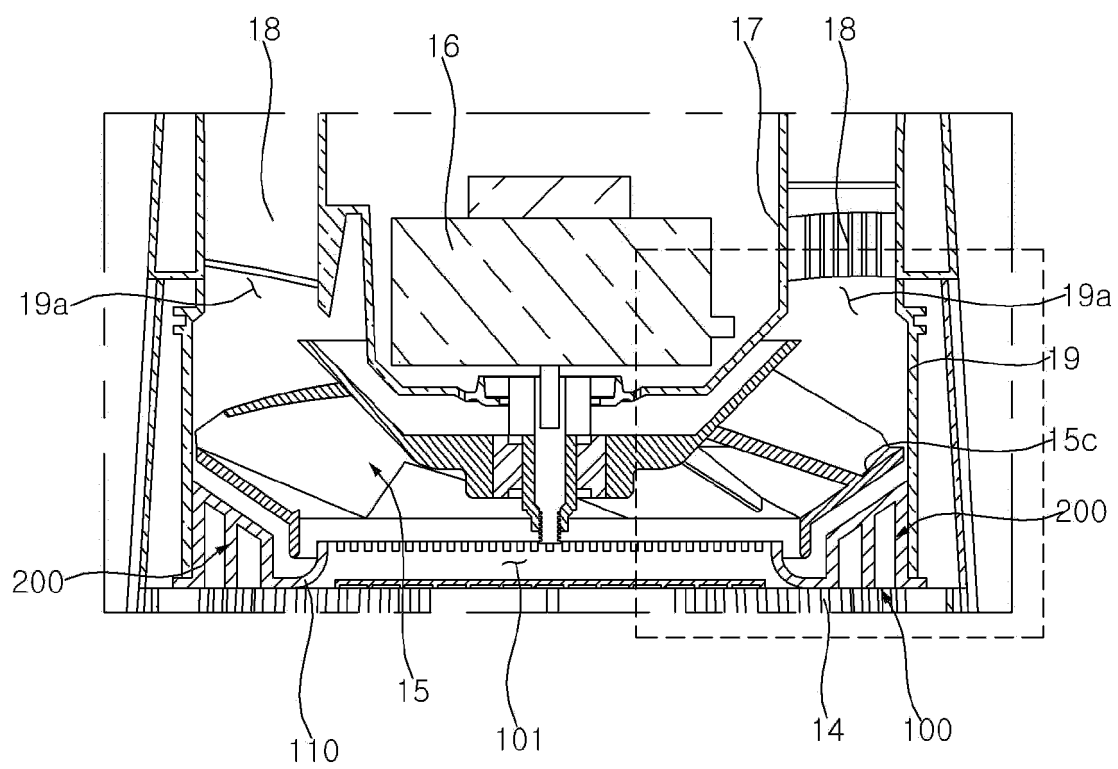


FIG. 5

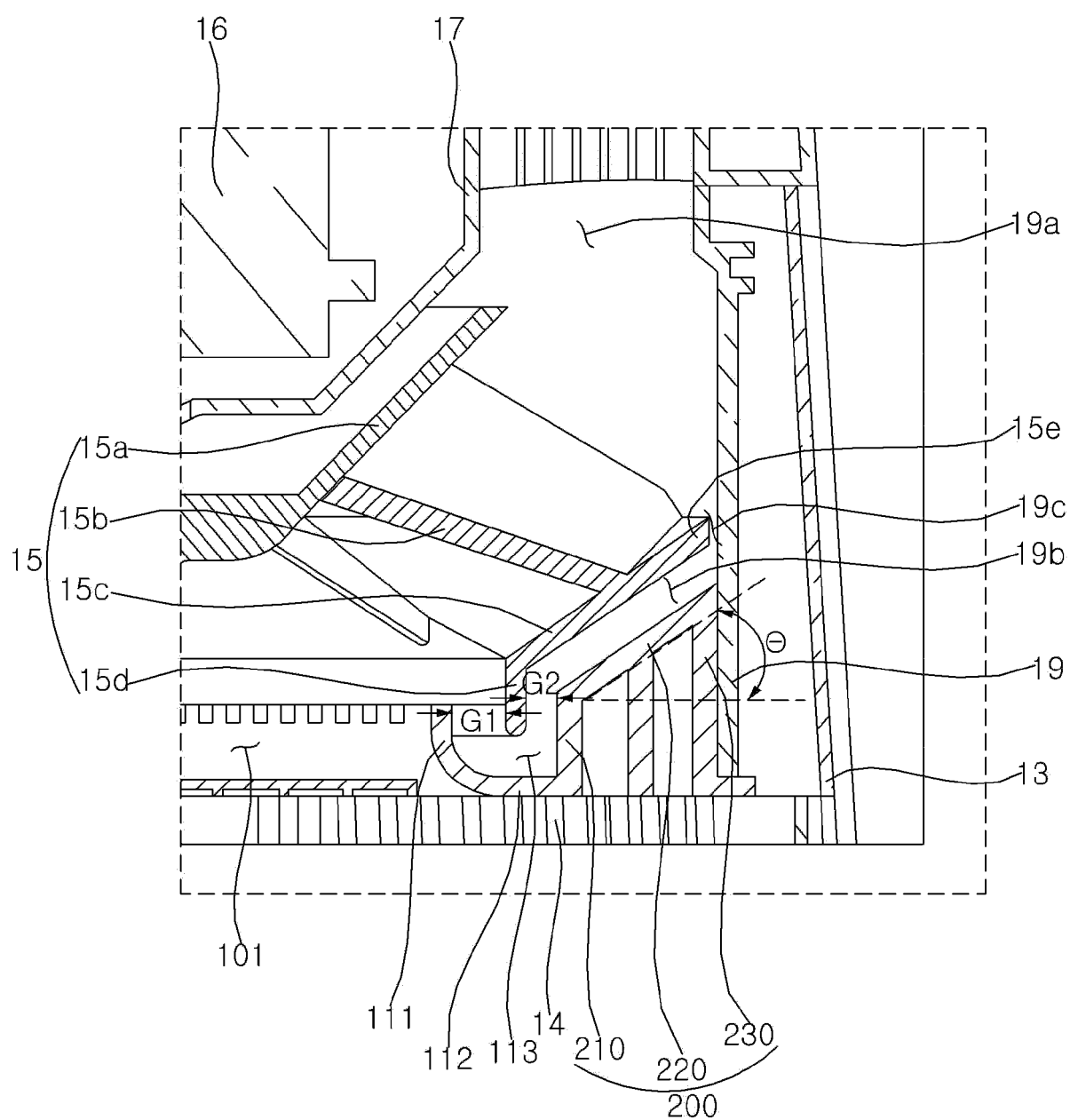


FIG. 6

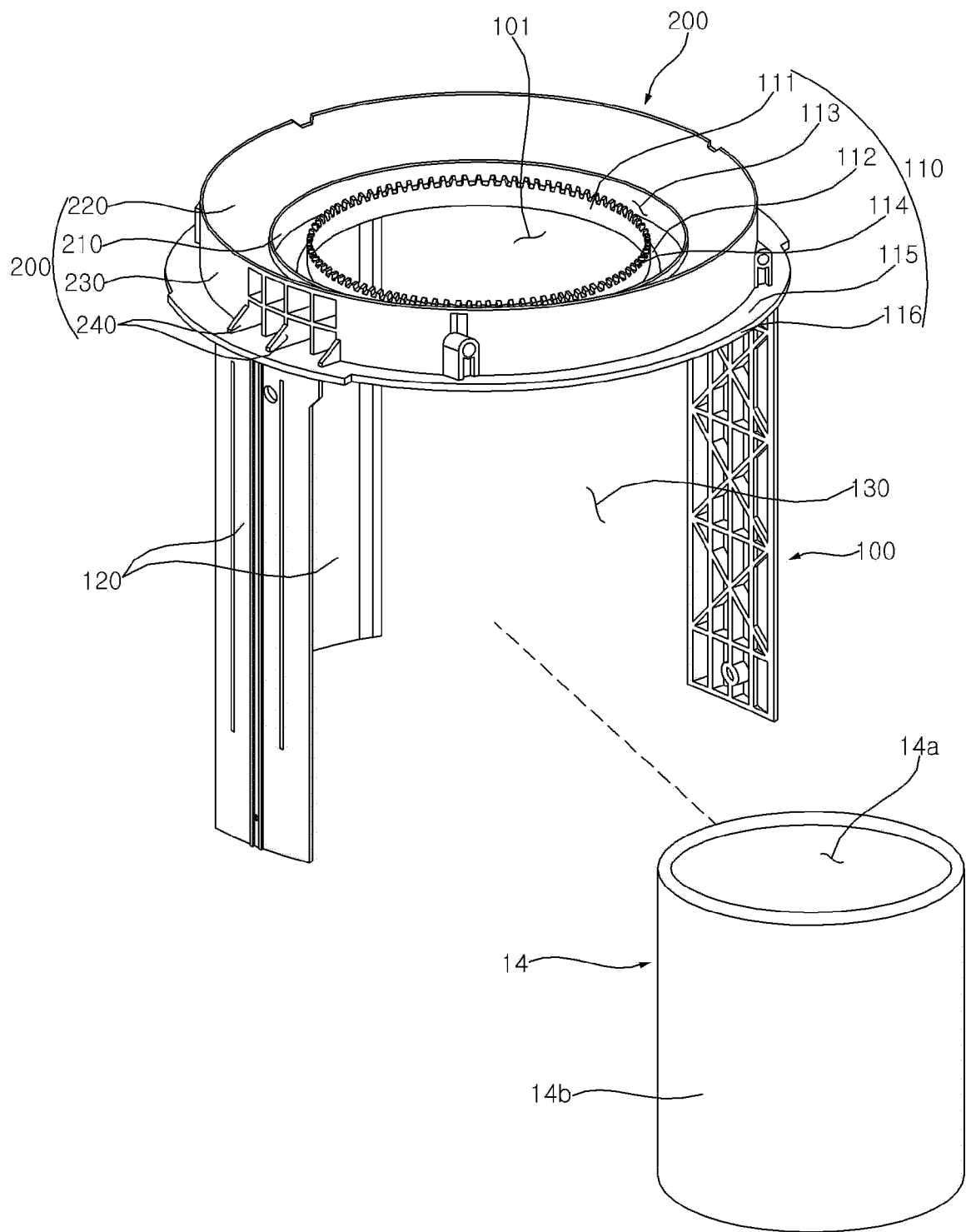


FIG. 7

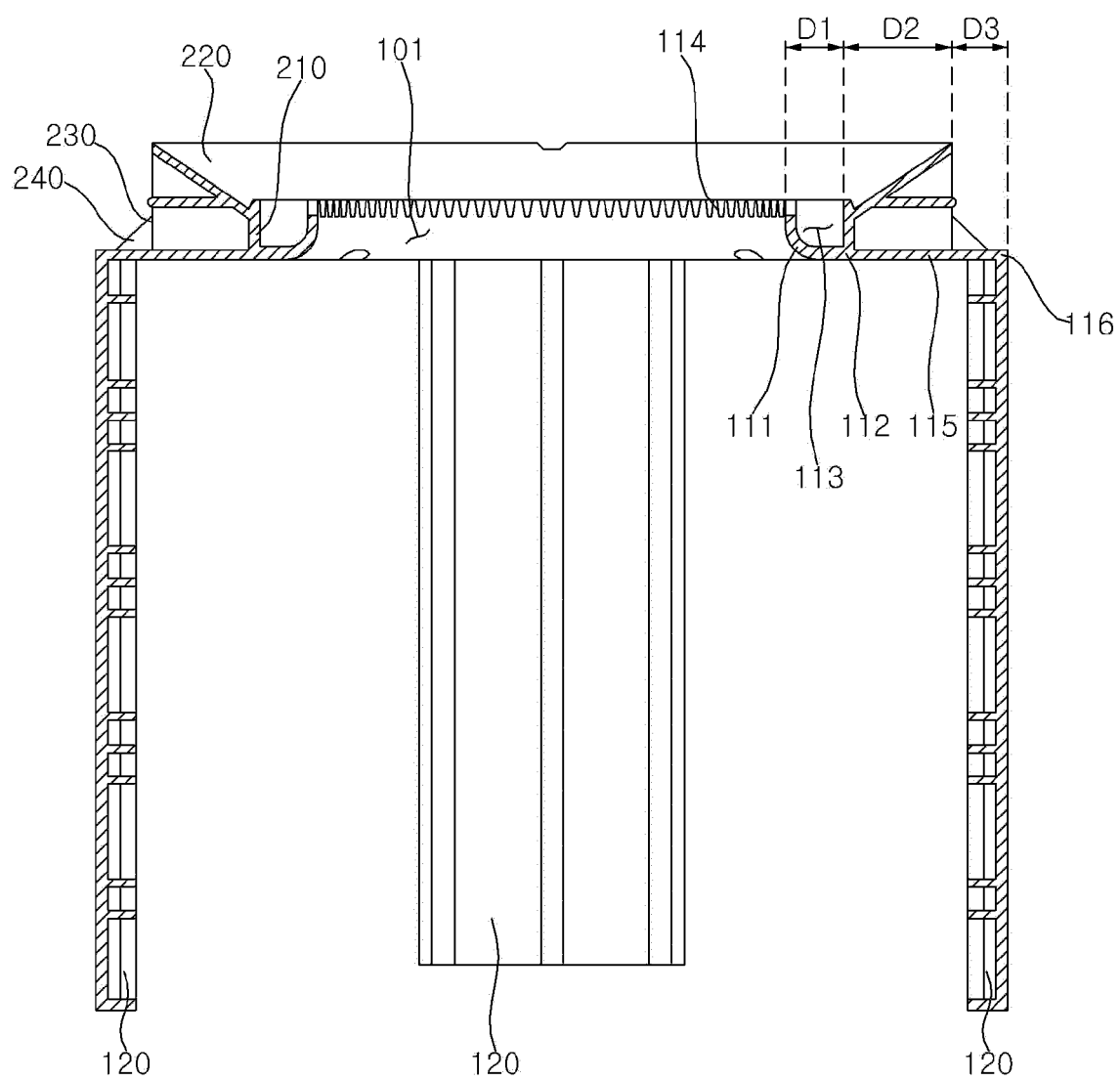


FIG. 8

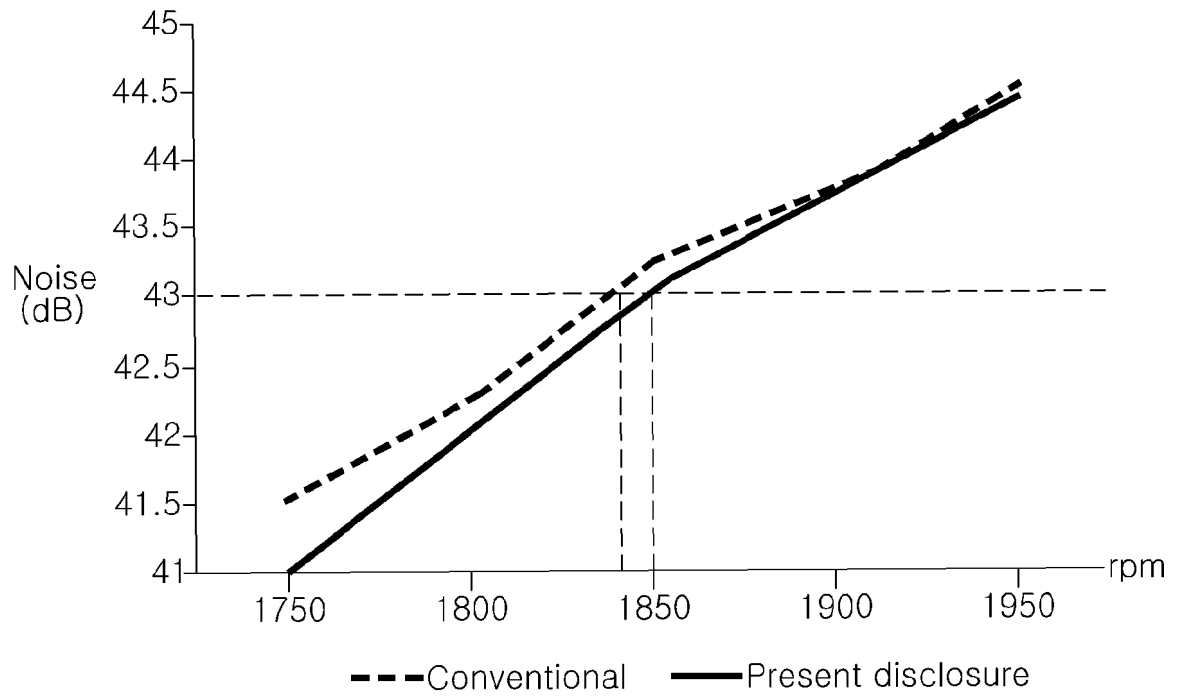


FIG. 9

@43dB

Latitude information	rpm	Air cleaner performance (pyeong)
Conventional	1840	5.4
Present disclosure	1850	5.6

FIG. 10

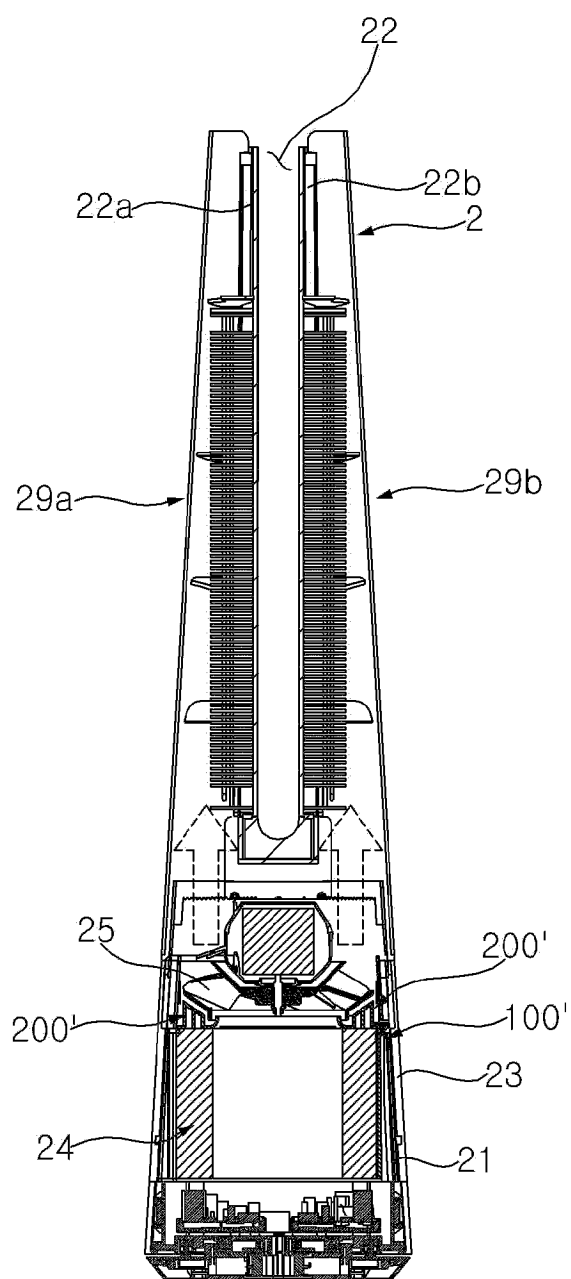
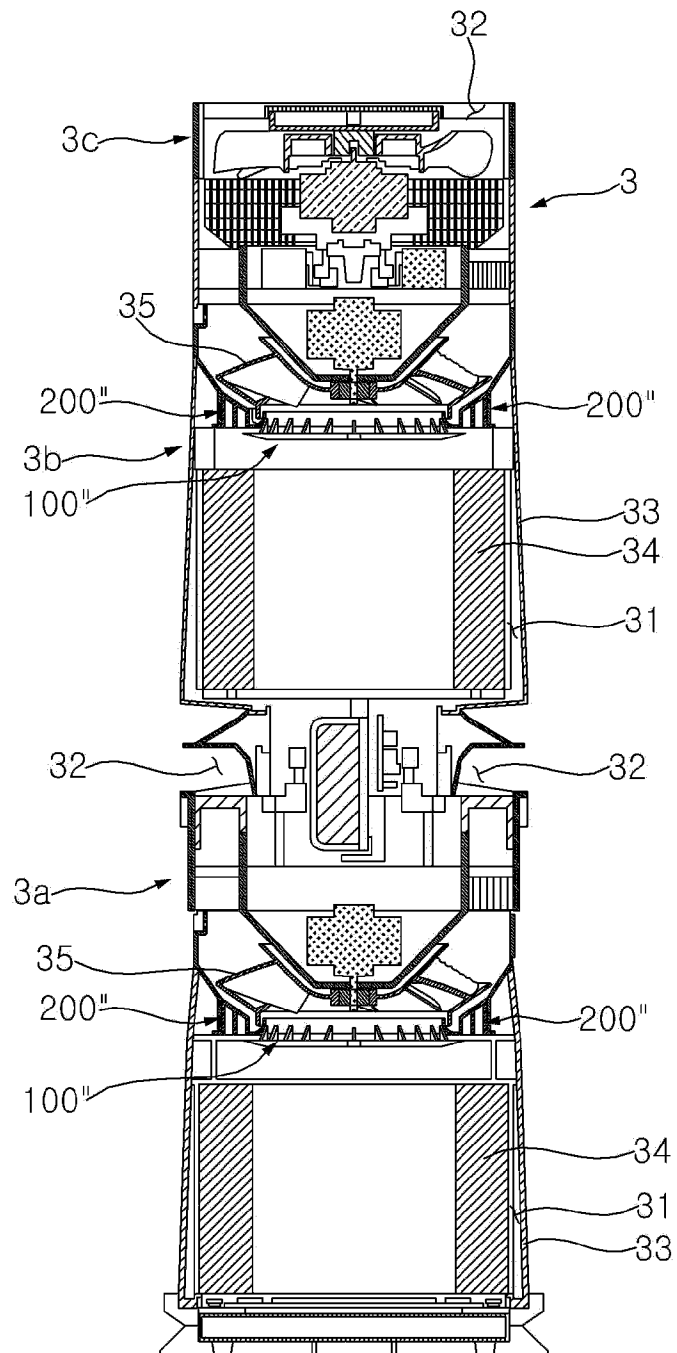


FIG. 11



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/008902

A. CLASSIFICATION OF SUBJECT MATTER

F24F 8/80(2021.01)i; F24F 8/108(2021.01)i; F24F 13/20(2006.01)i; F24F 13/28(2006.01)i; F24F 13/08(2006.01)i;
F04D 29/42(2006.01)i; F04D 29/44(2006.01)i; F04D 29/28(2006.01)i; A47B 37/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F 8/80(2021.01); B01D 46/00(2006.01); B01D 46/42(2006.01); F24F 11/89(2018.01); F24F 3/16(2006.01);
F24F 7/00(2006.01); H02J 50/00(2016.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 공기청정기(air purifier), 필터(filter), 가이드(guide), 이너플레이트(inner plate), 쉬라우드(shroud), 이너림(inner rim)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2021-0112653 A (LG ELECTRONICS INC.) 15 September 2021 (2021-09-15) See paragraphs [0036]-[0054] and [0071]-[0103] and figures 1-4.	1-11,13-20
A		12
Y	KR 10-2022-0007363 A (LG ELECTRONICS INC.) 18 January 2022 (2022-01-18) See paragraph [0116] and figure 8.	1-11,13-20
A	KR 10-2165914 B1 (LG ELECTRONICS INC.) 14 October 2020 (2020-10-14) See claim 1 and figure 5.	1-20
A	CN 210171012 U (CUI, Ziqi) 24 March 2020 (2020-03-24) See paragraphs [0016]-[0018] and figure 1.	1-20
A	JP 2010-223532 A (PANASONIC CORP.) 07 October 2010 (2010-10-07) See claim 1 and figure 1.	1-20

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"D" document cited by the applicant in the international application	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 23 October 2023	Date of mailing of the international search report 23 October 2023
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208	Authorized officer
Facsimile No. +82-42-481-8578	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2023/008902

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		CN 113915760 B	01 September 2023
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CN 210171012 U	24 March 2020	None	
JP 2010-223532 A	07 October 2010	JP 5540538 B2	02 July 2014

Form PCT/ISA/210 (patent family annex) (July 2022)