



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.03.2007 Bulletin 2007/13

(51) Int Cl.:
F24F 1/00 (2006.01) F24F 13/20 (2006.01)

(21) Application number: **06018636.8**

(22) Date of filing: **06.09.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(71) Applicant: **SANYO ELECTRIC CO., LTD.**
Moriguchi-shi, Osaka-fu (JP)

(72) Inventor: **Suzuki, Katuo**
Ora-gun
Gunma-ken (JP)

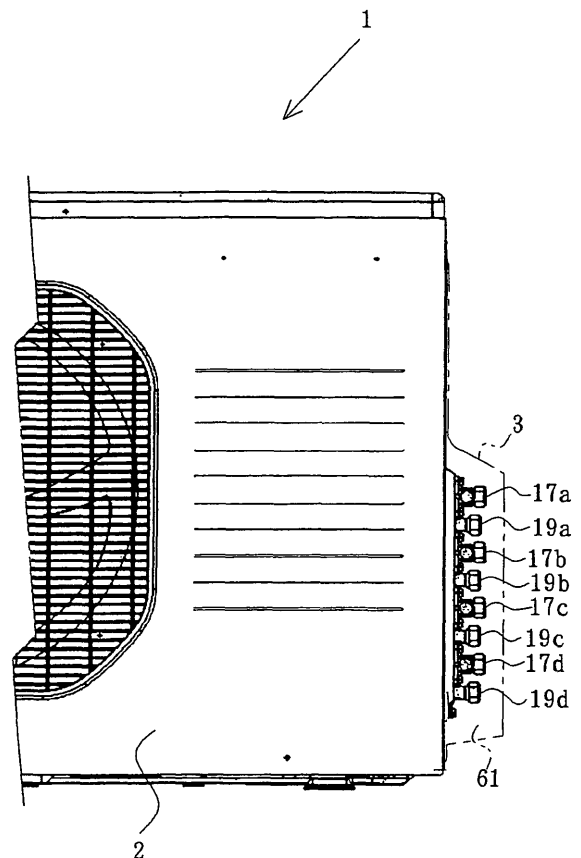
(30) Priority: **26.09.2005 JP 2005277198**

(74) Representative: **Leitner, Waldemar**
Zerrennerstrasse 23-25
75172 Pforzheim (DE)

(54) **Air conditioner**

(57) An air conditioner capable of easily changing the size of lead-out opening of a protective cover of an outdoor unit with good appearance according to the number of indoor units to be connected is provided. In a multi-type air conditioner capable of connecting a plurality of indoor units 18a-18d to an outdoor unit 1 covered with a facing case 2 through unit pipes 15, 20 and unit cables 41, a protective cover 3 covering a cable connecting opening 51 and a pipe connecting opening 52 of the outdoor unit is provided with a lead-out opening 76, with a first opening portion 76a for connecting one indoor unit being formed at a lower portion thereof. Each indoor unit opening portion 76b-76d for connecting each different indoor unit is arranged on the upper side of the first opening portion, and a cover plate 78 for closing the respective opening is separably provided on each indoor unit opening portion.

Fig. 4



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a multi-type air conditioner capable of connecting a plurality of indoor units to an outdoor unit covered with a facing case through unit pipes and unit cables.

Description of the Related Art

[0002] In a conventional air conditioner of this type (for example, refer to Japanese Patent Application Laid-Open No. 5-133571 (Patent No. 3094578)), a protective cover is provided to cover a cable connecting opening and a pipe connecting opening in a facing case of an outdoor unit.

[0003] The air conditioner of the above-mentioned related art is of a single type for connecting one indoor unit, and the lead-out opening of the protective cover for leading out unit cables and unit pipes has a size sufficient for connection of one indoor unit.

[0004] In a multi-type air conditioner, however, the lead-out opening of the protective cover needs a size sufficient for connection of a plurality of indoor units so that a plurality of indoor units can be connected. However, indoor units as many as a maximum allowable number of connectable indoor units are not always connected to the outdoor unit. In a case that indoor units below the maximum allowable number are connected, a part of the lead-out opening is left largely open.

[0005] Therefore, the lead-out opening is required to be partially closed with a cover plate in accordance with the number of indoor units to be connected. However, mounting of the cover plate by a small screw or the like requires a time-consuming work, and may impair the appearance.

[0006] Thus, the problem to be solved is that the size of lead-out opening of the protective cover of the outdoor unit cannot be easily changed with good appearance in accordance with the number of indoor units to be connected.

SUMMARY OF THE INVENTION

[0007] To solve the above-mentioned problem, the present invention provides an air conditioner that is a multi-type air conditioner capable of connecting a plurality of indoor units 18a-18d to an outdoor unit 1 covered with a facing case 2 through unit pipes 15, 20 and unit cables 41. The outdoor unit comprises service valves 17a-17d and 19a-19d to be connected with the unit pipes and connecting terminals 42 to be connected with the unit cables; a cable connecting opening 51 for connecting the unit cables to the connecting terminals, which is formed on one surface of the facing case, and a pipe

connecting opening 52 for connecting the unit pipes to the service valves, which is formed on the lower side of the cable connecting opening; and an integrated protective cover 3 covering both the cable connecting opening and the pipe connecting opening. The protective cover is swollen outwardly to internally form an internal space 61 for arranging the unit cables and the unit pipes, and includes a lead-out opening 76 for leading the unit cables and the unit pipes through a side part of the internal space to the outside. The lead-out opening has a vertically long shape, with a first opening portion 76a for leading out unit pipes and unit cables for connecting one indoor unit being formed in a lower portion thereof, and each indoor unit opening portion 76b-76d for leading out unit pipes and unit cables for connecting each different indoor unit being arranged on the upper side of the first opening portion, and each indoor unit opening portion is provided with a cover plate 78 for closing the respective opening. The cover plate is arranged on the main body of the protective cover while keeping a clearance therefrom, and integrally formed therewith by partially connecting the clearance between the cover plate and the main body of the protective cover through connecting parts 81, with the upper edge and lower edge of the cover plate being curved so as to be further downward as they are further away from the main body of the outdoor unit.

[0008] As the connecting parts, a first connecting part connecting a lower end portion of the protective cover main body-side edge of the cover plate to the main body of the protective cover, a second connecting part connecting the vicinity of the protective cover main body-side end of the upper edge to the upper cover plate or to the main body of the protective cover, and a third connecting part connecting the outdoor unit-side end of the upper edge to the upper cover plate or to the main body of the protective cover can be provided on the periphery of the cover plate.

[0009] Further, the protective cover can include a drain guide part 71 formed protrusively toward the outdoor unit side, and the main body of the outdoor unit can include a fitting hole 73 to which the drain guide part of the protective cover is fitted.

[0010] The drain guide part of the protective cover can include a drain groove for carrying drain, and a rib 72 can be formed in the drain groove along the direction of carrying drain to partition the drain groove to two drain flow parts.

[0011] A small screw hole 86 for mounting the protective cover on the outdoor unit can be arranged closer to the lead-out opening side from the center of the protective cover.

[0012] According to the present invention, the protective cover includes a lead-out opening for leading unit cables and unit pipes to the outside, the lead-out opening has a vertically long shape provided with a first opening portion for leading out unit pipes and unit cables for connecting one indoor unit, formed at a lower portion thereof, and each indoor unit opening portion for leading out unit

pipes and unit cables for connecting each different indoor unit, arranged on the upper side of the first opening portion, each indoor unit opening portion is provided with a cover plate closing the respective opening, and the cover plate is arranged on the main body of the protective cover while keeping a clearance therefrom and formed integrally therewith by partially connecting the clearance between the cover plate and the main body of the protective cover through connecting parts, with the upper edge and lower edge of the cover plate being curved so as to be further downward as they are further away from the main body of the outdoor unit. Therefore, at the time of connecting only one indoor unit to the outdoor unit, the protective cover can be mounted without removing the cover plate. On the other hand, at the time of connecting a plurality of indoor units to the outdoor unit, the protective cover can be mounted after removing necessary cover plates by cutting the connecting parts by use of a nipper or the like. Since the open size of the lead-out opening of the protective cover can be changed without screwing or the like, mounting of the protective cover can be performed without a time-consuming work. Since the upper edge and lower edge of the cover plate are curved so as to be further downward as they are further away from the main body of the outdoor unit, a satisfactory appearance can be ensured even after removing the cover plate, and when the protective cover is mounted on the main body of the outdoor unit, the unit pipes and the unit cables can be arranged in the lead-out opening as close as possible to prevent penetration of rainwater or the like.

[0013] When the first connecting part connecting a lower end portion of the protective cover main body-side edge of the cover plate to the main body of the protective cover, the second connecting part connecting the vicinity of the protective cover main body-side end of the upper edge to the upper cover plate or to the protective cover main body, and the third connecting part connecting the outdoor unit-side end of the upper edge to the upper cover plate or to the protective cover main body are provided, as the connecting parts, on the periphery of the cover plate, the number of connecting parts to be cut for removing the cover plate can be minimized as much as possible, and at the time of integral molding of the protective cover main body with the cover plate, a resin or the like can be smoothly poured into a molding die.

[0014] When the drain guide part is formed on the protective cover protrusively toward the indoor unit, and the fitting hole for fitting the drain guide part of the protective cover is formed in the outdoor unit main body, the drain guide part can be used to position the protective cover at the time of mounting the protective cover on the outdoor unit main body.

[0015] When the drain groove for carrying drain is formed in the drain guide part of the protective cover, and the rib is formed in the drain groove along the direction of carrying drain to partition the drain groove to two drain flow parts, the drain guide part to be used for positioning can be reinforced by the rib without disturbing the flow

of drain.

[0016] In the lead-out opening of the protective cover, unit pipes and unit cables are frequently bulkily arranged without being neatly arranged. If the protective cover is mounted on the outdoor unit main body in such a state, the lead-out opening side of the protective cover may float from a normal mounting position. However, when the small screw hole for mounting the protective cover on the outdoor unit is arranged closer to the lead-out opening side from the center of the protective cover, the lead-out opening side of the protective cover can be fastened toward the outdoor unit main body by a small screw. Therefore, the floating of the protective cover can be prevented as much as possible.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 is an apparent perspective view of the outdoor unit of an air conditioner according to the present invention, which is taken from the front side thereof; Fig. 2 is an internal perspective view of the outdoor unit;

Fig. 3 is a schematic circuit diagram of a refrigerating cycle of the air conditioner;

Fig. 4 is a front view of an essential part of the outdoor unit in a state where a protective cover is removed therefrom;

Fig. 5 is a right side view of the outdoor unit in a state where the protective cover is removed therefrom;

Fig. 6 is a view of the protective cover, which is taken from the front side of the outdoor unit;

Fig. 7 is a view of the protective cover, which is taken from the rear side of the outdoor unit;

Fig. 8 is an enlarged view of an essential part of Fig. 7; and

Fig. 9 is a view of the protective cover, which is taken from the outdoor unit side.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] The purpose of easily changing the size of lead-out opening of a protective cover of an outdoor unit with good appearance according to the number of indoor units to be connected is realized by forming a lead-out opening for leading unit cables and unit pipes to the outside in a vertically long shape, with a first opening portion for leading out unit pipes and unit cables for connecting one indoor unit being formed in a lower portion thereof, and each indoor unit opening portion for leading out unit pipes and unit cables for connecting each different indoor unit being arranged on the upper side of the first opening portion; providing a cover plate on each indoor unit opening portion through connecting parts; and curving the upper edge and lower edge of the cover plate so as to be further downward as they are further away from the outdoor unit main body.

[Example 1]

[0019] One preferred embodiment of the air conditioner according to the present invention will be described in reference to Fig. 1 to Fig. 9. Fig. 1 is an apparent perspective view of the outdoor unit of the air conditioner according to the present invention, which is taken from the front side thereof. Fig. 2 is an internal perspective view of the outdoor unit. Fig. 3 is a schematic circuit diagram of a refrigerating cycle of the air conditioner. Fig. 4 is a front view of an essential part of the outdoor unit in a state where a protective cover is removed. Fig. 5 is a right side view of the outdoor unit in a state where the protective cover is removed. Fig. 6 is a view of the protective cover, which is taken from the front side of the outdoor unit. Fig. 7 is a view of the protective cover, which is taken from the rear side of the outdoor unit. Fig. 8 is an enlarged view of an essential part of Fig. 7. Fig. 9 is a view of the protective cover, which is taken from the outdoor unit side.

[0020] In Fig. 1, a facing case 2 of an outdoor unit 1 of air conditioner has substantially a rectangular solid shape, with a protective cover 3 described in detail below being mounted on the right side surface that is one surface thereof.

[0021] In Figs. 2 and 3, an outdoor-side heat exchanger 4 having a substantially L-shape in plan view, and a blower 5 air-cooling the outdoor-side heat exchanger 4 are provided within the outdoor unit 1 of the air conditioner. The outdoor-side heat exchanger 4 is connected with equipment such as a compressor 6 through a refrigerant pipe, constituting the refrigerating cycle shown in Fig. 3. A four-way valve 8 is connected to the discharge side of the compressor 6 through a muffler 7. The four-way valve 8 has four ports, with the discharge side of the compressor 6 being connected to the first port, the outdoor-side heat exchanger 4 to the second port, the sucking side of the compressor 6 to the third port through accumulators 11, 12, and a cylindrical header 16 to the fourth port. The four-way valve 8 that is a refrigerant flow switching means is switched, whereby the refrigerant flow of the refrigerating cycle is changed to a heating mode shown by the continuous-line arrow and a cooling mode shown by the broken-line arrow.

[0022] A plurality of service valves 17a-17d are connected to the header 16. One-side ends of indoor-side heat exchangers (not shown) of indoor units 18a-18d are connected to the service valves 17a-17d, respectively, through unit pipes 15. The other ends of the indoor-side heat exchangers of the indoor units 18a-18d are connected to other service valves 19a-19d of the outdoor unit 1 through unit pipes 20. The service valves 19a-19d are connected to the outdoor-side heat exchanger 4 through electric expansion valves 21 which are expansion means and capillary tubes 22. The capillary tubes 22 are provided in parallel pairs. Further, a middle portion of the refrigerant circuit between the discharge side of the compressor 6 and the four-way valve 8 is connected

to the refrigerant circuit between the service valves 19a-19d and the capillary tubes 22 through a defrosting electric on-off valve 23.

[0023] When the compressor 6 is operated in the thus-constituted air conditioner, the compressor 6 compresses gaseous refrigerant, and discharges the refrigerant with increased temperature and increased pressure to the four-way valve 8 that is the refrigerant passage switching means through the muffler 7. In a heating operation with a refrigerant flow shown by the continuous-line arrow in Fig. 3, the four-way valve 8 carries the refrigerant from the compressor 6 to the header 16. The refrigerant flows from the header 16 to the indoor-side heat exchanger of each indoor unit 18a-18d through the service valves 17a-17d to perform heat exchange with indoor air. Namely, the temperature of the refrigerant is reduced in accordance with heating of the indoor air. The refrigerant leaving the indoor-side heat exchanger is carried and expanded in the electric expansion valves 21 and the capillary tubes 22 through the service valves 19a-19d, and further reduced in temperature. Thereafter, the refrigerant is passed through the outdoor-side heat exchanger 4 to perform heat exchange with outside air, and then returned to the compressor 6 through the four-way valve 8 and the accumulators 11, 12. In this way, hot refrigerant (so-called hot gas) is carried to the indoor-side heat exchangers of the indoor units 18a-18d.

[0024] In a defrosting operation in heating operation, the defrosting electric on-off valve 23 is opened to carry part of the hot gas from the compressor 6 to the outdoor-side heat exchanger 4. It raises the temperature of the outdoor-side heat exchanger 4 to perform defrosting.

[0025] In a cooling operation with a refrigerant flow shown by the broken-line arrow in Fig. 3, the four-way valve 8 carries the refrigerant from the compressor 6 to the outdoor-side heat exchanger 4. The refrigerant is air-cooled in the outdoor-side heat exchanger 4. The refrigerant leaving the outdoor-side heat exchanger 4 is expanded through the capillary tubes 22 and the electric expansion valve 21, and reduced in temperature. This temperature-reduced refrigerant is carried to the indoor-side heat exchanger of each indoor unit 18a-18d through the service valves 19a-19d and performs heat exchange with indoor air. Namely, the temperature of the refrigerant is raised in accordance with reduction in temperature of the indoor air. The refrigerant leaving the indoor-side heat exchanger is carried to the four-way valve 8 through the service valves 17a-17d and the header 16, and then returned from the four-way valve 8 to the compressor 6 through the accumulators 11, 12. In this way, cold refrigerant is carried to the indoor-side heat exchangers of the indoor units 18a-18d.

[0026] The connecting structure of refrigerant pipes to the header 16 will be described next.

[0027] In Fig. 3, a refrigerant pipe 31 from the four-way valve 8 is connected to the bottom of the header 16. On the other hand, refrigerant pipes 32 from service valves 17a-17d are connected to a side surface of the header

16 while keeping vertical intervals. The header 16 has a cylindrical shape, and is arranged in a longitudinal attitude so that its axis is turned vertically. The diameter of the header 16 is set larger than those of the refrigerant pipes 31 and 32 connected thereto, so that refrigerant sound resulted from pulsation of the compressor 6 can be suppressed.

[0028] The outdoor unit 1 is connected to each indoor unit 18a-18d through unit pipes 15, 20 as described above, and electric components of the outdoor unit 1 are connected to electric components of the indoor units 18a-18d through unit cables 41 (refer to Fig. 5). The unit cables 41 are connected to connecting terminals 42 of the outdoor unit 1, as shown in Fig. 5, on the outdoor unit 1 side.

[0029] A cable connecting opening 51 for connecting the unit cables 41 to the connecting terminals 42 is formed on the right side surface that is one surface of the facing case 2 of the outdoor unit 1, and a pipe connecting opening 52 for connecting the unit pipes 15, 20 to the service valves 17a-17d and 19a-19d is formed on the lower side of the cable connecting opening 51. A protruding streak 56 is formed on the surface of the facing case 2 in a substantially reversed U-shape along the upper side and both sides of the cable connecting opening 51 and the pipe connecting opening 52. A plurality of locking hook holes 57 (four pieces in this embodiment) are provided on the surface surrounded by the protruding streak 56.

[0030] The outside of the cable connecting opening 51 and the pipe connecting opening 52 is covered with the above-mentioned protective cover 3. The protective cover 3 is swollen outwardly to internally form an internal space 61 for disposing the unit pipes 15, 20 and the unit cables 41. The protective cover 3 is opened toward the main body side of the outdoor unit 1. Locking hooks 62 are formed on the opening-side edge of the protective cover 3 in an integrated manner. An engagement groove part 64 to be engaged with the upper edge part of the cable connecting opening portion 51 is formed on an upper end portion of the protective cover 3. Further, a dent for handle 66 used to hold the outdoor unit 1 is formed on an upper portion of the protective cover 3.

[0031] A drain guide part 71 is formed protrusively toward the main body side of the outdoor unit 1 in a center portion of the bottom wall 68 of the protective cover 3. The upper surface of the bottom wall 68 of the protective cover 3 is inclined downwardly toward the drain guide part 71. A drain groove for carrying drain is formed substantially in a U-shaped section in the drain guide part 71 of the protective cover 3, and a rib 72 is formed in the drain groove along the direction of carrying drain to partition the drain groove to two drain flow parts (laterally in Fig. 9). A fitting hole 73 to which the drain guide part 71 is fitted is provided in the main body of the outdoor unit 1. The fitting hole 73 is formed longer in the vertical direction than the size of the drain guide part 71, so that the drain guide part 71 is slightly slidable upward and

downward in the state where it is fitted to the fitting hole 73.

[0032] A lead-out opening 76 for leading the unit pipes 15, 20 and the unit cables 41 to the outside to be connected to the indoor units 18a-18d is formed on a side part of the internal space 61 of the protective cover 3. The lead-out opening 76 has a vertically long shape, with a first opening portion 76a for leading out unit pipes 15, 20 and unit cables 41 to be connected to one of the indoor units 18a-18d being formed in a lower part thereof. Indoor unit opening portions 76b-76d for leading out unit pipes 15, 20 and unit cables 41 to be connected to the other indoor units 18a-18d are arranged on the upper side of the first opening portion 76a, respectively, and each indoor unit opening portion 76b-76d includes a cover plate 78 for closing the respective opening. The cover plate 78 is arranged while keeping a clearance from the main body of the protective cover 3 and from the other cover plates 78, and integrally formed therewith by partially connecting the clearance between the cover plate 78 and the main body of the protective cover 3 or the other cover plates 78 through connecting parts 81.

[0033] The upper edge and lower edge of each cover plate 78 are curved so as to be further downward as they are further away from the outdoor unit 1. Both side edges of the cover plate 78 are linearly extended substantially in the vertical direction. As the connecting parts 81, three pieces are provided on each cover plate 78, with the first connecting part 81 connecting a lower end portion of the protective cover main body-side edge (the left edge in Fig. 8) of the cover plate to the main body of the protective cover 3, the second connecting part 81 connecting the vicinity of the protective cover main body-side end of the upper edge to the upper cover plate 78 or to the main body of the protective cover 3, and the third connecting part 81 connecting the outdoor unit 1-side end of the upper edge to the upper cover plate 78 or the main body of the protective cover 3.

[0034] A small screw hole 86 for mounting the protective cover 3 on the main body of the outdoor unit 1 is arranged closer to the lead-out opening 76 from the center of the protective cover 3. A small screw hole 87 and a small screw hole 89 are formed in the facing case 2 and the main body of the outdoor unit 1, respectively, in conformation to the small screw hole 86 of the protective cover 3. A plurality of ribs 88 extending in the vertical direction are arranged on the upper side from the arrangement part of the dent for handle 66 on the outdoor unit main body-side surface of the protective cover 3.

[0035] At the time of connecting the indoor units 18a-18d to the outdoor unit 1 in the thus-constituted air conditioner, there is no need to connect all of the four indoor units 18a-18d, and the number of indoor units 18a-18d to be connected is determined.

[0036] When one indoor unit is connected, the outdoor unit 1 is connected to one indoor unit through one set of unit pipes 15, 20 and unit cables 41. The engagement groove part 64 at the upper end of the protective cover

3 is engaged with the upper edge part of the cable connecting opening 51, the locking hooks 62 and drain guide part 71 of the protective cover 3 are fitted to the locking hook holes 57 of the facing case 2 and to the fitting hole 73 of the outdoor unit main body, respectively, and the protective cover 3 is then moved slightly upward to engagingly lock the locking hooks 62 to the locking hook holes 57. Thereafter, a small screw (not shown) is inserted to the small screw hole 86 of the protective cover 3 and the hole 87 of the facing case 2, and screwed to the small screw hole 89 of the main body of the outdoor unit. At the time of mounting the protective cover 3, the one set of unit pipes 15, 20 and unit cables 41 is led out of the outdoor unit 1 through the first opening portion 76a of the protective cover 3.

[0037] When a plurality of indoor units are connected, each indoor unit is connected to the outdoor unit through respective unit pipes 15, 20 and unit cables 41. The cover plates 78 are removed according to the number of indoor units to be connected. For example, one cover plate 78 for connection of two indoor units and two cover plates 78 for connection of three indoor units are removed. The removal of the cover plates 78 is performed by cutting three connecting parts 81 of each cover plate 78 by use of a nipper or the like. By removing the connecting parts 81, each indoor unit opening portion 76b-76d is opened according to the number thereof, and one set of unit pipes 15, 20 and unit cables 41 is arranged in each indoor unit opening portion 76b-76d. The other mounting work of the protective cover 3 to the outdoor unit main body is substantially the same as in the case of connecting one indoor unit.

[0038] The embodiment of the present invention was described above in detail, but the present invention is never limited to the above-mentioned embodiment, and various changes can be performed within the scope of the gist of the present invention described in the claims. The modification of the present invention will be exemplified below.

(1) The number of indoor units connectable to the outdoor unit can be at least two or more, and is properly changeable.

(2) The number and structure of the locking hooks 62 or the like can be properly changed.

[0039] Since the lead-out opening for leading unit cables and unit pipes to the outside are formed vertically long, with a first opening portion for leading out unit pipes and unit cables for connecting one indoor unit being formed in a lower portion thereof, and each indoor unit opening portion for leading out unit pipes and unit cables for connecting each different indoor unit being arranged on the upper side of the first opening portion, and a cover plate is provided on each indoor unit opening portion through connecting parts, with the upper edge and lower edge of the cover plate being curved so as to be further downward as they are further away from the main body

of the outdoor unit, the open size of the lead-out opening can be easily changed by cutting the connecting parts and removing the cover plates. Therefore, the present invention is most suitably applicable to a multi-type air conditioner capable of connecting a plurality of indoor units to an outdoor unit.

Claims

1. An air conditioner, which is a multi-type air conditioner capable of connecting a plurality of indoor units to an outdoor unit covered with a facing case through unit pipes and unit cables, said outdoor unit comprising:

service valves to be connected with the unit pipes and connecting terminals to be connected with the unit cables;

a cable connecting opening for connecting the unit cables to the connecting terminals, formed on one surface of said facing case, and a pipe connecting opening for connecting the unit pipes to the service valves, formed on the lower side of said cable connecting opening; and an integrated protective cover covering both the cable connecting opening and the pipe connecting opening,

said protective cover being swollen outwardly to internally form an internal space for arranging the unit cables and the unit pipes, and including a lead-out opening for leading the unit cables and the unit pipes through a side part of the internal space to the outside,

said lead-out opening having a vertically long shape, with a first opening portion for leading out unit pipes and unit cables for connecting one indoor unit being formed in a lower portion thereof, and each indoor unit opening portion for leading out unit pipes and unit cables for connecting each different indoor unit being arranged on the upper side of the first opening portion, each indoor unit opening portion being provided with a cover plate for closing the respective opening, and said cover plate being arranged on the main body of the protective cover while keeping a clearance therefrom, and integrally formed therewith by partially connecting the clearance between the cover plate and the main body of the protective cover through connecting parts, with the upper edge and lower edge of the cover plate being curved to be further downward as they are further away from the main body of the outdoor unit.

2. The air conditioner according to claim 1, wherein, as said connecting parts, a first connecting part connecting a lower end portion of the protective cover

main body-side edge of the cover plate to the main body of the protective cover, a second connecting part connecting the vicinity of the protective cover main body-side end of the upper edge to the upper cover plate or to the main body of the protective cover, and a third connecting part connecting the outdoor unit-side end of the upper edge to the upper cover plate or to the main body of the protective cover are provided on the periphery of said cover plate.

5

10

3. The air conditioner according to claim 1 or 2, wherein a drain guide part is protrusively formed from said protective cover toward the outdoor unit side, and a fitting hole for fitting the drain guide part of the protective cover is formed in the main body of the outdoor unit.

15

4. The air conditioner according to claim 3, wherein the drain guide part of said protective cover includes a drain groove for carrying drain, and a rib is formed in said drain groove along the direction of carrying drain to partition the drain groove into two drain flow parts.

20

5. The air conditioner according to any one of claims 1, 2, 3 and 4, wherein a small screw hole for mounting said protective cover on the outdoor unit is arranged closer to the lead-out opening side from the center of the protective cover.

25

30

35

40

45

50

55

Fig. 1

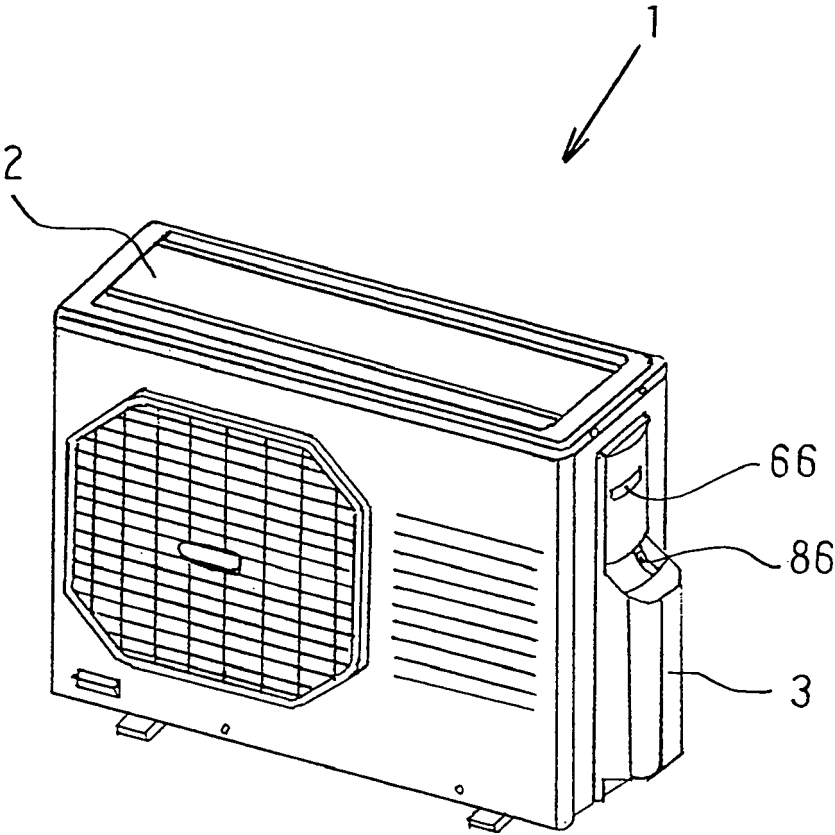


Fig. 2

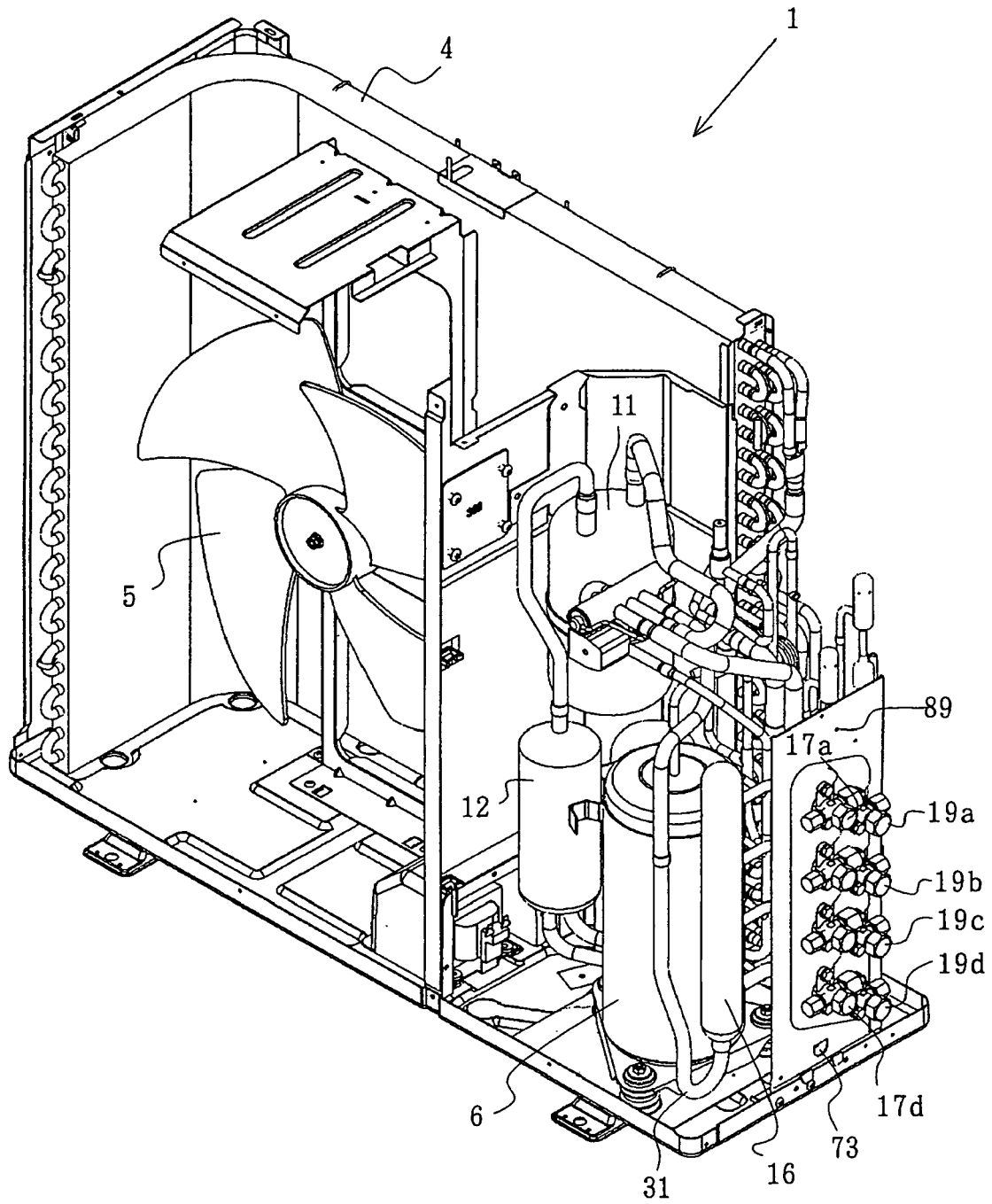


Fig. 3

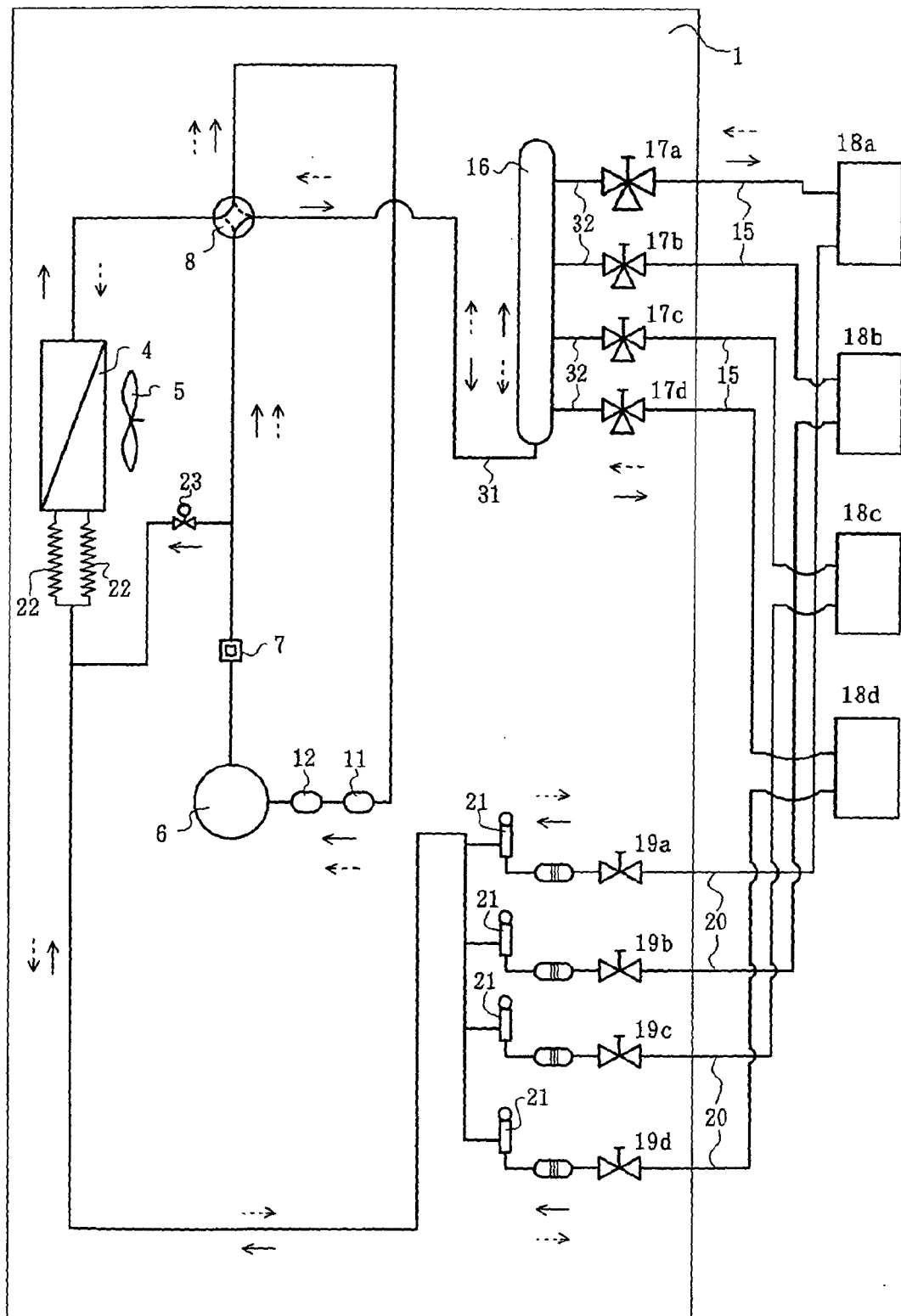


Fig. 4

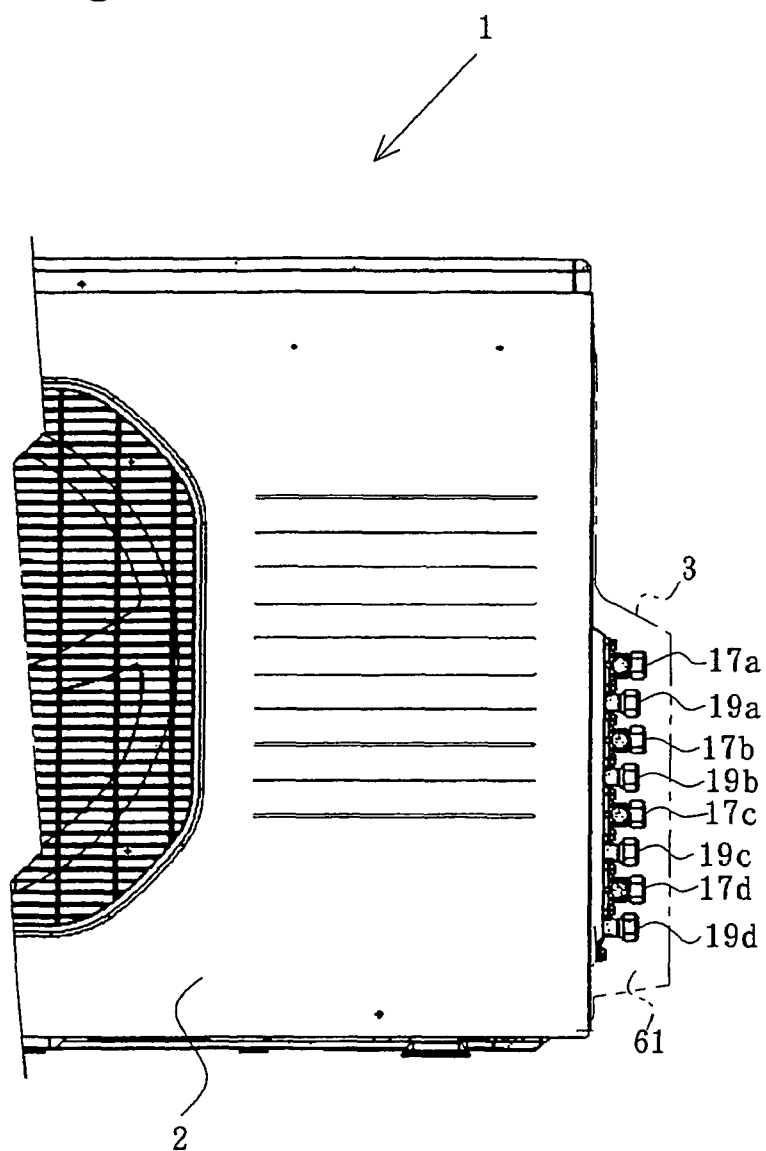


Fig. 5

1
↘

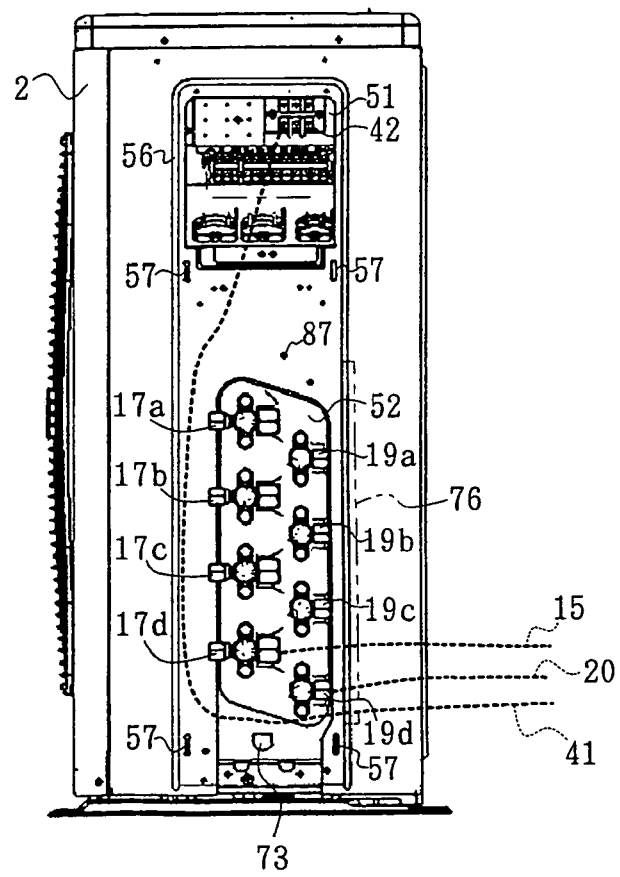


Fig. 6

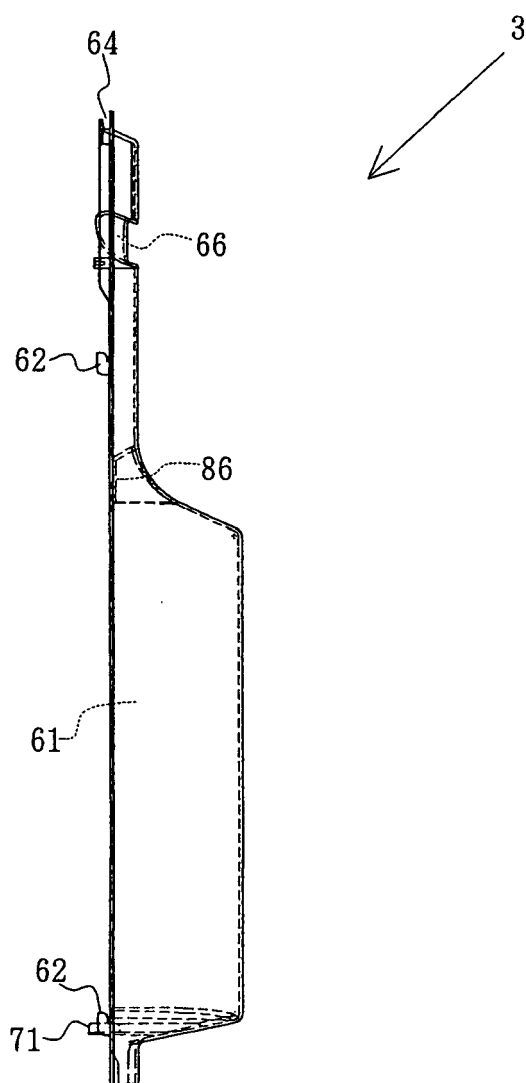


Fig. 7

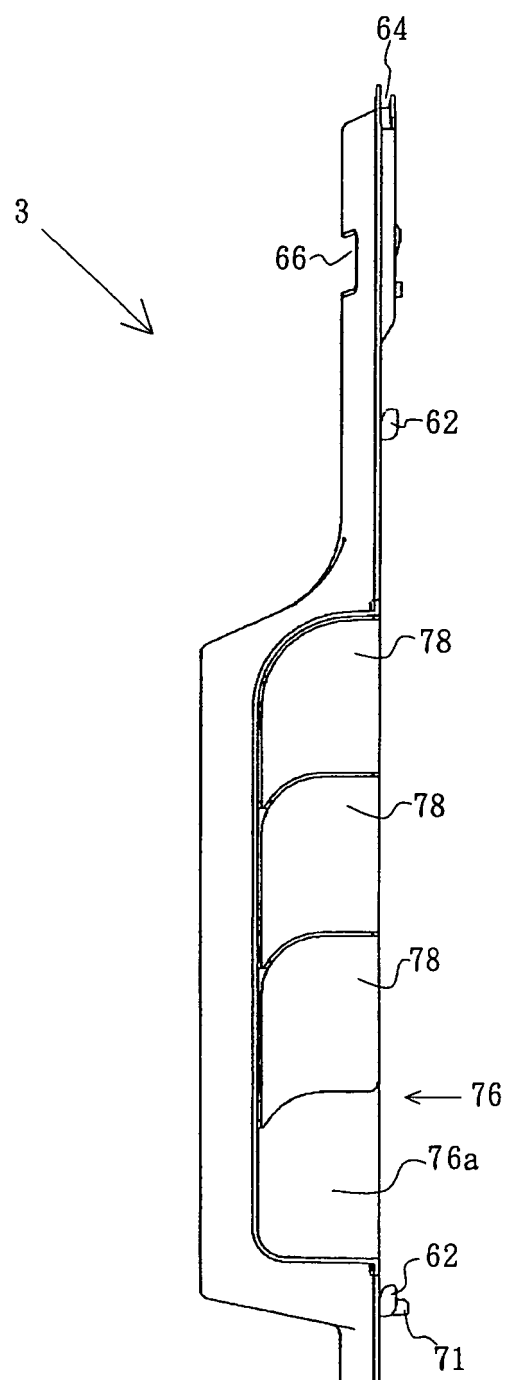


Fig. 8

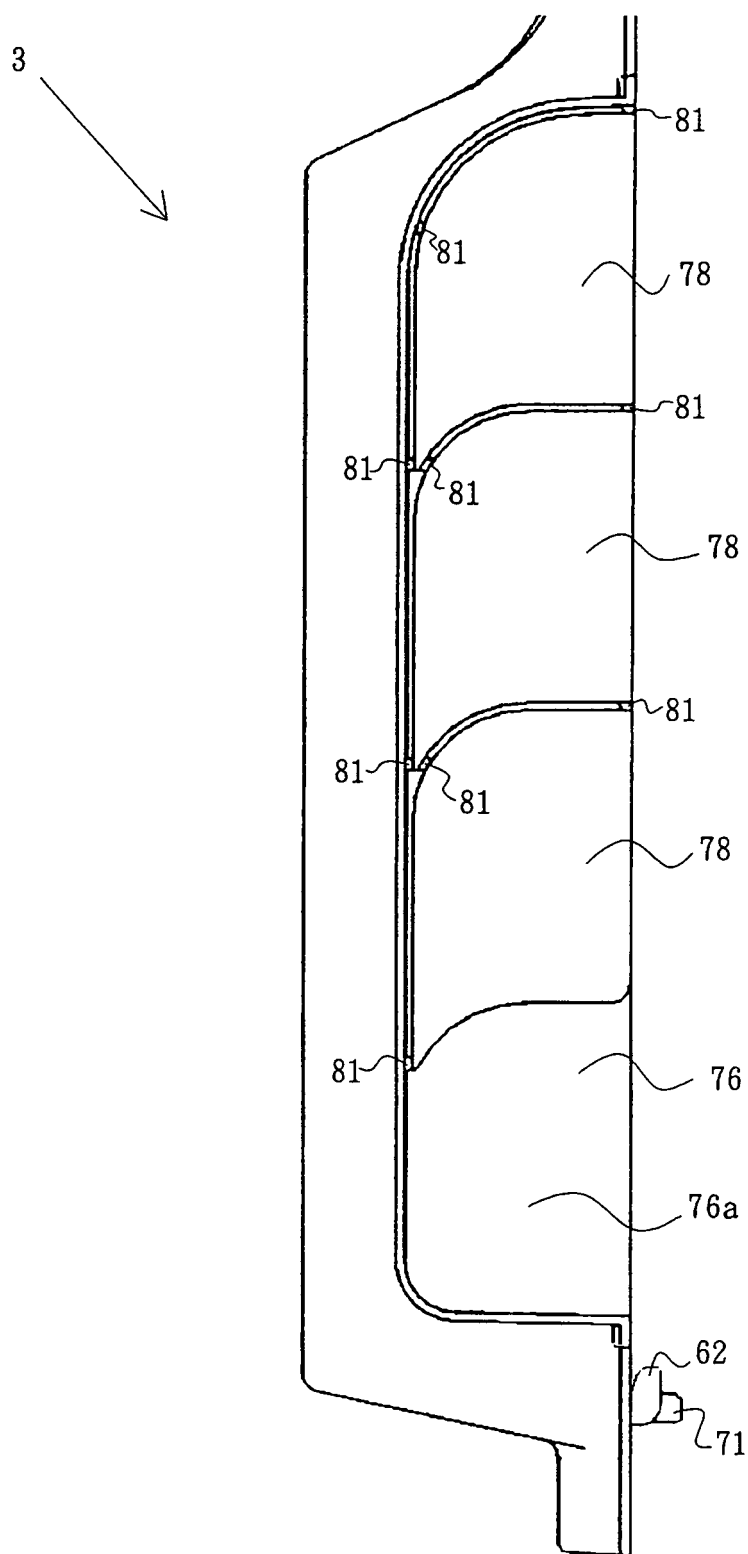
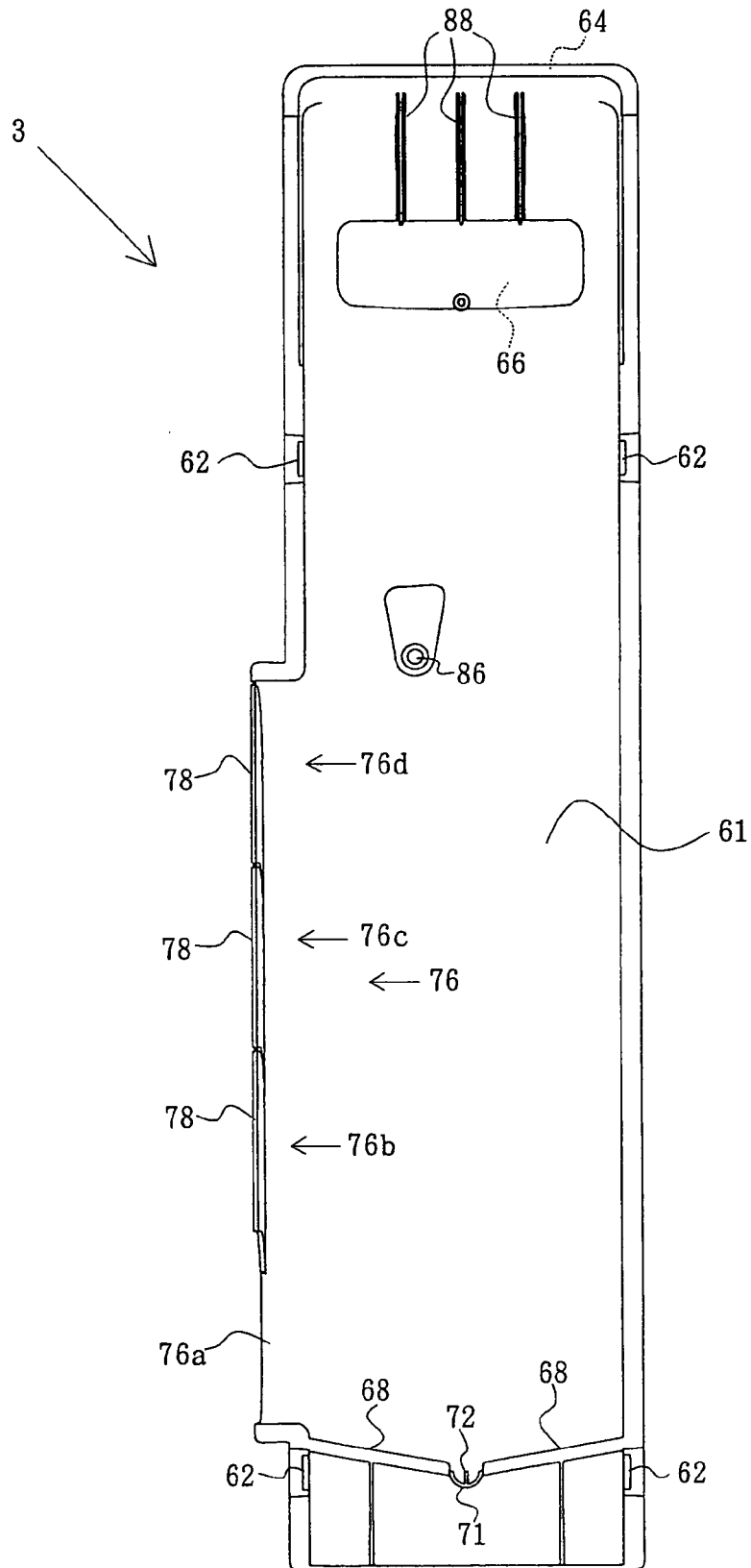


Fig. 9





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 01 8636

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	JP 05 133571 A (MATSUSHITA ELECTRIC IND CO LTD) 28 May 1993 (1993-05-28) * abstract *	1-5	INV. F24F1/00 F24F13/20
A	US 6 263 692 B1 (NAKANUMA MITSUO [JP] ET AL) 24 July 2001 (2001-07-24) * abstract *	1-5	
A	WO 97/40324 A (MITSUBISHI HEAVY IND LTD [JP]) 30 October 1997 (1997-10-30) * abstract *	1-5	
A	JP 2004 251586 A (MATSUSHITA ELECTRIC IND CO LTD) 9 September 2004 (2004-09-09) * abstract *	1-5	
A	JP 2003 074910 A (CHOFU SEISAKUSHO CO LTD) 12 March 2003 (2003-03-12) * abstract *	1-5	
A	JP 06 123446 A (MATSUSHITA ELECTRIC IND CO LTD) 6 May 1994 (1994-05-06) * abstract *	1-5	TECHNICAL FIELDS SEARCHED (IPC) F24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 December 2006	Examiner Valenza, Davide
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

2

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 01 8636

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-12-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 5133571	A	28-05-1993	JP 3094578 B2	03-10-2000
US 6263692	B1	24-07-2001	CN 1261650 A	02-08-2000
			JP 2000193275 A	14-07-2000
WO 9740324	A	30-10-1997	EP 0834707 A1	08-04-1998
			ES 2210513 T3	01-07-2004
			JP 3771626 B2	26-04-2006
			JP 9287776 A	04-11-1997
JP 2004251586	A	09-09-2004	NONE	
JP 2003074910	A	12-03-2003	NONE	
JP 6123446	A	06-05-1994	JP 3175340 B2	11-06-2001

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 5133571 A [0002]
- JP 3094578 B [0002]