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(54) Air conditioner

(57) An air conditioner that has patterned louvers (101) to provide aesthetic appearance. Several air conditioner units can be stacked or juxtaposed to increase the size and conditioning capacity of the conditioner as a whole.

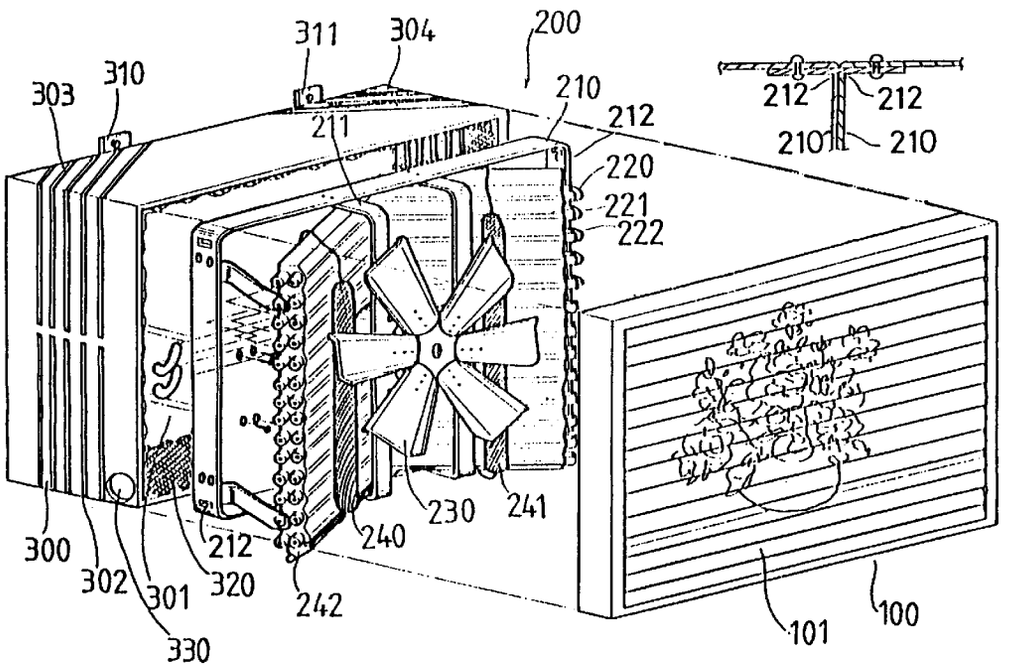

FIG. 3

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a room air conditioner, and more particularly to a separate type air conditioner that has patterned louvers to provide aesthetic appearance. Besides, several conditioner units may be stacked or juxtaposed to increase the size and conditioning capacity of the conditioner as a whole.

2. Description of the Prior Art

[0002] Fig. 1 shows a conventional air conditioner. An evaporation 2 is installed inside a cabinet 1. A blower 3 is disposed at a lower end of the evaporator 2. The blower 3 is pivotally connected to a motor 4 at one side thereof. Louvers 5 are disposed below the blower 3. The cabinet 1 is provided with a plurality of air inlets 1A corresponding to the front side of the evaporator 2 and air outlets 1B corresponding to the louvers 5. When the motor 4 operates, the blower 3 is actuated so that indoor air is drawn via the air inlets 1A into the evaporator 2 which absorbs the heat of the drawn-in air or the drawn-in air absorbs the high heat of the evaporator 2 before being released to the room. Such conventional air conditioners have the following drawbacks:

1. In the conventional air conditioner, air is drawn in from the front side and pass through the planar evaporator. The amount of refrigerant in the evaporator determines the size of the air conditioner, and there are at least 6-8 specifications of air conditioners to match different room sizes so that there are enough specifications of evaporators to meet different air conditioning requirements. Therefore, in manufacture, huge capital investments have to expended on different specifications of evaporators and their peripheral equipment.
2. When it is desirable to have the air conditioner to send out warm air, it is necessary to provide a flow modulator control valve on the outdoor unit (main body) so as to change the direction of refrigerant flow and enable the condenser and evaporator to operate in a reverse fashion. But in the entire design of the air conditioner, since the main body is mounted outdoors and is subject to outdoor temperature changes, once the room temperature drops to below 5 degrees C, the air conditione cannot function properly, and forced defrosting of the outdoor unit has to be carried out at stages. This problem aggravates in cold places. Therefore, air conditioners can only serve to provide auxiliary warm air in cold places. Besides, it is a complicated and expensive technology to design reverse refrigerant flow.
3. The design of the outer appearance of conventional room air conditioners usually does not fit in with the interior design due to their dull looks.

SUMMARY OF THE INVENTION

[0003] A primary object of the present invention is to provide an air conditioner in which several conditioner units may be stacked or juxtaposed to form a larger air conditioner. The specification of the evaporator structure of the air conditioner is standard and of a smaller size. It is accommodated within a cabinet of a determined specification. Several cabinets can be stacked or juxtaposed on a vertical surface allow expansion of conditioning capacity. For instance, when each conditioner unit is designed to have heat dissipating capacity in the range of 6000-15000 BTU, a single row, two rows, or three rows of evaporators and blower motors can be used to provide sufficient room air conditioning effects in the range of 15000 BTU. When it is desirable to have an air conditioning capacity below 30000 BTU, two conditioning units can be stacked or juxtaposed by means of connecting plate and securing holes provided at four corners of the evaporator bases, with the face panel and frame enlarged correspondingly, to achieve 6000-30000 BTU. Hence, there is no need to manufacture room air conditioners of different specifications since the conditioner of the present invention can be expanded vertically or horizontally to provide greater air conditioning capacity at reduced costs.

[0004] Another object of the present invention is to provide an air conditioner in. which the evaporator structure is provided with electrical heating elements to directly heat the air so that there is no need to provide reverse refrigerant flow or actuate the outdoor unit, thereby eliminating the problem of frost accumulation on outdoor units in the prior art.

[0005] A further object of the present invention is to provide an air condition in which the louvers are provided with patterns that will display when the louvers are all closed, thus adding aesthetic quality to the air conditioner.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

Fig. 1 is a perspective view of the prior art;
Fig. 2 is a perspective view of the present invention;
Fig. 3 is a perspective exploded view of the present invention;
Fig. 4 is a sectional view of Fig. 1 taken along line IV-IV;
Fig. 5 is an exploded view of another embodiment of the present invention; and
Fig. 6 is a schematic view of still another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0007] With reference to Figs. 2 and 3, the present invention essentially comprises a frame body 100 accommodating therein louvers 101, an evaporator structure 200, and a rear cabinet 300. The evaporator structure 200 includes a base 210, an evaporator 220 disposed on the base 210, a mounting frame 211, and a blower 230 mounted on the mounting frame 211. The mounting frame 211 straddles over the evaporator 220, and the blower is located between the evaporator 220 and the frame 100. The evaporator 220 is a plate structure in which multiple refrigerant ducts are disposed. The middle section of the evaporator 220 bent s towards the base to connect therewith, while the two ends of the evaporator 220 tilt away from the base 210 so that there are more space between the ends of the evaporator 220 and the base 210. A moisture collector duct 240 is connected to a lower rim of the evaporator 220 so that moisture formed on the surface of the evaporator 220 may be collected in the moisture collector duct 240 below and discharged. When two or more bases 210 are stacked, the moisture collector ducts 240 can be inter-connected. Electrical heating elements 240, 241 may be mounted on the surface of the evaporator 220 at suitable positions to directly heat the air so that the present invention can also provide warm air. The entire evaporator structure 200 is inserted into the rear cabinet 300 via a hollow 301 at one end of the rear cabinet 300 and is secured to the inner walls of the rear cabinet 300 by screws or other means, such that the blower 230 sends out air currents via the hollow 301. The interior space of the rear cabinet 300 is slightly larger than the base 210 and the evaporator 220, so that air flowing in between the ends of the evaporator 220 and the base 210 may be discharged by means of the blower 230 when flowing past the upper and lower rims of the evaporator 220. In addition, the four walls of the rear cabinet 300 are provided with air inlets 302, 303, 304,..., which are provided with filter materials 320 and air purification means so that the induced air can pass through the air inlets 302, 303,304,..., and the filter materials 320 into the rear cabinet 300 to contact the evaporator 220 to thereby generate cooling or warming effects. A pipe hole 330 is further provided on the rear cabinet 300 at a suitable position for linking the evaporator 200 to other equipment or systems. At that side of the rear cabinet 300 opposite to the hollow 301, there are provided suspension hooks 310, 311 adapted to suspend the present invention on an upright surface. the frame 100 is securely provided at the four sides of that side of the rear cabinet 300 with the hollow 301. The louvers 101 arranged in the frame 100 have patterns thereon. When the louvers are all closed, the patterns will be displaced to add aesthetic quality to the present invention.

[0008] In use, referring to Fig. 4, the blower 230 is actuated and the cooling or warming mode is selected. Air in the rear cabinet 300 is passed through the evaporator 220 and the electrical heating elements 240, 240 to condition the temperature of the air which is released to the room via the louvers 101. Indoor air is drawn via the air inlets 302, 303,...into the rear cabinet 300 and in between the two ends of the evaporator 220 and the base 210 to contact the surfaces of the evaporator 220. The air then flows past the upper and lower rims of the evaporator 220 to the blower 230 in front of the evaporator 220 and is then sent out.

[0009] With reference to Fig. 5, the outer periphery of the frame 100 can be configured to be an artistic picture frame 102, and an inner frame 102 having louvers 101 installed therein is mounted in the picture frame 102 to further enhance the aesthetic quality of the present invention. The picture frame 102 can further be provided with a trigger element 120 at that side orienting towards rear cabinet 300, the trigger element 120 being linked to the louvers 101. By actuating the trigger element 120 the louvers may rhythmically open or close. A step motor 150 may be provided at a suitable position to drive the trigger element 120. By means of the step motor 150, the trigger element 120 is driven to cause the louvers to rhythmically swing to provide mobile patterns while directing the flow of air to the room.

[0010] In practice, referring to Fig. 6, a number of bases 210, each as a single unit, can be stacked or juxtaposed to form an air conditioner of a larger size. Since each rear cabinet 300 is provided with suspension hooks 310, 311, the present invention, even when stacked or juxtaposed to form a larger structure can be firmly secured to vertical surfaces such as walls. Supposing each unit can achieve 15000 BTU air conditioning capacity, the three units shown in Fig. 6 can achieve thrice the capacity. The units are directly secured or stacked to adjacent units by means of securing holes 212. As can be appreciated from the above description, the present invention allows expansion of the size of the air conditioner in various ways using identical air conditioning units, which is very cost efficient.

[0011] It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above.

Claims

1. An air conditioner, at least comprising a frame having louvers disposed therein, at least one evaporator structure, and at least one base, matching said evaporator structure in number, wherein said evaporator structure essentially comprises an evaporator disposed on said base, a blower mounted between said evaporator and said frame, said evaporator structure being accommodated in a rear cabinet having a plurality of hollowed portions at one side, said blower sending air out through said hollowed portions, said rear cabinet being further pro-

vided with air outlets at its four walls, said air inlets being provided with filter material and air purification means, said rear cabinet additionally having suspension hooks providing on a wall opposite to said hollow portions thereof, said suspension hooks being adapted to suspend the air conditioner on a vertical surface, whereby a plurality of said bases can be stacked or juxtaposed to increase the size of the air conditioner and the conditioning capacity, said frame being secured to that side of said rear cabinet with said hollowed portions, said louvers having patterns which will display when said louvers are all closed.

2. The air conditioner as claimed in claim 1, wherein said evaporator is a plate structure having a plurality of refrigerant ducts disposed therein, a middle section of said plate structure bending towards said base to be connected thereto, and the two ends of said plate structure tilting away from said base to allow more space between said two ends of said plate structure and said evaporator.

3. The air conditioner as claimed in claim 1 or 2, wherein said evaporator is provided with electrical heating elements at suitable positions.

4. The air conditioner as claimed in claim 1, wherein said frame has its outer periphery configured to form an artistic picture frame in which said louvers are installed.

5. The air conditioner as claimed in claim 1 or 4, wherein the periphery of said frame allows entry of air from various side directions.

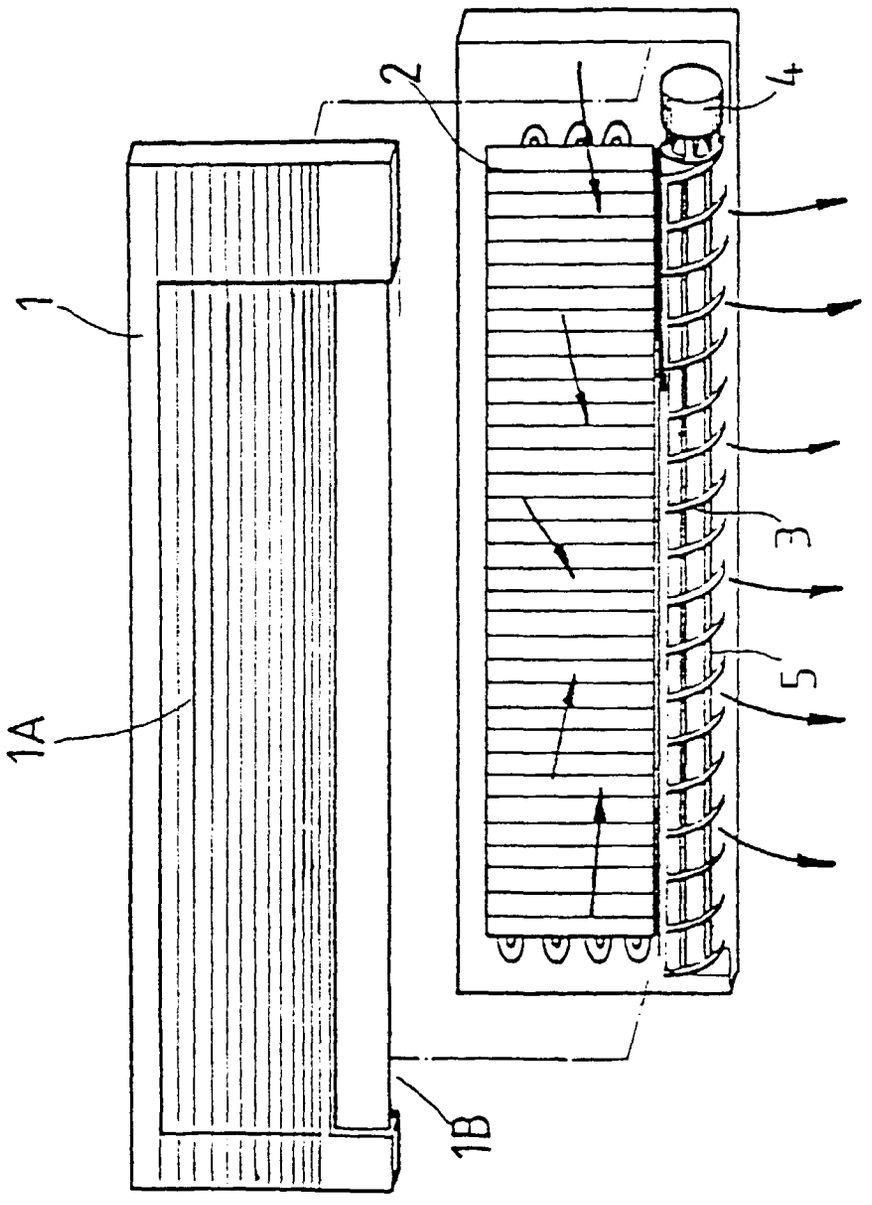

FIG. 1

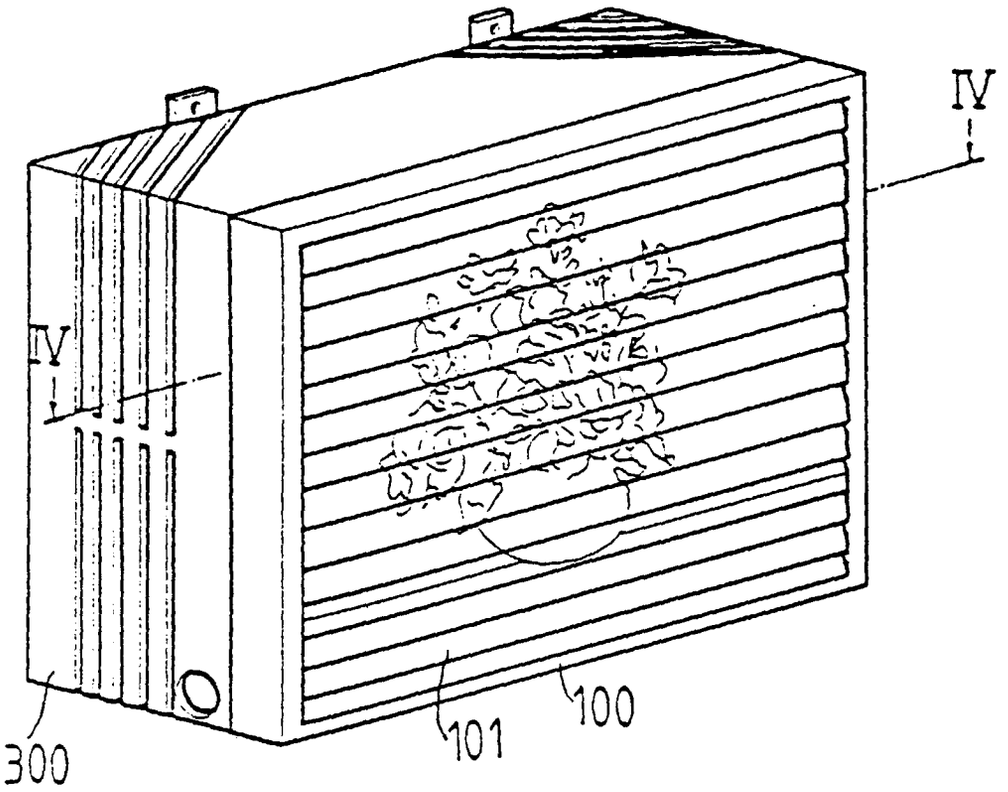

FIG. 2

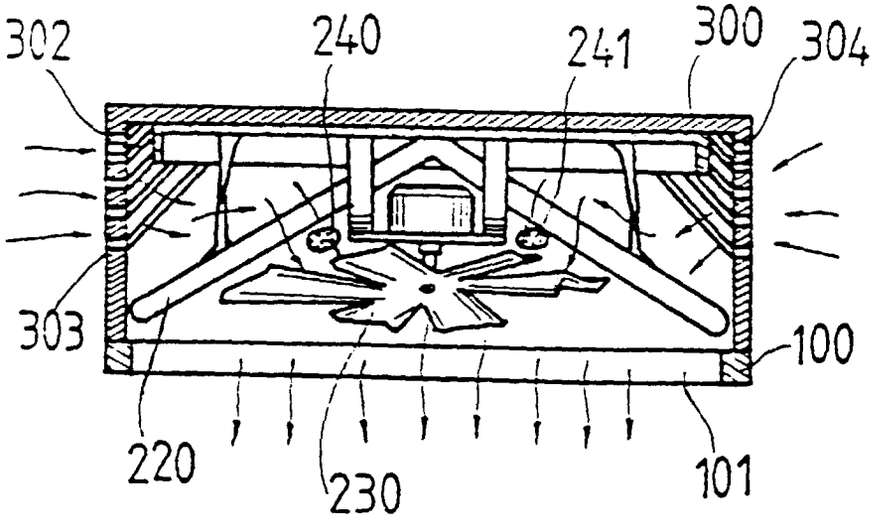

FIG. 4

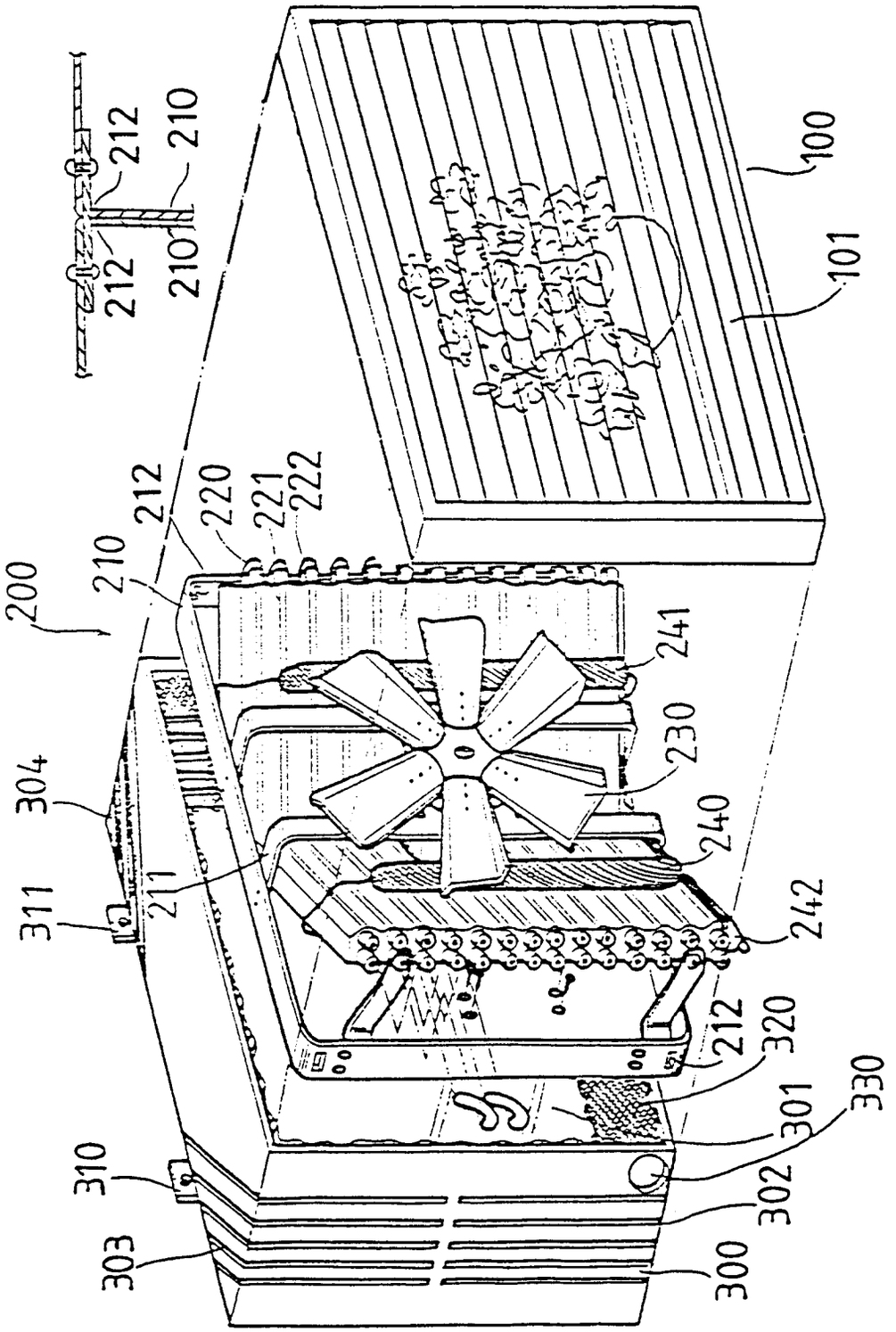
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FIG. 3

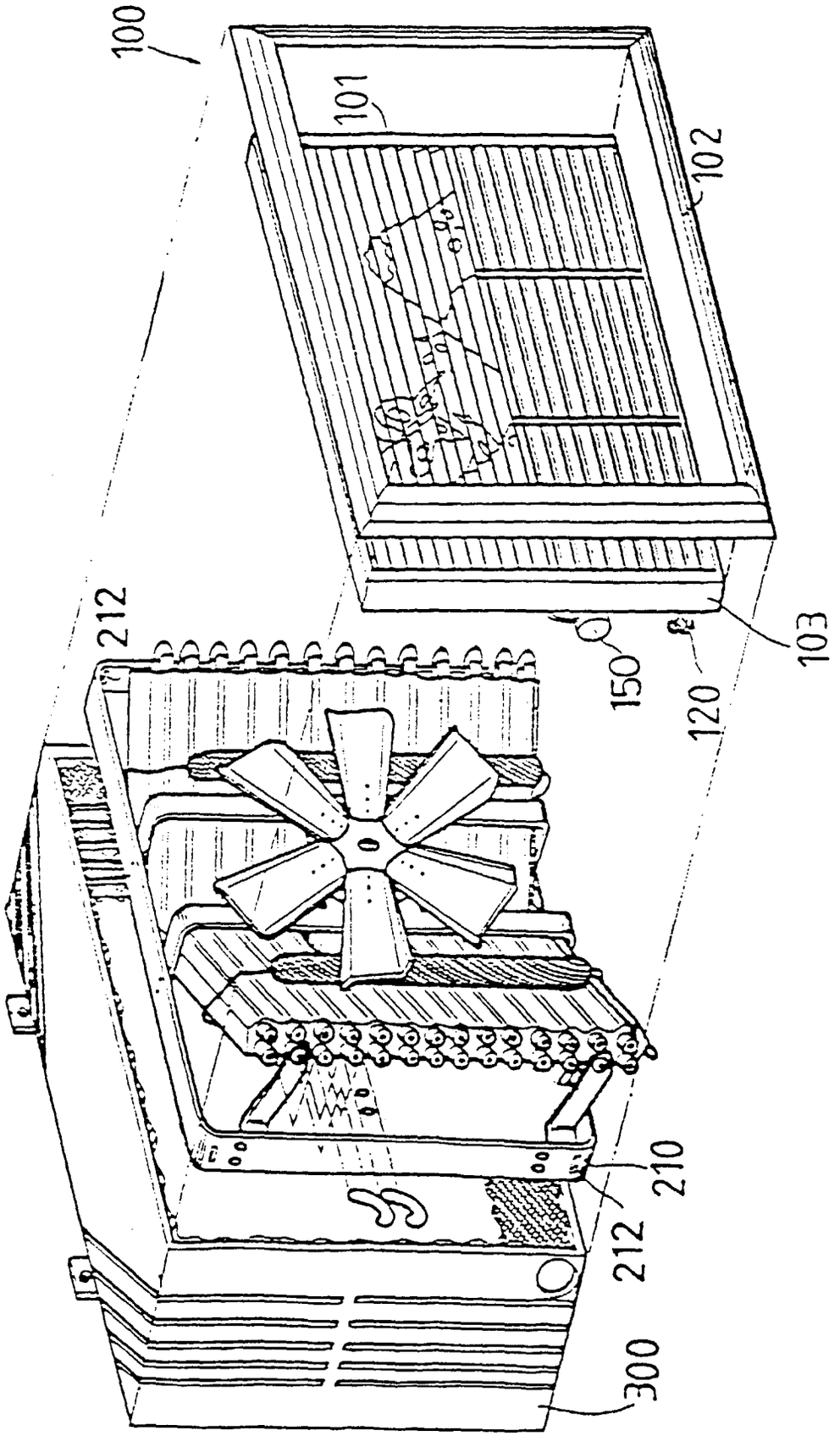

FIG. 5

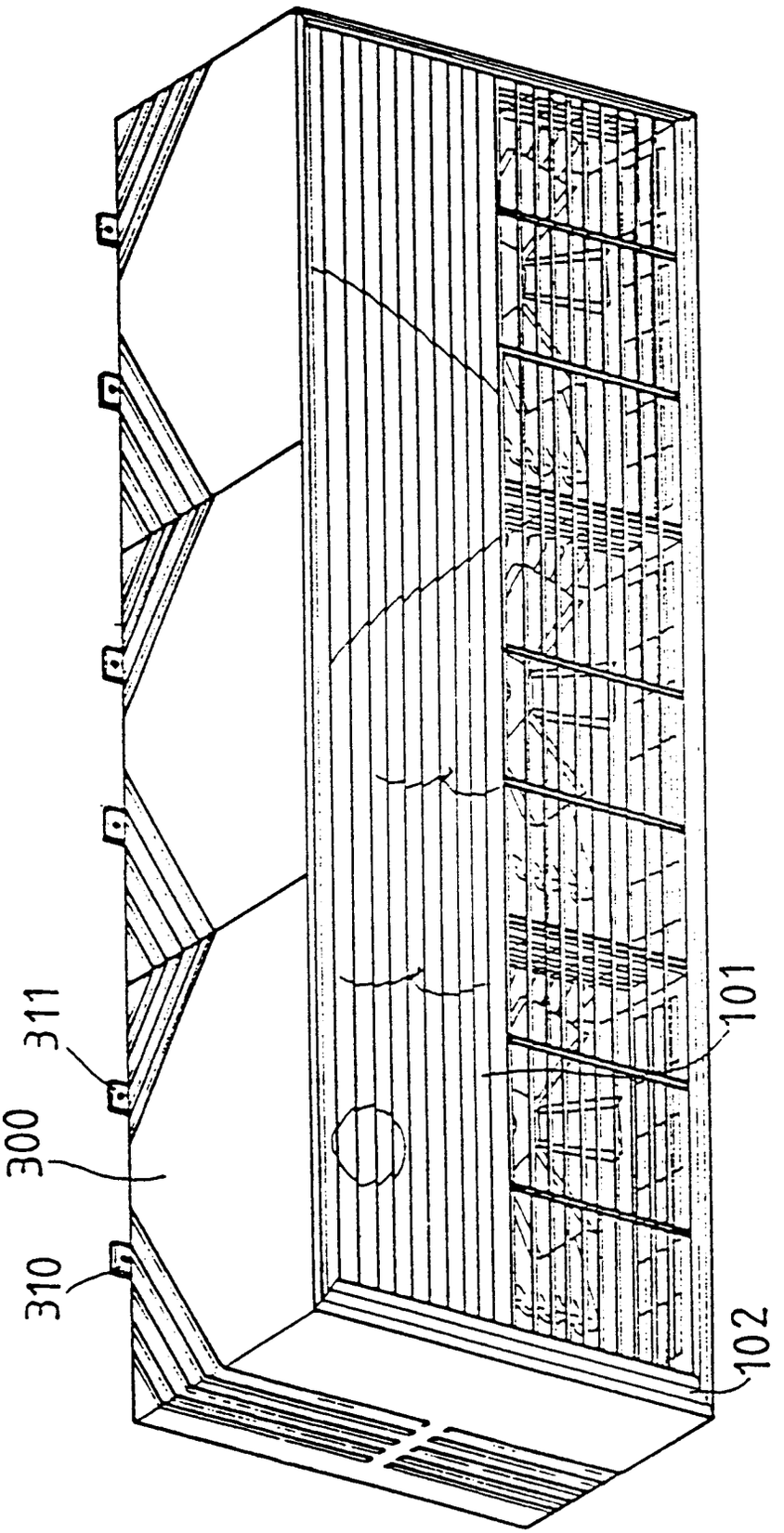

FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 81 0803

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB 2 305 500 A (MITSUBISHI ELECTRIC CORP) * the whole document *	1	F24F1/00
A	US 5 669 229 A (OHBAYASHI KAZUMI ET AL) * the whole document *	1	
A	US 5 263 529 A (LANDIS ERMA E) * abstract; figures *	1	
A	EP 0 668 473 A (TOKYO SHIBAURA ELECTRIC CO)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F24F
F28D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 February 1998	Gonzalez-Granda, C

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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