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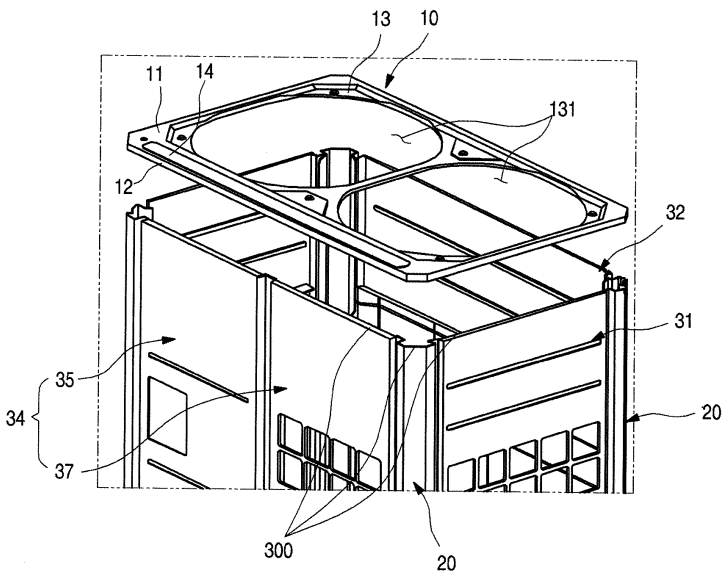
(54) OUTDOOR DEVICE OF AIR CONDITIONER

(57) An outdoor device of an air conditioner is provided. The outdoor device may include a top cover configured to form an external appearance of an upper surface of the outdoor device and having at least one discharge port, through which air passed through an outdoor heat exchanger may be discharged; a recess recessed along at least a portion of an edge of the top cover; a plurality of panels configured to form an external appearance of a circumference of the outdoor device; an edge bent downward along an outer end of the top cover and configured to accommodate upper ends of the plurality of panels; and a bent portion bent from an upper end of each of the plurality of panels toward an inside of the outdoor device. The bent portion may extend and be fitted into a space between the edge and the recess, and restricted by the top cover.

FIG. 4



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Description

[0001] An outdoor device of an air conditioner is disclosed herein.

[0002] An air conditioner is a home appliance that maintains indoor air in an optimal state according to uses and purposes thereof. For example, an interior indoor space may be maintained in a cool state in summer, and may be maintained in a warm state in winter, indoor humidity may also be controlled, and the indoor air may be maintained in a fresh and clean state. The air conditioner may be driven in a refrigeration cycle, in which compression, condensation, expansion, and evaporation processes of a refrigerant are performed, and thus, a cooling or warming operation of the indoor space may be performed.

[0003] According to whether an indoor unit or device and an outdoor unit or device are separated or integrated, the air conditioner may be classified as a separated type air conditioner, in which the indoor device and the outdoor device are separated from each other, and an integrated type air conditioner, in which the indoor device and the outdoor device are integrated in one unit or device. The outdoor device may include an outdoor heat exchanger that heat-exchanges with external air, and the indoor device may include an indoor heat exchanger that heat-exchanges with indoor air. When the refrigeration cycle performs the cooling operation, the outdoor heat exchanger may serve as a condenser, and the indoor heat exchanger may serve as an evaporator. However, when the refrigeration cycle performs the warming operation, the indoor heat exchanger may serve as the condenser, and the outdoor heat exchanger may serve as the evaporator.

[0004] Recently, a multi-type air conditioner having a refrigerant circuit in which a plurality of outdoor devices are provided outside, such as on a rooftop of a building, and a plurality of indoor devices are respectively connected with the plurality of outdoor devices to independently cool or warm each indoor space has been used widely.

[0005] In Korean Unexamined Patent Application Publication No. 10-2013-0088435 an outdoor device of a multi-type air conditioner is disclosed. In the outdoor unit of the air conditioner according to the related art, each component forming the refrigeration cycle, such as a compressor, is installed on an upper surface of a base pan, an outdoor heat exchanger is disposed along a circumference of the base pan to be exposed to or at three surfaces, and a left panel and a right panel, each of which has an inlet port, are formed at left and right sides thereof corresponding to the outdoor heat exchanger, and a suction grille is provided at a rear surface thereof to allow external air to pass through the outdoor heat exchanger.

[0006] A front panel, which forms a front surface, and a rear panel, which forms a part of the rear surface, may be further provided at a circumference of the outdoor heat exchanger together with the left panel, the right panel, and the suction grille. A top panel having a discharge hole, through which air is discharged upward, is provided at an upper surface of the outdoor device. A circumference of the top panel may be formed to be bent, and then may be coupled to the left panel, the right panel, the front panel, and the rear panel, which form a circumference of the outdoor unit.

[0007] The top panel has a structure in which the circumference thereof is bent and accommodates the left panel, the right panel, the front panel, and the rear panel. The bent portion of the top panel may be fastened to the left panel, the right panel, the front panel, and the rear panel by a plurality of screws provided from an outside of the top panel. However, as a coupling structure is not provided between the circumference of the top panel and the left panel, the right panel, the front panel, or the rear panel, there is a problem that a gap is formed between the circumference of the top panel and the left panel, the right panel, the front panel, or the rear panel.

[0008] Also, as a size of the outdoor device is further increased, such a problem occurs more frequently. To solve this problem, a number of screw fastening places or locations should be increased. However, due to an increase in the screw fastening places or locations, there is another problem that an external appearance is affected, and also productivity reduced.

[0009] The present invention provides an outdoor device as claimed in independent claim 1. The dependent claims relate to further aspects of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Embodiments will be described in detail with reference to the following drawings in which like reference numerals refer to like elements, and wherein:

FIG. 1 is a perspective view of an outdoor device of an air conditioner according to an embodiment;

FIG. 2 is an exploded perspective view illustrating a coupling structure among components which forms an external appearance of the outdoor device of FIG. 1;

FIG. 3 is a plan view illustrating an inside of the outdoor device of FIG. 1;

FIG. 4 is an exploded perspective view illustrating a state in which a top cover according to an embodiment is separated;

FIG. 5 is a plan view of the top cover of FIG. 4;

FIG. 6 is an enlarged rear view of a portion A of FIG. 5;

FIG. 7 is a partial perspective view illustrating a coupling structure of the top cover of FIG. 4;

FIG. 8 is a cross-sectional view taken along line VIII-VIII' of FIG. 1; and

FIGs. 9A-9C are cross-sectional views sequentially illustrating an installation process of the top cover.

DETAILED DESCRIPTION

[0011] Hereinafter, embodiments will be described with reference to the accompanying drawings. However, embodiments not limited to the embodiments disclosed below, and those skilled in the art appreciating the ideas can easily propose other embodiments within the scope.

[0012] FIG. 1 is a perspective view of an outdoor device of an air conditioner according to an embodiment. FIG. 2 is an exploded perspective view illustrating a coupling structure among components which forms an external appearance of the outdoor device of FIG. 1. FIG. 3 is a plan view illustrating an inside of the outdoor device of FIG. 1.

[0013] As illustrated in the drawings, an air conditioner according to an embodiment may include an outdoor unit or device 1, which may be provided at or in an outside space, and an indoor unit or device (not shown), which may be connected with the outdoor device 1 by a refrigerant pipe and may be provided at or in an inside space. The indoor device may include an indoor heat exchanger (not shown), which may heat-exchange with indoor air. An entire external shape of the outdoor device 1 may be formed by a top cover 10, a plurality of panels 30, a base pan 40, and a plurality of side supporters 20.

[0014] The top cover 10 may be provided at or on an upper surface of the outdoor device 1, and form an external shape of the upper surface of the outdoor device 1. A pair of discharge ports 131 may be formed at or in the top cover 10, and enable air heat-exchanged at an inside of the outdoor device 1 to be discharged outside of the outdoor device 1. A discharge grille 132 may be installed at each of the discharge ports 131 to prevent external foreign substances from being introduced through the pair of discharge ports 131.

[0015] The plurality of side supporters 20 may be provided at each of four corners of the outdoor device 1, respectively. The plurality of side supporters 20 may be bent, to connect the top cover 10 with the base pan 40, and thus, to form each corner of the outdoor device 1, and may be in a pipe shape or partial pipe shape. The plurality of panels 30 may be provided between the plurality of side supporters 20, respectively, and thus, may form an external appearance of an outer surface of the outdoor device 1.

[0016] The plurality of panels 30 may include a pair of side panels 31, which may form first and second or left and right side surfaces of the outdoor device 1, a front panel 34, which may form a front surface of the outdoor device 1, and a rear panel 32, which may form a rear surface of the outdoor device 1. Each of the side panels 31 may be formed in a plate shape and may connect the adjacent side supporters 20, the base pan 40, and the top cover 10.

[0017] An upper portion of each side panel 31, that is, an area thereof corresponding to one or more shroud 90 in the outdoor device 1 may be solid, and a plurality of suction ports 311 may be formed at or in a remaining area of a lower portion thereof except for the solid area. The plurality of suction ports 311 may be uniformly formed at or in an entire area in which an outdoor heat exchanger 55 heat-exchanging with suctioned air may be located, and may serve to guide laterally suctioned air to pass through the outdoor heat exchanger 55.

[0018] An arrangement of the plurality of suction ports 311 formed at or in each side panel 31 may be changed according to a structure and an arrangement of the outdoor heat exchanger 55. The plurality of suction ports 311 may be arranged at or in an area corresponding to the outdoor heat exchanger 55, and other areas, which do not correspond to the outdoor heat exchanger 55 may be solid, and thus, all of the suctioned air may pass through the outdoor heat exchanger 55.

[0019] The rear panel 32 may be provided at a portion of the rear surface of the outdoor device 1 corresponding to a position of the one or more shroud 90. A suction grille 33 may extend from a lower end of the rear panel 32 to the base pan 40. The suction grille 33 may include of a plurality of wires having a lattice shape, and may have a size corresponding to the outdoor heat exchanger 55 located at the rear surface of the outdoor device 1. Therefore, the suction grille 33 may protect the outdoor heat exchanger 55 from an external impact or a foreign substance, and may also allow external air to be smoothly introduced.

[0020] A plurality of front panels 34 may be provided at the front surface of the outdoor device 1. The plurality of front panels 34 may include a service panel 35, a piping panel 36, and a suction panel 37. The front surface of the outdoor device 1 may be divided into first and second or left and right sides based on a point from which the outdoor heat exchanger 55 extends. That is, the service panel 35 and the piping panel 36 may be provided at the first or left side of the outdoor device 1, and the suction panel 37 may be provided at the second or right side of the outdoor device 1.

[0021] The service panel 35 may be provided at a position corresponding to a first or left side end of the outdoor device 1 corresponding to an extending end of the outdoor heat exchanger 55. The service panel 35 may be formed to be independently separable in a state in which all of the front panels 34 are installed. Therefore, access to internal components of the outdoor device 1 may be provided by separating the service panel 35. In particular, when the service panel 35 is opened, an entire control box 56 may be exposed to a front side, and thus, access to each of components forming a refrigeration cycle and a refrigerant pipe, which connects the components, may be easily provided.

[0022] The piping panel 36 to pass-through and fix a plurality of indoor device connection pipes that connect the outdoor device 1 with the indoor device may be provided between a lower end of the service panel 35 and the base pan 40. The piping panel 36 may have a same width as a width of the service panel 35, and may also be formed to allow the service panel 35 to be separated

in a state in which the piping panel 36 is fixedly installed at or on the base pan 40.

[0023] A plurality of pipe installation holes 361, through which the plurality of indoor device connection pipes connected with the indoor device may pass, may be formed at or in the piping panel 36. A service valve may be installed at or in each pipe installation hole 361 to enable the indoor device connection pipes connected with the indoor device to be easily connected and installed. If necessary, the piping panel 36 may be integrally formed with the service panel 35.

[0024] The suction panel 37 may form an external appearance of a remaining portion of the front surface of the outdoor device 1 besides the service panel 35 and the piping panel 36. The suction panel 37 may extend from the top cover 10 to the base pan 40, and may extend from the adjacent side supporter 20 to the service panel 35 and the piping panel 36. The suction panel 37 may extend to an end of the outdoor heat exchanger 55, and may be provided inside of the outdoor device 1 so that a coupling plate 57, to which the end of the outdoor heat exchanger 55 may be fixed, may be coupled with an end of the suction panel 37. Therefore, the outdoor heat exchanger 55 may be stably maintained in a fixed state by the suction panel 37. The suction panel 37 may also be formed so that an upper portion thereof corresponding to a position of the one or more shroud 90 is solid, and a plurality of suction ports 371 may be formed at or in a remaining area corresponding to an area of the outdoor heat exchanger 55, and thus, allow external air to flow toward the outdoor heat exchanger 55.

[0025] A lower surface of the outdoor device 1 may be formed by the base pan 40. The outdoor device 1 may be supported to be spaced apart from a surface, such as a floor, by a base frame 41. Components forming the refrigeration cycle, such as one or more compressor 51 and the outdoor heat exchanger 55, may be provided on an upper surface of the base pan 40.

[0026] The one or more compressor 51 may be provided on the upper surface of the base frame 41. The one or more compressor 51 may serve to enable a gaseous refrigerant to be compressed to a high temperature and high pressure state, and may include a constant speed compressor, which may be rotated at a constant speed and perform a compression operation with a constant capacity, and an inverter compressor, a rotational of which speed may be varied according to a load, and thus, a compression capacity may be adjustable.

[0027] An oil separator 52, which may separate oil contained in the refrigerant discharged from the one or more compressor 51, may be provided at the refrigerant pipe, which may be connected with an outlet port of each compressor 51, and thus, the oil in the refrigerant may be separated and then recovered again into each compressor 51. A four-way valve 53, which may enable the refrigerant passing through the oil separator 52 to be selectively supplied to an indoor heat exchanger (not shown) or the outdoor heat exchanger 55, may be provided at one side of the outdoor device 1.

[0028] The four-way valve 53 may be connected with the indoor heat exchanger, the outdoor heat exchanger 55, the compressor(s) 51, and an accumulator 54, respectively, and may switch a path so that the refrigerant discharged from the compressor(s) 51 may be selectively supplied to the indoor heat exchanger or the outdoor heat exchanger 55 according to a warming operation or a cooling operation. The accumulator 54 may be formed at one side of the base pan 40 to be connected with the indoor heat exchanger and the four-way valve 53. The accumulator 54 may separate a liquefied refrigerant from the gaseous refrigerant, and enable the liquefied refrigerant to be stored and the gaseous refrigerant to be supplied to the one or more compressor 51. The outdoor heat exchanger 55 may enable external air to be heat-exchanged with the refrigerant, while the external air is forcibly passed through the outdoor heat exchanger 55 via a fan 81.

[0029] The outdoor heat exchanger 55 may extend along a circumference of the base pan 40, and be arranged along four surfaces of the outdoor device 1. Both ends of the outdoor heat exchanger 1 may be spaced apart from each other at a corner, which may be formed by the first or left surface and the front surface of the outdoor device 1, and form a predetermined space. A space between the ends of the outdoor heat exchanger 1 may be open, when the service panel 35 is separated, and thus, access to various pipes forming the refrigeration cycle and the control box 56 may be allowed through the space.

[0030] The outdoor heat exchanger 55 may extend from the base pan 40 to a height close to the fan 81. Therefore, the outdoor heat exchanger 55 may cover all of the plurality of suction ports 311 and 371 at the inside of the outdoor device 1, and also enable all of the air passing through the plurality of suction ports 311 and 371 to pass through the outdoor heat exchanger 55.

[0031] The one or more shroud 90 may be provided at an upper portion of the inside of the outdoor device 1, and a fan motor assembly 80 may be provided inside of each shroud 90. The one or more shroud 90 may guide discharged air, and may be vertically opened. A side surface of each shroud 90 may be rounded, such that a center thereof is recessed inward, and also an opening thereof may be gradually widened upward from the center. An open upper surface of each shroud 90 may have a same shape as the discharge port 131, and thus, discharged air may be effectively guided to the discharge port 131. Each shroud 90 may have a size which accommodates the respective fan motor assembly 80 therein.

[0032] Hereinafter, a structure and a coupling structure of the top cover will be described.

[0033] FIG. 4 is an exploded perspective view illustrating a state in which a top cover according to an embodiment is separated. FIG. 5 is a plan view of the top cover of FIG. 4. FIG. 6 is an enlarged rear view of a portion A of FIG. 5.

[0034] As illustrated in the drawings, the top cover 10 may have a structure configured to be coupled with an upper end of the plurality of panels 30, which form a circumference of the outdoor device 1. A bent portion 300, which may be inserted into the top cover 10, may be formed at the upper end of the plurality of panels 30. That is, the bent portion 300, which may be bent toward the inside of the outdoor device 1, may be formed at all upper ends of the side panel 31 and the rear panel 32 forming the plurality of panels 30, and the service panel 35 and the suction panel 37 forming the front panel 34, and the plurality of side supporters 20.

[0035] The bent portion 300 may contact with a lower surface of the top cover 10, and may be formed to extend by a corresponding length, and thus, be in contact with an edge 12 and a recess 13 or a forming portion 14, which will be described hereinafter. Therefore, the bent portion 300 may be supported by the recess 13 or the forming portion 14, and thus, maintained in an accurately installed state at a predetermined position of the top cover 10, when the top cover 10 is installed.

[0036] The top cover 10 may include a plate 11, which may form the upper surface of the outdoor device 1, and the edge 12, which may be formed at or along a circumference of the top cover 10. The plate 11 of the top cover 10 may be formed in a plate shape, and the pair of discharge ports 131 may be formed therein. A shape of each of the pair of discharge ports 131 may be the same as a shape of the open upper surface of the one or more shroud 90, and both ends of the pair of discharge ports 131 may be in contact with each other so that air guided through the one or more shroud 90 may be discharged through the pair of discharge ports 131.

[0037] The recess 13 may be formed at or in the plate 11. The recess 13 may be formed by recessing an area in which the pair of discharge ports 131 is formed and an outer area adjacent to the pair of discharge ports 131, and may be formed so that a remaining portion of the plate 11 except for edges thereof may be recessed and form a flat surface.

[0038] The discharge grille 132 may be installed at or in the recess 13. The discharge grille 132 may shield the discharge port 131, and may be formed of a plurality of wires having a lattice shape or a net shape. The discharge grille 132 may shield all of the discharge ports 131, or may be separately formed to be independently installed thereat.

[0039] The edge 12 may be bent downward along a circumference of the plate 11. The edge 12 may have a predetermined length, and thus, may accommodate the upper ends of the plurality of panels 30, that is, the side panels 31, the front panel 34 and the rear panel 32, and the side supporters 20.

[0040] The edge 12 may be in close contact with and fixed to outer surfaces of the side panels 31, the front panel 34 and the rear panel 32, and the side supporters 20. The plate 11 may have a same size and shape as a cross section formed in a state in which all of the side panels 31, the front panel 34, the rear panel 32, and the side supporters 20 are coupled to each other.

[0041] A coupling hole 123 to couple the side panels 31, the front panel 34, and the rear panel 32 forming the plurality of panels 30, and the side supporters 20 may be formed at or in the edge 12. Each coupling hole 123 may be open, such that a fastening member, such as a screw, may be fastened thereto.

[0042] The edge 12 may be spaced apart from a circumference of the recess 13, and the bent portion 300 may be inserted between the circumference of the recess 13 and the edge 12. That is, a distance between an outer circumference of the recess 13 and the edge 12 of the plate 11 may correspond to a length of the bent portion 300, and thus, the bent portion 300 may be inserted into and fixed thereto.

[0043] The forming portion 14 may be formed at or on the plate 11. The forming portion 14 may be formed at a front portion of the plate 11. The forming portion 14 may extend a length corresponding to a transverse width of the front panel 34, and may form a space in which the bent portion 300 formed at the upper end of the front panel 34 may be inserted.

[0044] That is, a front end of the forming portion 14 may be formed at a position which is spaced apart from the edge 12 formed at a front end of the top cover 10 by a length of the bent portion 300. Therefore, the bent portion 300 may be accommodated at an inside of a space formed by the edge 12 and the forming portion 14.

[0045] The forming portion 14 may be located between the edge 12 and the recess 13 of the top cover 10, and may be formed to have a predetermined width. Therefore, the forming portion 14 may prevent deformation of the top cover 10, which may extend lengthwise transversely, and reinforce a strength thereof.

[0046] This embodiment has been described as an example in which the forming portion 14 is formed at the front portion of the top cover 10. However, the forming portion 14 may be formed at at least one side of a first or left side, a second or right side, or a rear side of the top cover 10.

[0047] FIG. 7 is a partial perspective view illustrating a coupling structure of the top cover. FIG. 8 is a cross-sectional view taken along line VIII-VIII' of FIG. 1.

[0048] As illustrated in the drawings, the bent portion 300, which may be formed at the upper ends of the front panel 34, the side panels 31, the rear panel 32, and the side supporters 20 may include a first rounded portion 301, and the edge 12, which may be bent downward from an outer end of the plate 11 may include a second rounded portion 121. When the top cover 10 is installed, the first rounded portion 301 and the second rounded portion 121 may be in contact with each other, and thus, the edge 12 may be in close contact with the panel 30.

[0049] More specifically, the bent portion 300 may be bent backward from the upper end of the panel 30, that is, the front panel 34, and may include the first rounded portion 301, which may be formed at the upper end of

the panel 30 to be rounded with a predetermined curvature, and a first extension 302, which may extend from an end of the first rounded portion 301 toward the inside of the outdoor device 1. The first extension 302 may extend in a direction that vertically crosses the front panel 34.

[0050] The edge 12 may be bent downward from the outer end of the plate 11, and may include the second rounded portion 121, which may be formed at the outer end of the plate 11 to be rounded with a predetermined curvature, and a second extension 122, which may extend downward from an end of the second rounded portion 121. The second extension 122 may extend in a direction that vertically crosses the plate 11.

[0051] When the top cover 10 is installed, the bent portion 300 may be inserted into the inside of the edge 12. At this time, an outer surface of the first rounded portion 301 may be adjacent to an inner surface of the second rounded portion 121, and a radius of curvature R1 of the outer surface of the first rounded portion 301 may be larger than a radius of curvature R2 of the inner surface of the second rounded portion 121. Therefore, as the top cover 10 is moved down, the outer surface of the first rounded portion 301 may press the inner side surface of the second rounded portion 121, and thus, the second extension 122 of the edge 12 may be maintained to be pressed to and in close contact with the inner side surface of the panel 30.

[0052] The forming portion 14 or the recess 13 of the top cover 10 has a structure which is recessed downward. Restriction portions 143 and 133 may be formed at a recessed circumference. The restriction portions 143 and 133 may be portions in contact with an end of the second extension 122 of the bent portion 300, when the top cover 10 is installed, and may support the end, such that the bent portion 300 may be prevented from being further moved toward the inside of the outdoor device 1 and is located in position.

[0053] The recess 13 may be recessed downward from the plate 11, and a first restriction portion 133 may be formed along the circumference of the recess 13. A distance between the first restriction portion 133 and the edge 12 may correspond to the length of the bent portion 300.

[0054] Therefore, when the bent portion 300 is inserted into a space between the edge 12 and the first restriction portion 133, the bent portion 300 may not deviate from an installation position, even when an external force is applied. That is, in a process in which the outer surface of the first rounded portion 301 presses the second rounded portion 121 due to installation of the top cover 10, the first extension 302 may be prevented from being pushed to the inside of the outdoor device 1, and the second extension 122 may be maintained to be in close contact with the front panel 34.

[0055] The forming portion 14 may also be recessed downward from the plate 11 of the top cover 10, and a second restriction portion 143 may be formed along a circumference of the forming portion 14. A distance between the second restriction portion 143 and the edge 12 may correspond to the length of the bent portion 300.

[0056] Therefore, when the bent portion 300 is inserted into a space between the edge 12 and the second restriction portion 143, the bent portion 300 may not deviate from an installation position, even when an external force is applied. That is, in a process in which the outer surface of the first rounded portion 301 presses the second rounded portion 121 due to installation of the top cover 10, the first extension 302 may be prevented from being pushed to the inside of the outdoor device 1, and the second extension 122 may be maintained to be in close contact with the front panel 34.

[0057] Hereinafter, an assembly process of the top cover of the outdoor device 1 having the above-described structure will be described.

[0058] FIGs. 9A-9C are cross-sectional views sequentially illustrating an installation process of the top cover. The installation process of the top cover 10 will be described with reference to the drawing.

[0059] Various components forming the refrigeration cycle, such as the compressor(s) 51 and the outdoor heat exchanger 55, may be installed on the upper surface of the base pan 40. The side supporters 20 may be coupled to four corners of the base pan 40, the plurality of panels 30 may be installed between the adjacent side supporters 20, and the suction grille 33 may be installed, to form an external appearance of the outdoor device 1. Then, the control box 56, the one or more fan motor assembly 80, and the one or more shroud 90 may be installed, and the top cover 10 may be installed at the opened upper end of the outdoor device 1, and thus, the assembly process may be completed.

[0060] To assemble the top cover 10, first, the top cover 10 should be located at an upper side corresponding to the bent portion 300 formed at the upper ends of the panel 30 and the side supporters 20, as illustrated in FIG. 9A. In this state, when the top cover 10 is moved downward, the edge 12 may be moved along the outer side surfaces of the panel 30 and the side supporters 20, and the bent portion 300 of each of the panels 30 and the side supporters 20 may be adjacent to the plate 11 of the top cover 10, as illustrated in FIG. 9B.

[0061] In a state as illustrated in FIG. 9B, when the top cover 10 is further moved downward, the outer surface of the first rounded portion 301 of each of the panels 30 and the side supporters 20 may press the second rounded portion 121, while being in contact with the inner side surface of the second rounded portion 121 of the top cover 10. The end of the first extension 302 of the bent portion 300 may be supported by the restriction portion 143, 133 of the forming portion 14 or the recess 13 to not deviate. Therefore, due to a pressure applied to the second rounded portion 121, the second extension 122 may be maintained to be in close contact with the upper end of the outer side surface of each of the panels 30 and the upper end of the outer side surface of each of the

side supporters 20. In such a structure, as a pressing force is always applied downward by a weight of the top cover 10, the bent portion 300 may be maintained to be in close contact with the inside of the edge 12.

[0062] As described above, the top cover 10 may be fixed in a fitted state to the panel 30 and the side supporters 20. Therefore, the fixed state may be maintained without a separate fastening member, and to further firmly maintain the coupled state, a fastening member, which may be fastened to each panel forming the panel 30 may be partially used.

[0063] According to the outdoor device of an air conditioner in accordance with embodiments disclosed herein, the bent portion may be formed at the upper ends of the plurality of panels and the plurality of side supports forming the circumference of the outdoor device, and the edge, which may be bent downward to accommodate the upper ends of the plurality of panels and the plurality of side supporters may be formed at the top cover installed at the plurality of panels and the plurality of side supporters. The radius of the outer surface of the first rounded portion formed at the bent portion may be larger than the radius of the inner surface of the second rounded portion formed at the edge. Therefore, when the top cover is moved downward, the first rounded portion may press the second rounded portion, while being in close contact with the second rounded portion, and thus, the edge may be in close contact with the outer side surfaces of the panels and the side supporters. Therefore, even when a separate fastening member is not provided or a small number of fastening members is used, a gap is not generated between the edge and the outer side surfaces of the panels and the side supporters, and thus, an external appearance may be improved.

[0064] Also, as a fastening member is not used, or a number of fastening members may be reduced, and thus, man hours may be reduced, it is possible to reduce man hours and manufacturing costs.

[0065] As the recess is formed at the upper surface of the top cover, and the pair of discharge ports are disposed or provided at or in the area of the recess, and the discharge grille is installed, the pair of discharge ports and the discharge grille are not exposed, when being seen from a front side, and the external appearance may be further enhanced.

[0066] Further, as the circumferential surface of the recess is in contact with the end of the bent portion, the bent portion may be prevented from deviating or moving and may be located in position during the installation process of the top cover, and thus, the top cover may be further easily assembled.

[0067] As the strength of the top cover is reinforced by the forming portion, which is formed to be recessed in the lengthwise direction, and also, the circumference of the forming portion is in contact with the end of the bent portion, the bent portion may be prevented from deviating or moving and may be located in position during the installation process of the top cover, and thus, the top cover may be further easily assembled.

[0068] Embodiments disclosed herein are directed to an outdoor unit or device of an air conditioner which is able to prevent a gap from occurring at an external appearance of the outdoor device and to minimize a number of screws to be used, thereby improving an external appearance and enhancing productivity.

[0069] Embodiments disclosed herein provide an outdoor unit or device of an air conditioner that may include a top cover configured to form an external appearance of an upper surface of the outdoor unit and having a discharge port, through which air passed through an outdoor heat exchanger is discharged; a recessed portion or recess recessed along at least a part or portion of an edge of the top cover; a plurality of panels configured to form an external appearance of a circumference of the outdoor unit; an edge or edge portion bent downward along an outer end of the top cover and configured to accommodate upper ends of the panels; and a bent portion bent from an upper end of each of the panels toward an inside of the outdoor unit. The bent portion may be formed to extend and to be fitted into a space between the edge portion and the recessed portion, and restricted by the top cover.

[0070] An end of the bent portion may be in contact with and supported by a circumferential surface of the recessed portion. The bent portion may be further formed at an upper end of a side supporter, which may be formed to extend vertically, form an inclined surface of a corner of the outdoor unit, and connect the plurality of panels.

[0071] The edge portion corresponding to a corner of the top cover may have a corresponding shape so as to be in contact with the inclined surface of the side supporter. The top cover may further include a forming portion, which may be recessed between the recessed portion and the outer end of the top cover, and formed to extend in an extension direction of the top cover, and thus, to prevent deformation of the top cover. A part of the bent portion may be fitted into a space between the edge portion and the forming portion.

[0072] The discharge port may be opened at an internal recessed area of the recessed portion. A discharge grille, through which discharged air may pass, may be installed at or in the discharge port, and the discharge grille may be located inside of the recessed portion. A recessed depth of the recessed portion may be formed greater than a height of the discharge grille.

[0073] A first round portion or rounded portion having a predetermined curvature may be formed at the bent portion, and a second round portion or rounded portion having a predetermined curvature may be further formed at a position of the edge portion, which may be in contact with the first round portion when the top cover is installed. A radius of an outer surface of the first round portion may be formed larger than a radius of an inner surface of the second round portion.

[0074] A second extension portion which extends in a direction crossing the top cover and is in close contact

with outer side surfaces of the outer panels may be further formed at an end of the second round portion.

[0075] The bent portion may include a first round portion or rounded portion, which may be bent at an upper end of each of the panels to be rounded with a predetermined curvature, and a first extension portion, which may extend from the first round portion in a direction perpendicular to each of the outer panels, and the edge portion may include a second round portion or rounded portion, which may be formed at the outer end of the top cover to have a curvature smaller than the curvature of the first round portion, and a second extension portion, which may extend from the second round portion in a direction perpendicular to the top cover. When the top cover is installed, the first round portion may press the second round portion so that the second extension portion is in close contact with each of the out panels.

[0076] A coupling hole, through which a fastening member fastened to the outer panels may pass, may be formed at the edge portion. A circumference of the recessed portion may be formed to be inclined, and formed by a restriction portion, which may be in contact with an end of the bent portion. A distance between the restriction portion and the edge portion may be gradually reduced upward.

[0077] Any reference in this specification to "one embodiment," "an embodiment," "example embodiment," etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

[0078] 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 outdoor device of an air conditioner, comprising:

a top cover (10) configured to form an external appearance of an upper surface of the outdoor device, the top cover (10) having at least one discharge port (131), through which air passed through an outdoor heat exchanger is discharged and a recess (13) recessed along at least a portion of an edge (12) of the top cover (10); and

a plurality of panels (30) configured to form an external appearance of a circumference of the outdoor device, wherein an outer end of the top cover (10) is bent downward to form an edge configured to accommodate upper ends of the plurality of panels (30), and wherein an upper end of each of the plurality of panels (30) is bent toward an inside of the outdoor device to form a bent portion (300), wherein the bent portion (300) is formed to extend and be fitted into a space between the edge (12) and the recess (13), and restricted by the top cover (10).

2. The outdoor device according to claim 1, wherein an end of the bent portion (300) is in contact with and supported by a circumferential surface of the recess (13).

3. The outdoor device according to claim 1 or 2, wherein the bent portion (300) is further formed at an upper end of a side supporter (20) which is formed to extend vertically, forms an inclined surface of a corner of the outdoor device, and connects the plurality of panels (30).

4. The outdoor device according to claim 3, wherein the edge (12) corresponding to a corner of the top cover (10) has a corresponding shape so as to be in contact with the inclined surface of the side supporter (20).

5. The outdoor device according to any one of the preceding claims, wherein the top cover (10) further includes a forming portion (14) recessed between the recess (13) and an outer end of the top cover (10), and formed to extend in an extension direction of the top cover (10) and thus to prevent deformation of the top cover (10).

6. The outdoor device according to claim 5, wherein a portion of the bent portion (300) is fitted into a space between the edge (12) and the forming portion (14).

7. The outdoor device according to any one of the preceding claims, wherein the at least one discharge port (131) is opened at an internal recessed area of the recess (13).

8. The outdoor device according to claim 7, wherein a discharge grille (132) through which discharged air passes is installed at the at least one discharge port (131), and the discharge grille (132) is located inside

of the recess (13).

9. The outdoor device according to claim 8, wherein a recessed depth of the recess (13) is greater than a height of the discharge grille (132).

10. The outdoor device according to any one of the preceding claims, wherein a first rounded portion (301) having a predetermined curvature is formed at the bent portion (300), and a second rounded (121) portion having a predetermined curvature is formed at a position of the edge (12) which is in contact with the first rounded portion (301) when the top cover (10) is installed.

11. The outdoor device according to claim 10, wherein a radius of curvature of an outer surface of the first rounded portion (301) is larger than a radius of curvature of an inner surface of the second rounded portion (121).

12. The outdoor device according to claim 10 or 11, wherein an extension that extends in a direction that crosses the top cover (10) and is in close contact with outer side surfaces of the plurality of panels (30) is formed at an end of the second rounded portion (121).

13. The outdoor device according to any one of the claims 1 to 9, wherein the bent portion (300) includes a first rounded portion (301), which is bent at an upper end of each of the plurality of panels (30) to be rounded with a predetermined curvature, and a first extension (302) that extends from the first rounded portion (301) in a direction perpendicular to each of the plurality of panels (30), wherein the edge (12) includes a second rounded portion (121), which is formed at the outer end of the top cover (10) to have a curvature smaller than the curvature of the first rounded portion (301), and a second extension (122) that extends from the second rounded portion (121) in a direction perpendicular to the top cover (10), and wherein when the top cover (10) is installed, the first rounded portion (301) presses the second rounded portion (121) so that the second extension (122) is in close contact with each of the plurality of panels (30).

14. The outdoor device according to any one of the preceding claims, wherein at least one coupling hole (123), through which a fastening member fastened to the plurality of panels (30) passes, is formed at the edge (12).

15. The outdoor device according to any one of the preceding claims, wherein a circumference of the recess (13) is formed to be inclined, and formed by a restriction portion (142; 133), which is in contact with an end of the bent portion (300), and a distance between the restriction portion (142; 133) and the edge (12) is gradually reduced upward.

FIG. 1

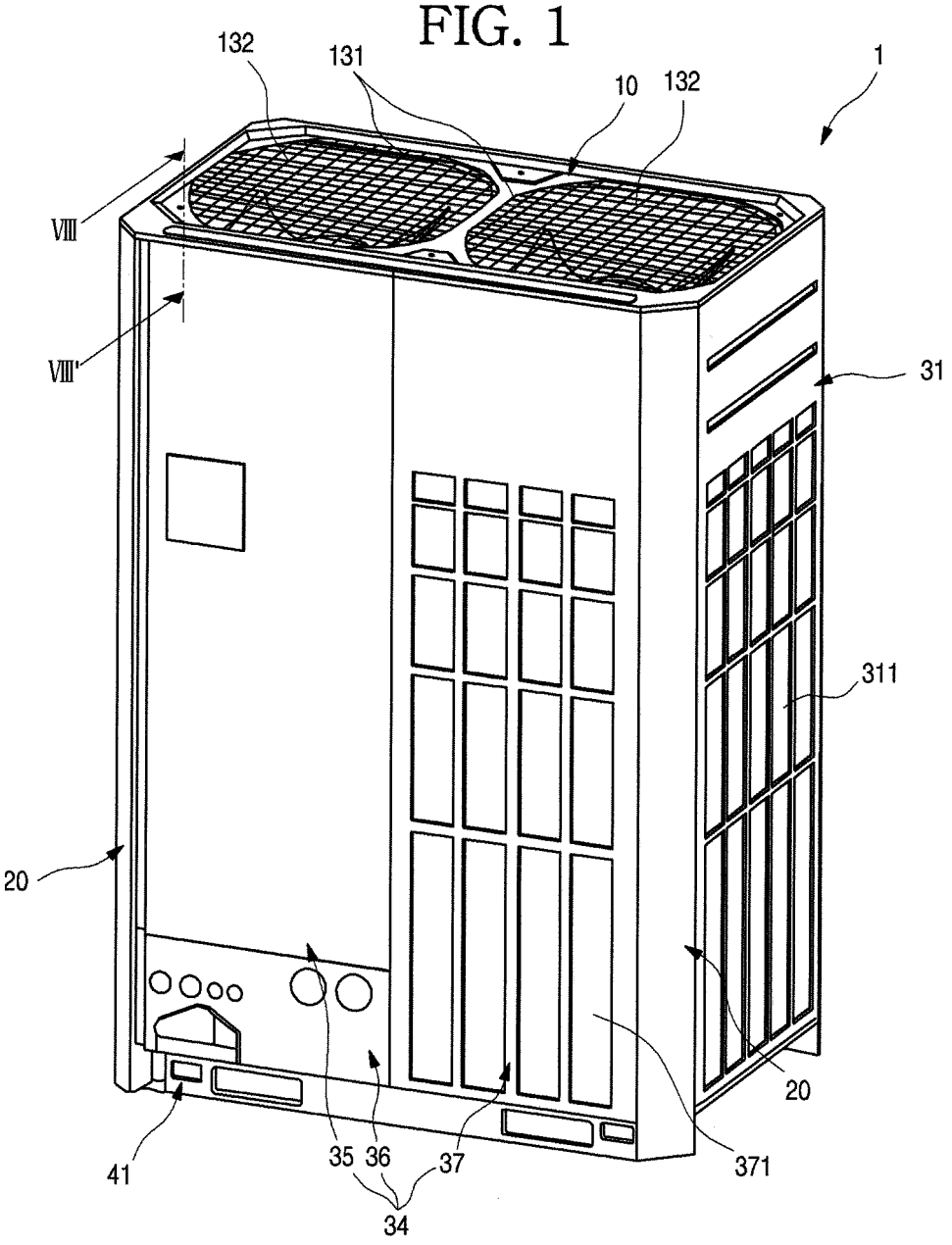

FIG. 2

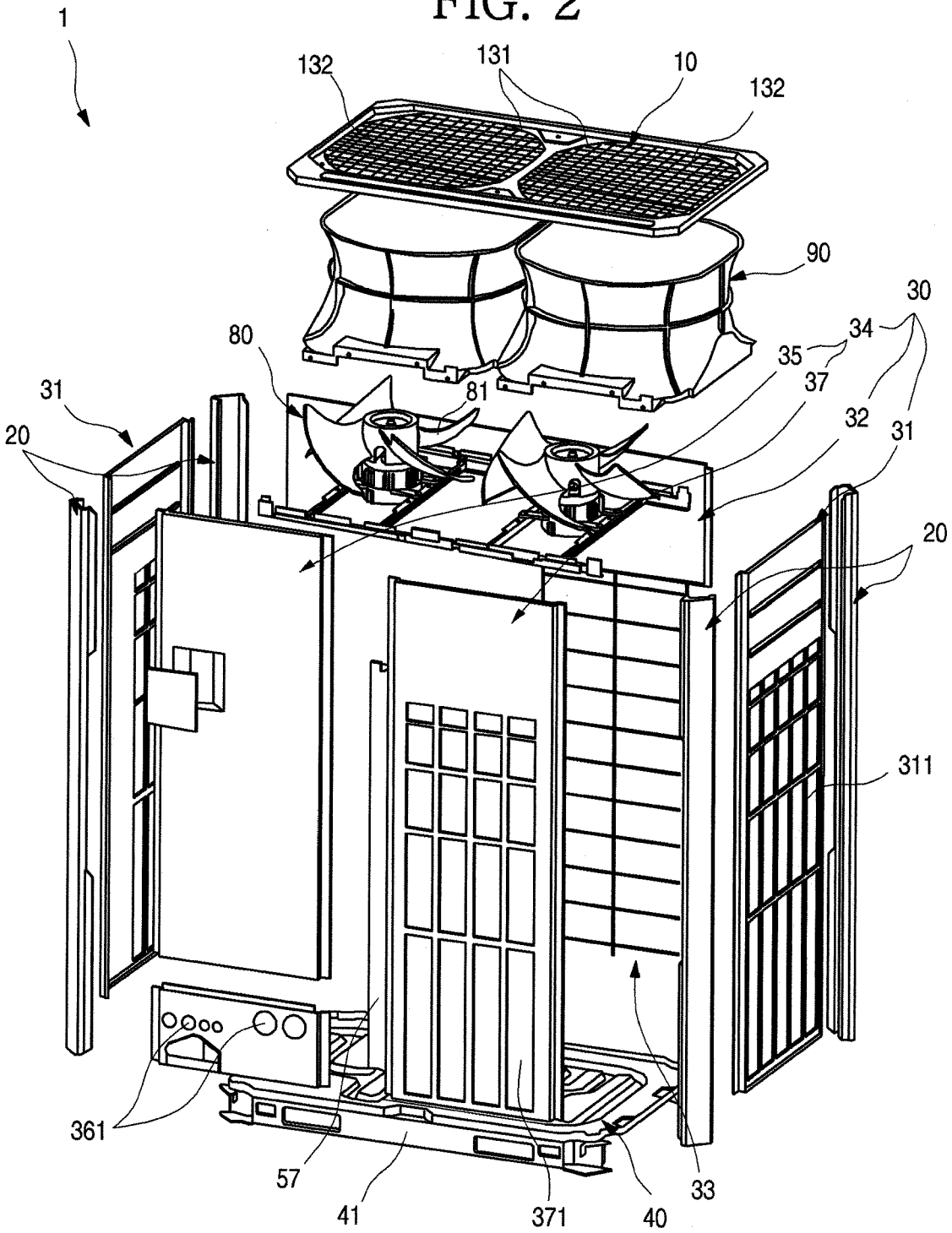
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FIG. 3

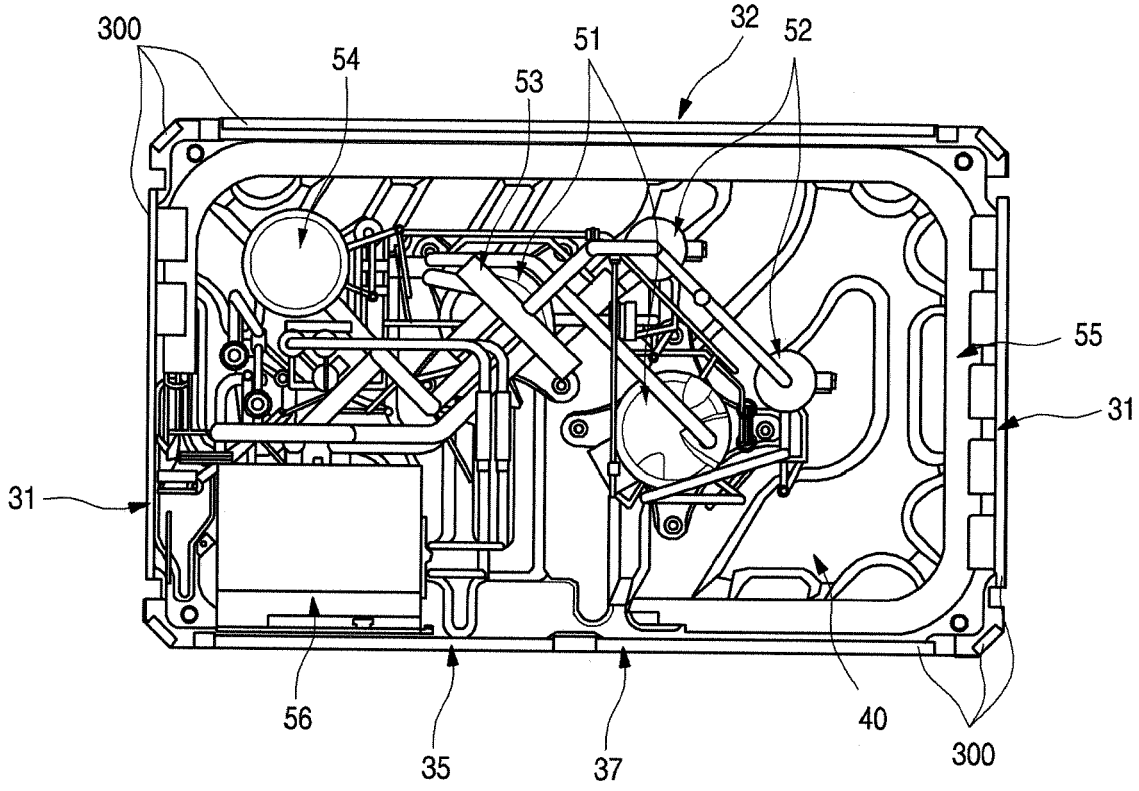


FIG. 4

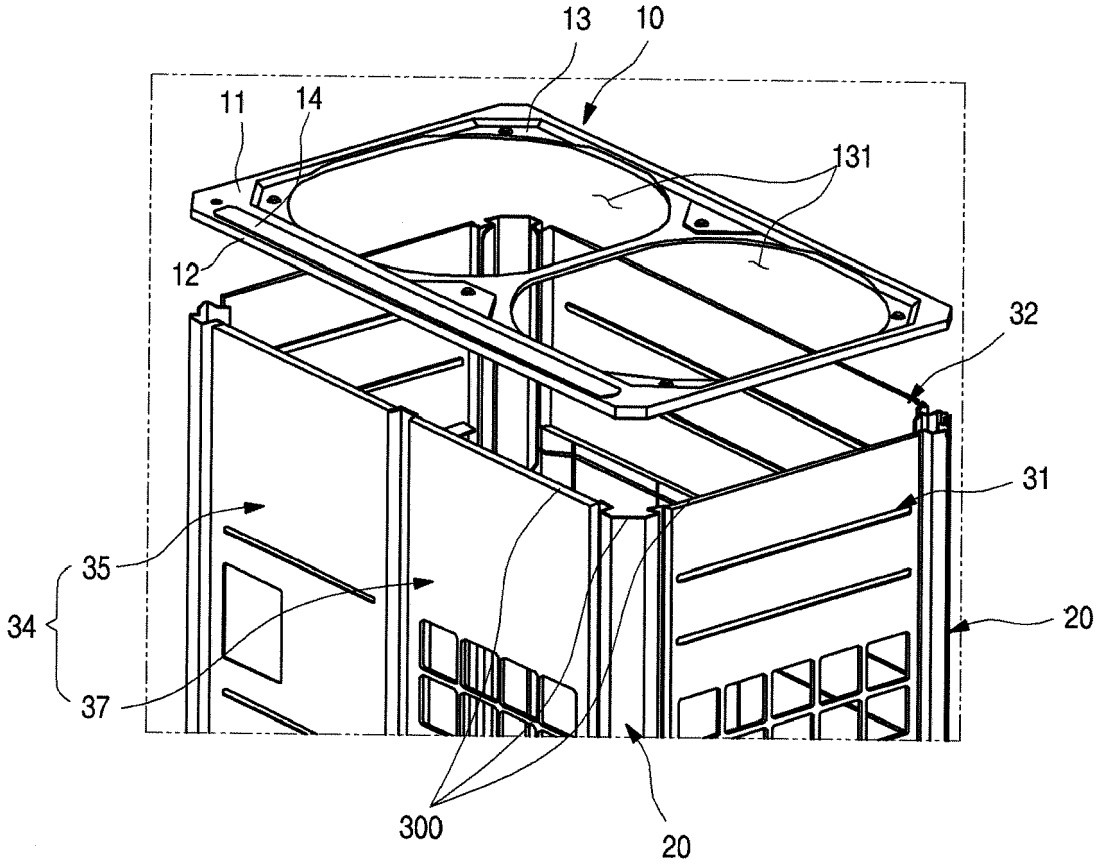


FIG. 5

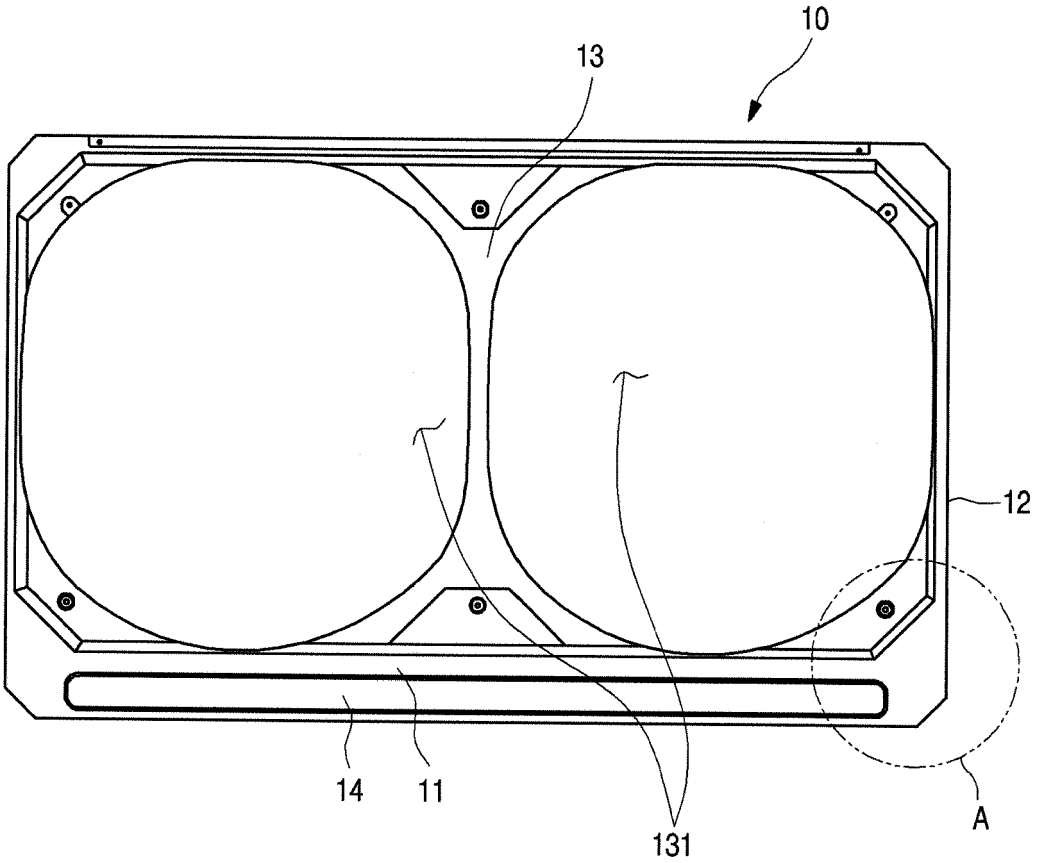


FIG. 6

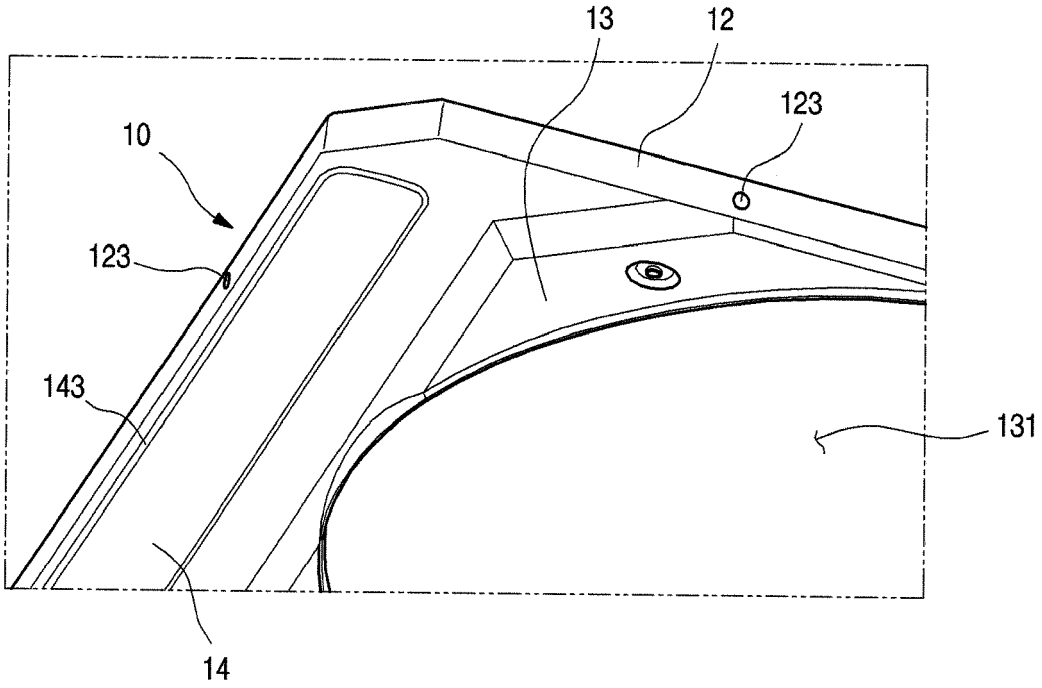


FIG. 7

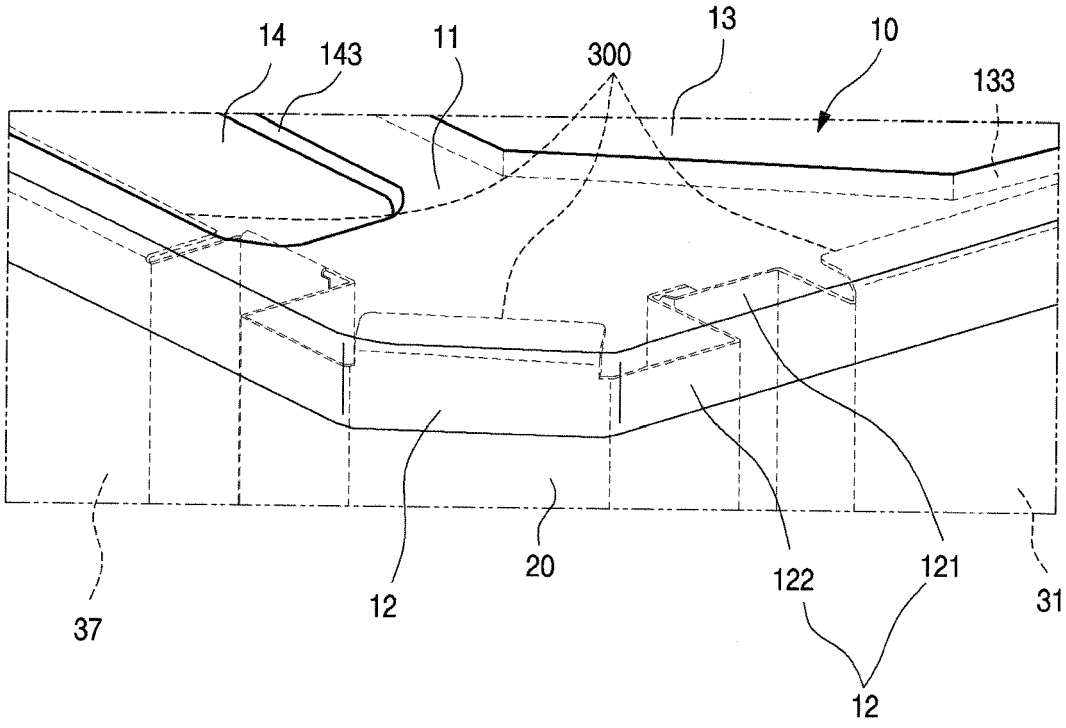


FIG. 8

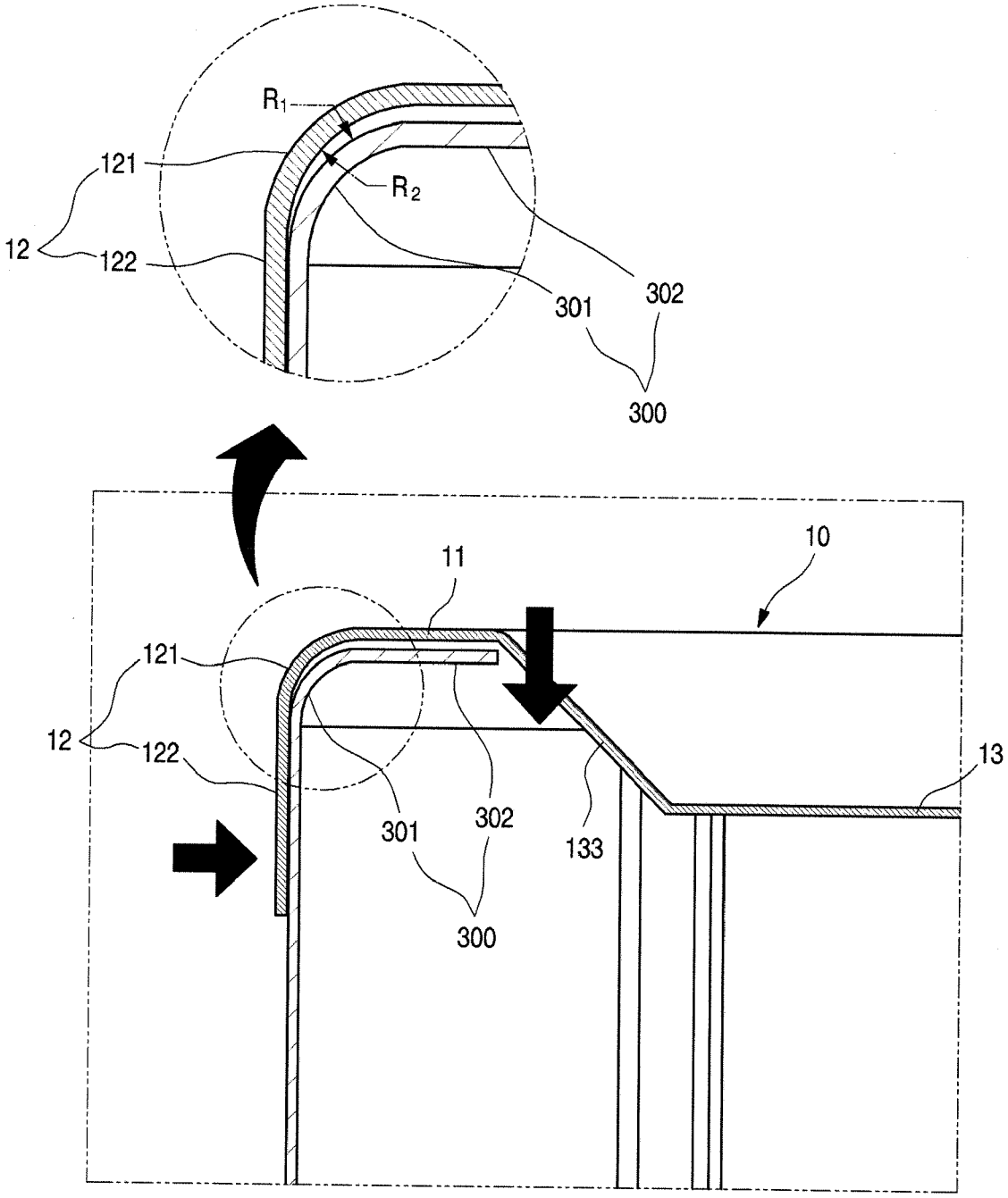


FIG. 9A

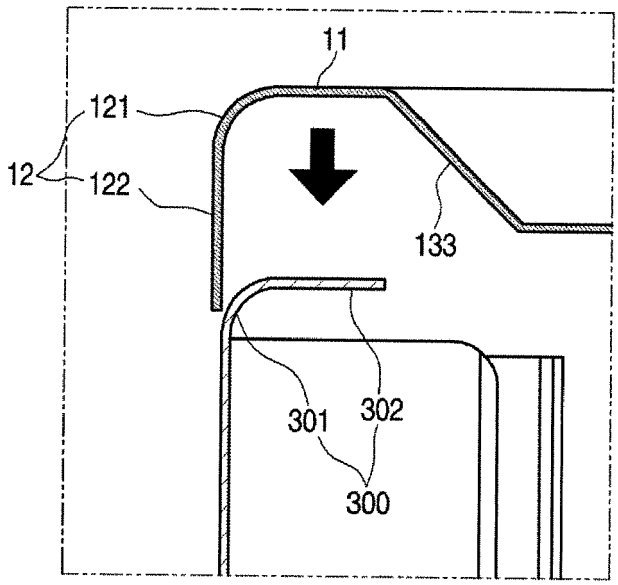


FIG. 9B

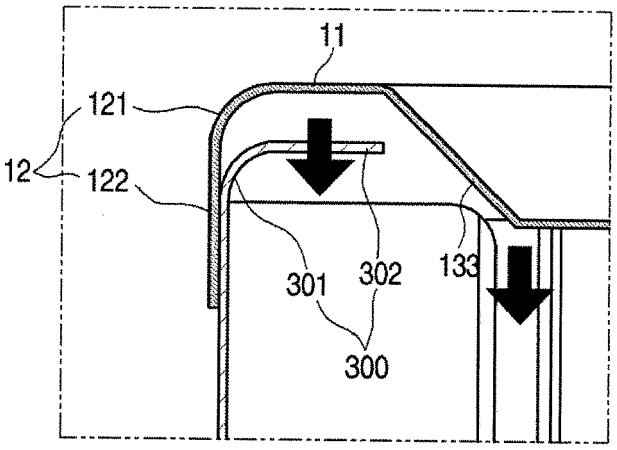
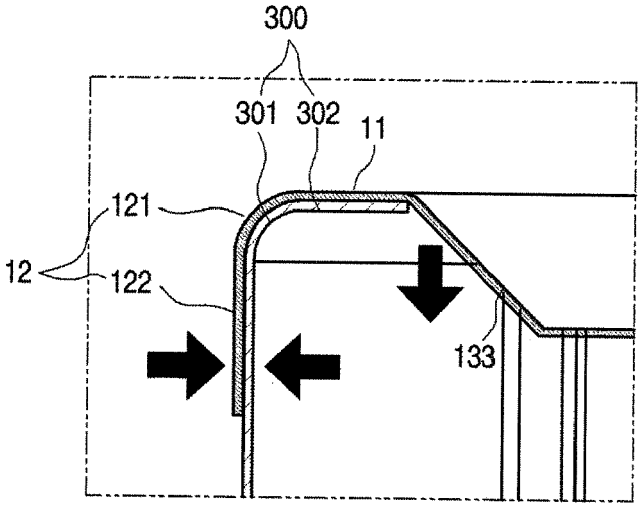


FIG. 9C



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EUROPEAN SEARCH REPORT

Application Number
EP 15 20 3083

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A	EP 2 623 876 A2 (LG ELECTRONICS INC [KR]) 7 August 2013 (2013-08-07) * abstract; figure 2 * -----	1-15	
A	US 2013/091889 A1 (KIM DONGHWI [KR] ET AL) 18 April 2013 (2013-04-18) * figure 4 * -----	1-15	
A	EP 2 056 029 A2 (LG ELECTRONICS INC [KR]) 6 May 2009 (2009-05-06) * figure 3 * -----	1-15	
			TECHNICAL FIELDS SEARCHED (IPC) F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 April 2016	Salaün, Eric

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EPO FORM 1503 03.82 (P04C01)

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27-04-2016

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