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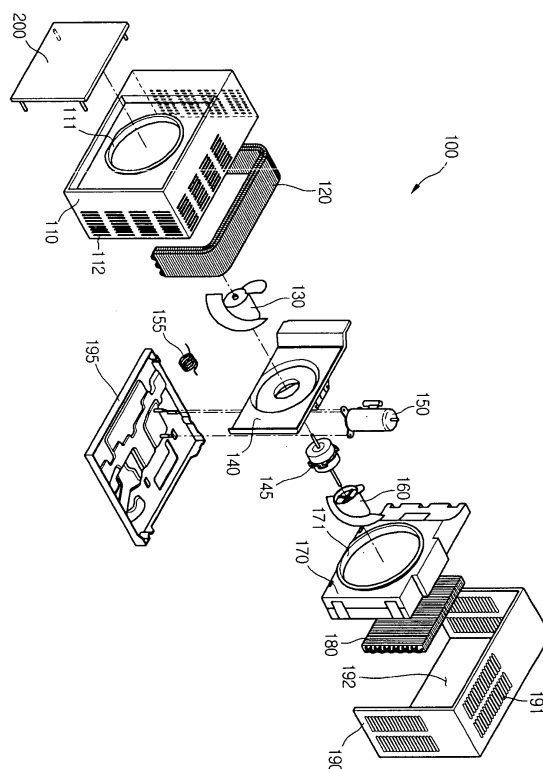
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(54) **Air conditioner**

(57) There is provided an air conditioner. The air conditioner includes a front frame, a cabinet, indoor and outdoor blower fans, a rotating drive motor, a heat exchanger portion, and a panel assembly. The front frame includes an intake slot for suctioning indoor air through. The cabinet is coupled at a rear of the front frame and includes an intake slot for suctioning outdoor air through. The indoor blower fan and the outdoor blower fan respectively suction the indoor air and the outdoor air. The rotating drive motor is axially connected to the indoor and outdoor blower fans. The heat exchanger portion includes an indoor heat exchanger for heat exchanging the suctioned indoor air and an outdoor heat exchanger for heat exchanging the suctioned outdoor air. The panel assembly is installed in front of the front frame for allowing replacing of an image.

Fig. 2



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Description

Field of the Invention

[0001] The present invention relates to an air conditioner, and more particularly, to an indoor portion of an air conditioner for allowing pictures or photographs displayed at the front thereof to be easily interchanged, thus providing the functional benefits of an air conditioner with an added aesthetic factor for interior decoration.

Description of the Related Art

[0002] Refrigerants circulating inside air conditioners undergo compression, condensing, expansion, and evaporation stages of a refrigeration cycle. In an air conditioner, refrigerant is first compressed to become high in temperature and pressure, and loses heat to the outside in a condenser, after which it passes through an expansion valve, gradually cooling and depressurizing. The cooled and depressurized refrigerant flows through an evaporator, absorbing heat along the way, and is then recycled to the compressor.

[0003] Here, the compression, condensing, and expansion stages occur in an outdoor portion of an air conditioner; and the evaporation stage occurs in an indoor portion by virtue of a blower fan and a heat exchanger.

[0004] Air conditioners are grouped into two basic types:

window-mounted air conditioners that consist of a single unit which performs the entire refrigeration cycle, installed in a wall opening such as a window, and split system air conditioners that have a separate indoor and outdoor unit that are respectively installed indoors and outdoors.

[0005] Air conditioner indoor units according to the related art have front portions that function only as covers. That is, a front cover installed at the front of an indoor unit functions to prevent components, such as a blower fan, heat exchanger, etc., from being exposed to the outside, as well as preventing electrocution or injury of children who may otherwise stick their hands inside the unit. Accordingly, the front of an indoor unit has a monotonous and stoic feel, and does not harmonize well with an interior.

SUMMARY OF THE INVENTION

[0006] Accordingly, the present invention is directed to an air conditioner that addresses one or more problems due to limitations and disadvantages of the related art.

[0007] It would be desirable to provide an air conditioner indoor unit with a modified structure that allows easy installation and removal of pictures, photographs, etc. to and from its blank front cover, so that the unit fulfills its air conditioning duties, as well as complements the

decor of an interior space.

[0008] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0009] Accordingly, the invention provides an air conditioner that includes: a front frame including an intake slot formed at a side thereof for suctioning the indoor air through; a cabinet coupled at a rear of the front frame and including an intake slot formed at a side thereof for suctioning outdoor air through; an indoor blower fan installed within the front frame for suctioning the indoor air; an outdoor blower fan installed within the cabinet for suctioning the outdoor air; a rotating drive motor axially connected to the indoor blower fan and the outdoor blower fan; a heat exchanger portion including an indoor heat exchanger for heat exchanging the suctioned indoor air and an outdoor heat exchanger for heat exchanging the suctioned outdoor air; and a panel assembly installed a predetermined distance forward from the front frame for allowing a replacing of an image.

[0010] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

Fig. 1 is a perspective view of a single unit-type air conditioner with a panel assembly according to the present invention;

Fig. 2 is an exploded perspective view of the single unit-type air conditioner in Fig. 1;

Fig. 3 is a perspective view of a panel assembly according to the first embodiment of the present invention;

Fig. 4 is a perspective view of a panel assembly according to the second embodiment of the present invention;

Fig. 5 is a perspective view of a panel assembly according to the third embodiment of the present invention;

Fig. 6 is a perspective view of a single unit-type air conditioner having a panel assembly according to the fourth embodiment of the present invention;

Fig. 7 is perspective view of a panel assembly according to the fifth embodiment of the present invention; and

Fig. 8 is a perspective view of a panel assembly according to the sixth embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0012] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0013] Fig. 1 is a perspective view of a single unit-type air conditioner with a panel assembly according to the present invention, and Fig. 2 is an exploded perspective view of the single unit-type air conditioner in Fig. 1.

[0014] Referring to Figs. 1 and 2, a single unit-type air conditioner 100 having a panel assembly according to the present invention includes a front frame 110 protruding towards the inside of a room and protecting components inside the air conditioner, a cabinet 190 coupled at the rear of the front frame 110 and protruding towards the exterior of the room, and a panel assembly 200 installed to be spaced a predetermined distance apart from the front frame 110.

[0015] Specifically, the panel assembly 200 is installed to be spaced in a frontal direction from the front frame 110, forms a discharge port 113 around its periphery, and includes a structure at the front thereof on which pictures or photographs can be interchangeably mounted.

[0016] In further detail, the single unit-type air conditioner 100 includes an indoor heat exchanger 120 installed inside the front frame 110 for performing heat exchanging of indoor air (A), a barrier 140 installed behind the indoor heat exchanger 120 for guiding the flow of suctioned indoor air, an indoor blower fan 130 installed at the front of the barrier 140 for suctioning indoor air, and a drive motor 145 coupled at the rear of the barrier 140 and having the indoor blower fan 130 installed on a side thereof. The barrier 140 prevents the suctioned indoor air from mixing with outdoor air (B) that is suctioned through the cabinet 190.

[0017] Additionally, the single unit-type air conditioner 100 includes an outdoor blower fan 160 connected at the other side of the drive motor 145 for rotating and suctioning outdoor air, a shroud 170 coupled at the rear of the outdoor blower fan 160 for guiding the flow of suctioned outdoor air and having an orifice 171 at a center thereof, an outdoor heat exchanger 180 installed at the rear of the shroud 170 for performing heat exchanging of suctioned outdoor air, an expansion coil 155 connecting the indoor heat exchanger 120 with the outdoor heat exchanger 180 for altering refrigerant passing therethrough to a low temperature/low pressure state, and a base 195

forming a floor for mounting each of the components.

[0018] In further detail, the front frame 110 has intake slots 112 formed on the sides thereof for indoor air to be suctioned through, and an orifice 111 formed in a center of the front frame 110 for discharging indoor air that has been suctioned through the indoor heat exchanger 120 back to the indoor space. A compressor 150 is installed on a portion of the base 195 for compressing the refrigerant that passes through the indoor heat exchanger 120 to a high temperature/high pressure state. Also, the cabinet 190 has intake slots 191 formed on the sides thereof for outdoor air to be suctioned through, and a discharge hole 192 formed at the rear thereof for discharging suctioned outdoor air. The panel assembly 200 is formed to be spaced a predetermined distance apart from the front frame 110 in a forward direction, and has a discharge port 113 formed at the peripheral region thereof.

[0019] To describe the operation of the above-structured single unit-type air conditioner 100, a user first presses an "on" button to rotate the drive motor 145. Refrigerant then circulates through the compressor 150 and the heat exchangers 120 and 180 and the expansion coil 155.

[0020] In further detail, the operation of the drive motor 145 rotates a motor shaft that rotates the indoor blower fan 130 and the outdoor blower fan 160. The rotation of the indoor and outdoor blower fans 130 and 160 suction indoor air into the air conditioner 100 through the intake slots 112 formed on the sides of the front frame 110 and outdoor air into the air conditioner 100 through the intake slots 191 formed on the sides of the cabinet 190.

[0021] In addition, indoor air suctioned by the rotating indoor blower fan 130 passes the indoor heat exchanger 120 to exchange heat with refrigerant therein so that the air becomes cooler. Conversely, outdoor air suctioned by the rotating outdoor blower fan 160 passes the outdoor heat exchanger 180 to exchange heat with refrigerant therein so that the air becomes hotter. The air that passes through the indoor heat exchanger 120 to become cooler is then guided in a forward direction by the barrier 140, and is discharged back to the indoor space through the discharge port 113 formed between the panel assembly 200 and the front frame 110. The air that passes through the outdoor heat exchanger 180 to be heated is guided by the shroud 170, and is discharged back to the outside through the discharge hole 192 formed on the rear of the cabinet 190.

[0022] A description of the refrigerant flowing through the inside of the air conditioner 100 will now be given. After the refrigerant is compressed to a gaseous high temperature/high pressure state in the compressor 150, it moves to the outdoor heat exchanger 180. The gaseous high temperature/high pressure refrigerant flowing inside the outdoor heat exchanger 180 loses heat to suctioned outdoor air and changes to a high temperature/high pressure liquid state. The liquid refrigerant passes from the outdoor heat exchanger 180 through the expansion coil 155 becomes a dual-state gas and liquid. The dual-state

refrigerant flows into the indoor heat exchanger 120 and absorbs heat from suctioned indoor air to become a liquid. The refrigerant then leaves the indoor heat exchanger 120 and returns to the compressor to complete the cycle, whereupon the cycle is repeated.

[0023] Fig. 3 is a perspective view of a panel assembly according to the first embodiment of the present invention.

[0024] Referring to Fig. 3, the panel assembly 200 according to the present invention includes a front panel 210, a front cover 220 pivotably attached at the front of the front panel 210, and an art panel 230 attached at the front of the front panel 210 for mounting a picture or photograph on.

[0025] In further detail, the front panel 210 has an art panel receiving portion 211 formed at the front thereof for receiving the art panel 230. The front cover 220 is supported on a hinge 240 on one edge thereof for pivotably mounting to the front panel 210. There is at least one magnet 221 to the rear edge (opposite the hinge 240) of the front cover 220, so that when the front cover 220 is closed, one end of the front cover 220 is spaced apart from the front panel 210 and doesn't move.

[0026] Fig. 4 is a perspective view of a panel assembly according to the second embodiment of the present invention.

[0027] Referring to Fig. 4, the panel assembly 200 according to the present invention uses a hook to press the front cover 220 and the front panel 210 together.

[0028] Specifically, the front cover 220 is pivotably fastened to the panel 210 by a hinge. At least one hook 222 is installed at the rear periphery of the front cover 220, so that the front cover 220 presses against the front panel 210 when the front cover 220 is closed. Also, a hook receptacle is formed on the front surface of the front panel 210 for inserting the hook 222 therein.

[0029] In the above structure, in order to change the art panel 230 mounted in the front panel 210, a user pulls the front cover 220 forward so that the hook 222 is released from the hook receptacle 212. After the art panel 230 is replaced, the front cover 220 is pivoted on the axis formed by the hinge 221, so that the hook 222 is inserted again into the hook receptacle 212.

[0030] Fig. 5 is a perspective view of a panel assembly according to the third embodiment of the present invention.

[0031] Referring to Fig. 5, the panel assembly 200 according to the present invention is characterized by its front cover 220 being completely detachable from its front panel 210.

[0032] Specifically, in the place of a hinge 240 (in Figs. 3 and 4) connecting one side of the front cover 220 to the front panel 210 are hooks and hook receptacles.

[0033] A plurality of hooks 222 are formed on the rear periphery of the front cover 220, and corresponding hook receptacles 212 are formed on the front surface of the front panel 210 for the hooks 222 to be inserted into. Also, an art panel receiving portion 211 formed at the front of

the front panel 210 receives an art panel 230. The hook 222 may be formed at the four corners of the front cover 220, so that the front cover 220 may be securely fastened to the front of the front panel 210.

[0034] In the above structure, a user presses the front cover 220 against the front of the front panel 210 so that the hook 222 formed at the rear of the front cover (220) inserts into the hook receptacle 212. To disassemble the front cover 220 from the front panel 210, the front cover 220 is grasped and pulled in a forward direction.

[0035] Here, another method of completely disengaging the front cover 220 from the front panel 210 is by using magnets instead of the hooks 222. In other words, magnets are installed in place of the hooks 222, so that the front cover 220 can be assembled to the front panel 210 by means of magnetic force. By varying the number of magnets, a suitable amount of magnetic force may be employed so that a user can easily detach the front cover 220 from the front panel 210. Conversely, the amount of magnetic force may be adjusted so that the front cover 220 does not autonomously disengage from the front panel 210 and fall to the floor.

[0036] Fig. 6 is a perspective view of a single unit-type air conditioner having a panel assembly according to the fourth embodiment of the present invention.

[0037] Referring to Fig. 6, the panel assembly 200 according to the present invention includes a front panel 210 installed to be spaced a predetermined distance from the front of a front frame, a pivoting axis 250 provided on a front surface of the front panel 210, a front cover 220 installed on the pivoting axis 250 to pivot in a clockwise or counter-clockwise direction at the front of the front panel 210, and an art panel received at the front of the front panel 210 and covered by the front cover 220. In further detail, the art panel 230 is protected by the front cover 220 from external shocks and dust. As described above, a picture or photograph is mounted on the front of the art panel 230.

[0038] A latch hook 213 is formed at a front of the front panel 210 opposite the pivoting axis 250 to prevent movement of the front cover 220. Also, a latch receiver 223 is formed at the rear of the front cover 220 for receiving the latch hook 213 inserted therein, to prevent movement of the front cover 220. Conversely, the latch hook 213 may be formed on the front cover 220, and the latch receiver 223 may be formed on the front panel 210.

[0039] In the above-described structure, in order to replace the art panel 230, a user pivots the front cover 220 in a predetermined arc, so that the latch hook 213 disengages from the latch receiver 223. After the art panel 230 is replaced, the front cover 220 is returned to its original position by swinging in the reverse direction, so that the latch hook 213 engages and inserts into the latch receiver 223.

[0040] Fig. 7 is perspective view of a panel assembly according to the fifth embodiment of the present invention.

[0041] Referring to Fig. 7, the panel assembly 200 ac-

according to the present invention is characterized in that it includes a cavity formed within the front panel 210 to insert the art panel 230 in, so that the art panel 230 is inserted from the top or from a side of the front panel 210.

[0042] In further detail, the front panel 210 is made of a transparent material that allows its inside to be visible. A cavity made to accommodate the three-dimensional size of the art panel 230 is formed within the front panel 210. Also, an art panel insertion slot 214 is formed on the top edge or on a side edge of the front panel 210 to insert the art panel 230 into the cavity.

[0043] The above structure allows easy interchanging of the art panel 230 and also a reduction in manufacturing cost of the panel assembly 200.

[0044] Fig. 8 is a perspective view of a panel assembly according to the sixth embodiment of the present invention.

[0045] Referring to Fig. 8, the air conditioner 100 according to the present invention includes a front panel 210 installed a predetermined distance to the front of a front frame 110, and a display 300 such as a liquid crystal display (LCD), plasma display panel (PDP), and an organic light emitting diode (OLED).

[0046] In further detail, the front panel 210 or the display 300 has a cable 310 for relaying data provided on a side thereof, so that a digital image signal relayed through the cable 310 can be displayed on the display 300. Accordingly, a user does not need to directly install a picture or photograph, but can save a large quantity of pictures, photographs, or other digital imagery as digital files and selectively display these images on the display 300.

[0047] For example, after saving preferred pictures, photographs or moving images as files on a computer, a user can display them on the display 300 through the cable 310. By thus providing a digital display on the display 300, there is no need to manually change pictures or photographs, and the front of the air conditioner 100 may function as a monitor as well.

[0048] The indoor portion of the air conditioner according to the present invention performs not only the functions of an indoor portion according to the related art, but also allows the display of easily interchangeable images such as art prints and family portraits at the front thereof, to become a piece of furniture complimenting the interior of a room.

[0049] By allowing the interchangeable display of photographs or pictures at the front thereof, the structure of the air conditioner indoor portion according to the present invention can augment the interior decoration of a room, and thus has a high industrial applicability.

[0050] While the present invention has been described and illustrated herein with reference to the preferred embodiments thereof, it will be apparent to those skilled in the art that various modifications and variations can be made.

Claims

1. An air conditioner for circulating refrigerant to absorb heat from indoor air and radiate the heat to an outside, the air conditioner comprising:

a front frame including an intake slot formed at a side thereof for suctioning the indoor air through;

a cabinet coupled at a rear of the front frame and including an intake slot formed at a side thereof for suctioning outdoor air through;

an indoor blower fan installed within the front frame for suctioning the indoor air;

an outdoor blower fan installed within the cabinet for suctioning the outdoor air;

a rotating drive motor axially connected to the indoor blower fan and the outdoor blower fan;

a heat exchanger portion including an indoor heat exchanger for heat exchanging the suctioned indoor air and an outdoor heat exchanger for heat exchanging the suctioned outdoor air; and

a panel assembly installed a predetermined distance forward from the front frame for allowing a replacing of an image.

2. The air conditioner according to claim 1, wherein the panel assembly includes:

a front panel installed at a front of the front frame; an art panel received at a front of the front panel and having an image attached thereon; and a front cover covering a front of the art panel.

3. The air conditioner according to claim 2, wherein the front cover is detachably or pivotably coupled to the front panel.

4. The air conditioner according to claim 2, wherein the front cover is coupled to the front panel through a hinge.

5. The air conditioner according to claim 2, further comprising at least one cohering member installed on at least one of a rear of the front cover and the front of the front panel, the cohering member for cohering the front cover to the front panel.

6. The air conditioner according to claim 5, wherein the cohering member is a magnet or a hook.

7. The air conditioner according to claim 1, wherein the panel assembly includes:

an art panel having a picture or a photograph attached thereto; and

a front panel having an insertion slot formed on

an edge portion thereof for inserting the art panel through, and a cavity formed in an inside thereof for receiving the art panel.

8. The air conditioner according to claim 1, wherein the panel assembly includes: 5

a front panel;
a front cover pivotably coupled at a front of the front panel; 10
an art panel received at the front of the front panel and having an image attached thereto;
and
a pivoting axis for pivotably mounting the front cover to the front panel. 15

9. The air conditioner according to claim 8, wherein the panel assembly further includes a movement preventing member formed at a location opposite to the pivoting axis for preventing a movement of the front cover with respect to the front panel. 20

10. The air conditioner according to claim 8, wherein the panel assembly further includes: 25

a latch hook formed on the front panel at a location opposite to the pivoting axis, the latch hook for preventing a movement of the front cover with respect to the front panel; and
a latch receiver formed on the front cover for receiving the latch hook. 30

11. The air conditioner according to claim 8, wherein the panel assembly further includes: 35

a latch hook formed on the front cover at a location opposite to the pivoting axis, the latch hook for preventing a movement of the front cover with respect to the front panel; and
a latch receiver formed on the front panel for receiving the latch hook. 40

12. The air conditioner according to claim 1, wherein the panel assembly is one of a liquid crystal display, plasma display panel, or organic light emitting diode. 45

13. The air conditioner according to claim 12, wherein the panel assembly includes a data transferring portion formed on a portion thereof for transferring digital data, and the panel assembly displays an image derived from the digital data. 50

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Fig.1

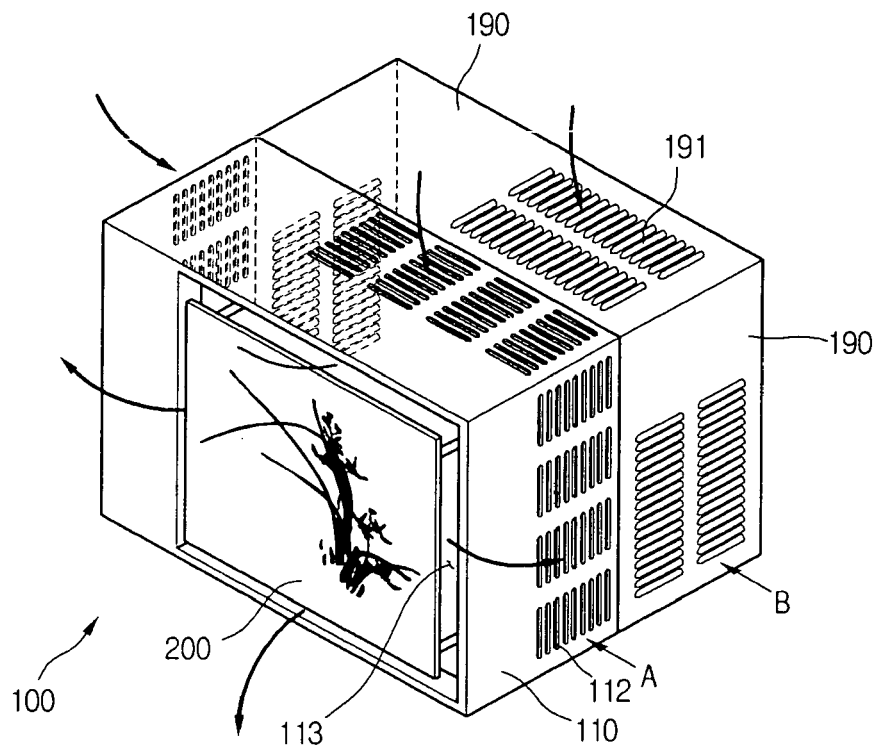


Fig.2

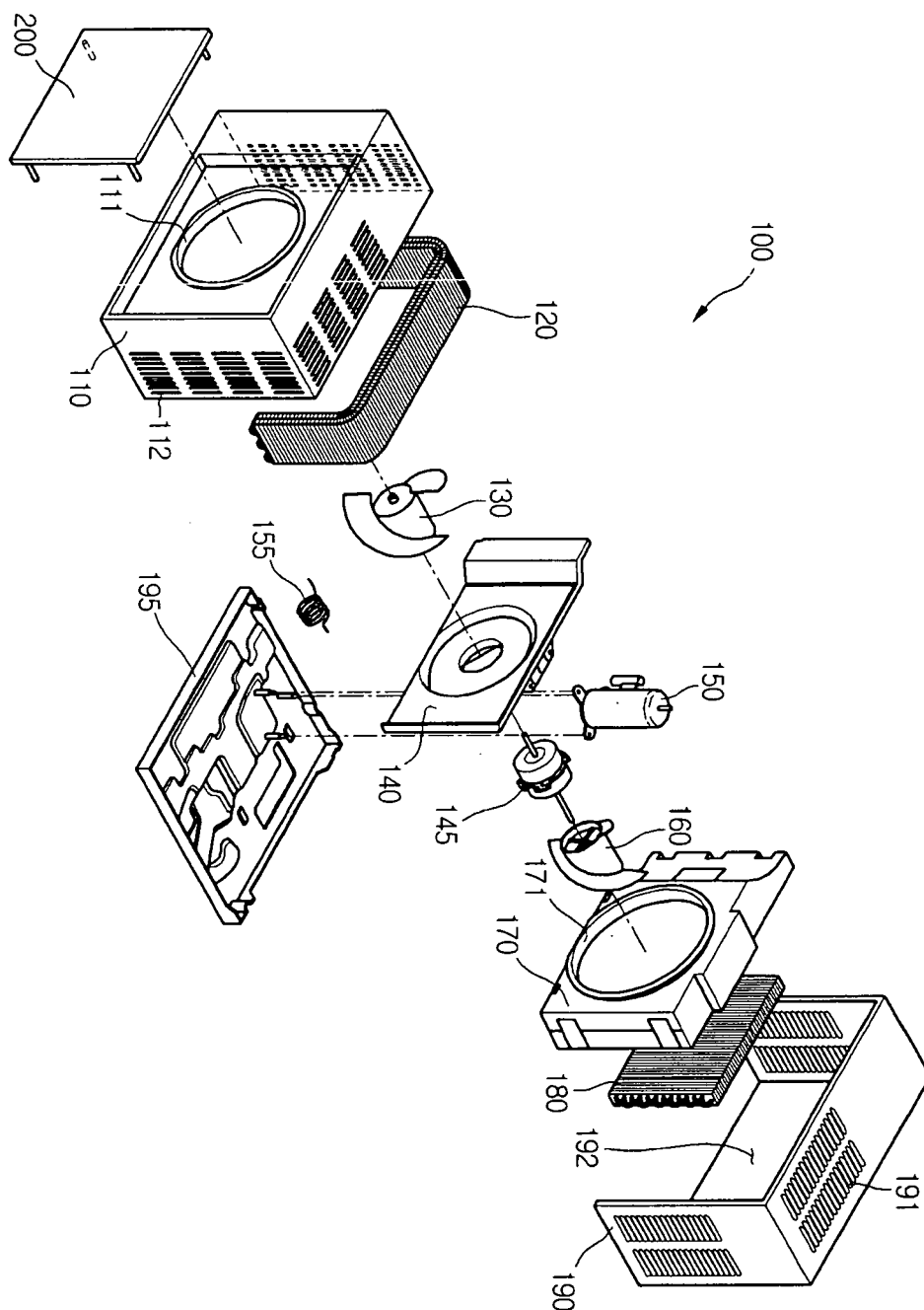


Fig.3

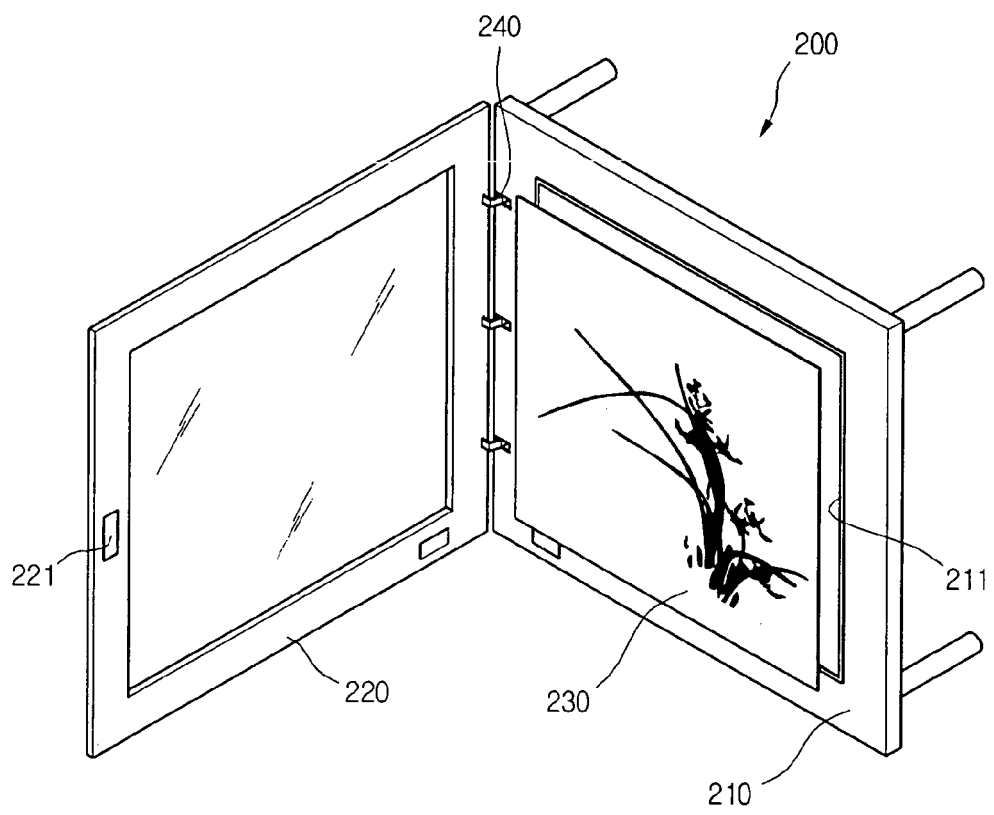


Fig.4

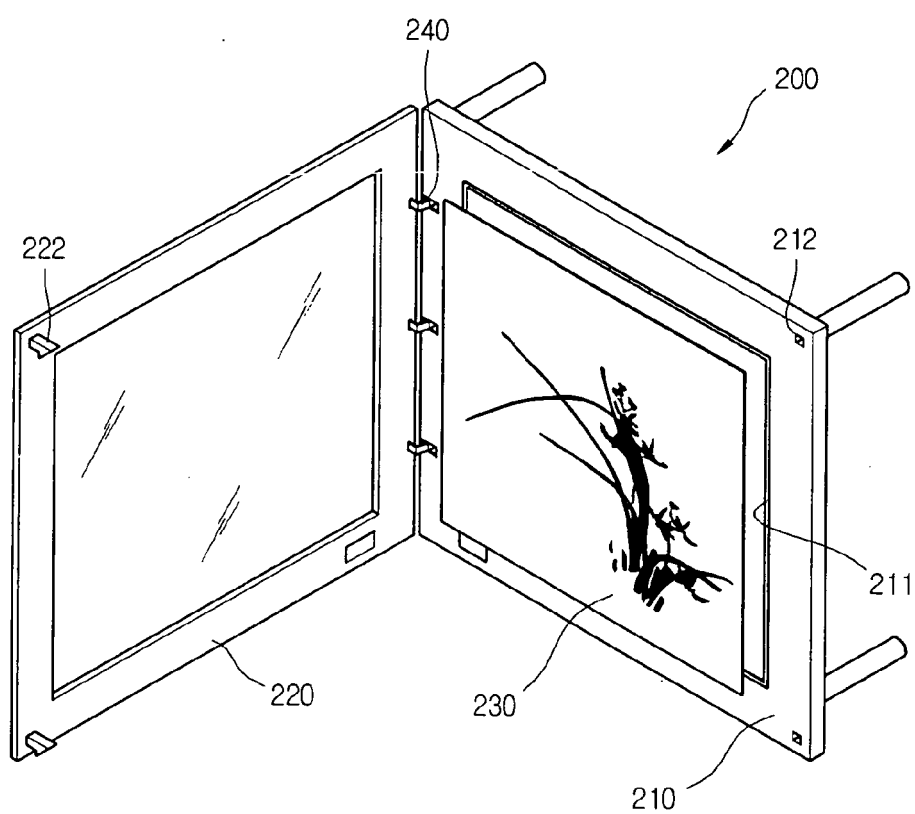


Fig.5

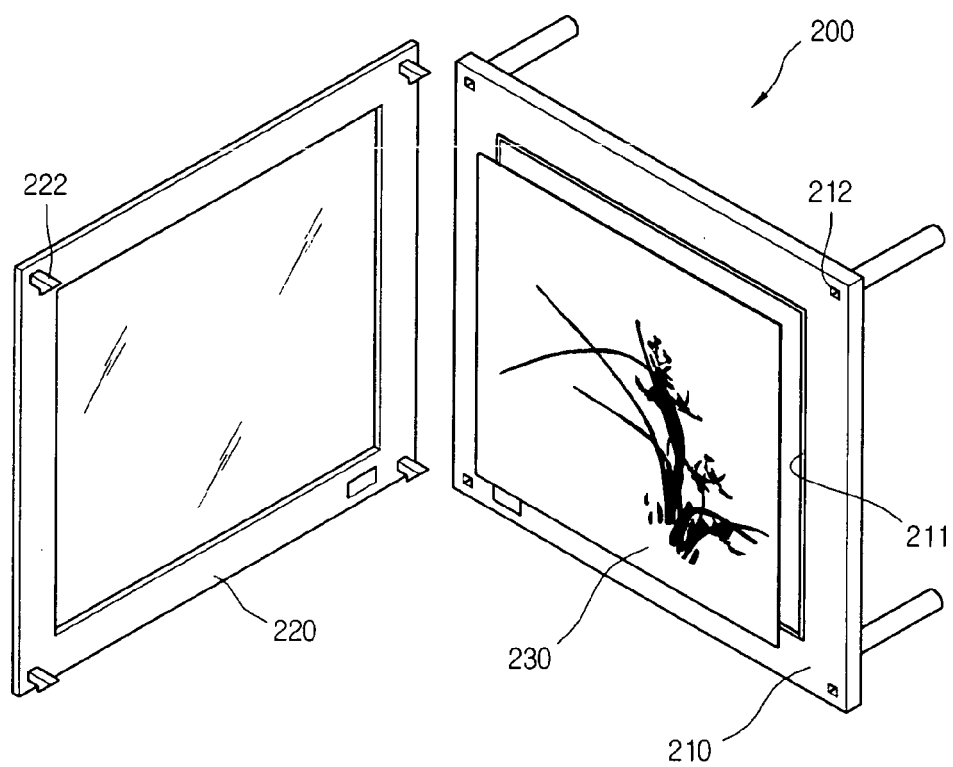


Fig.6

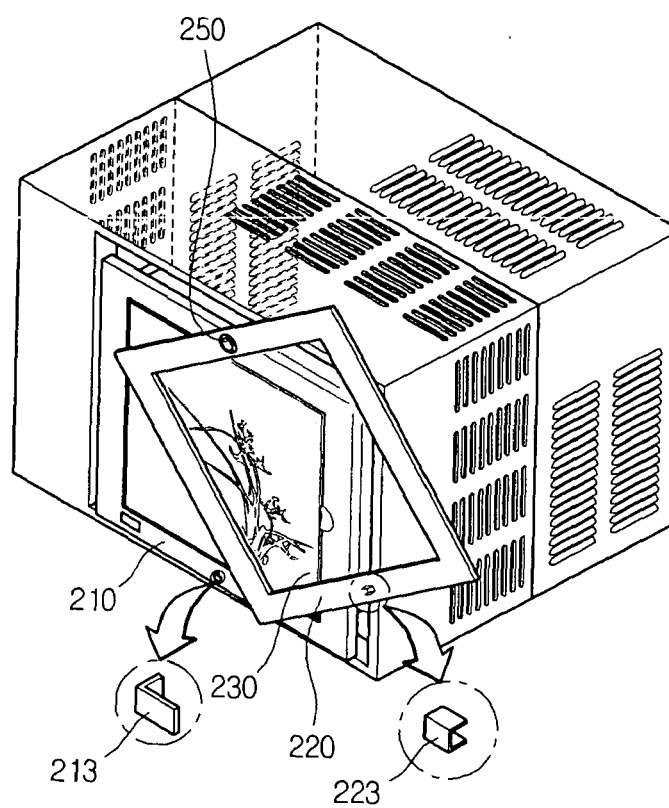


Fig.7

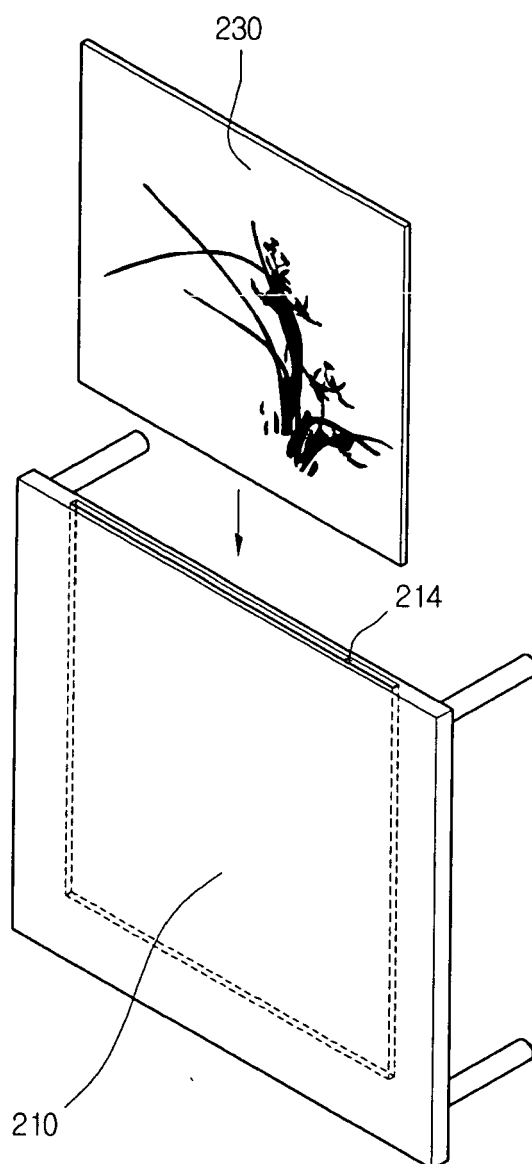
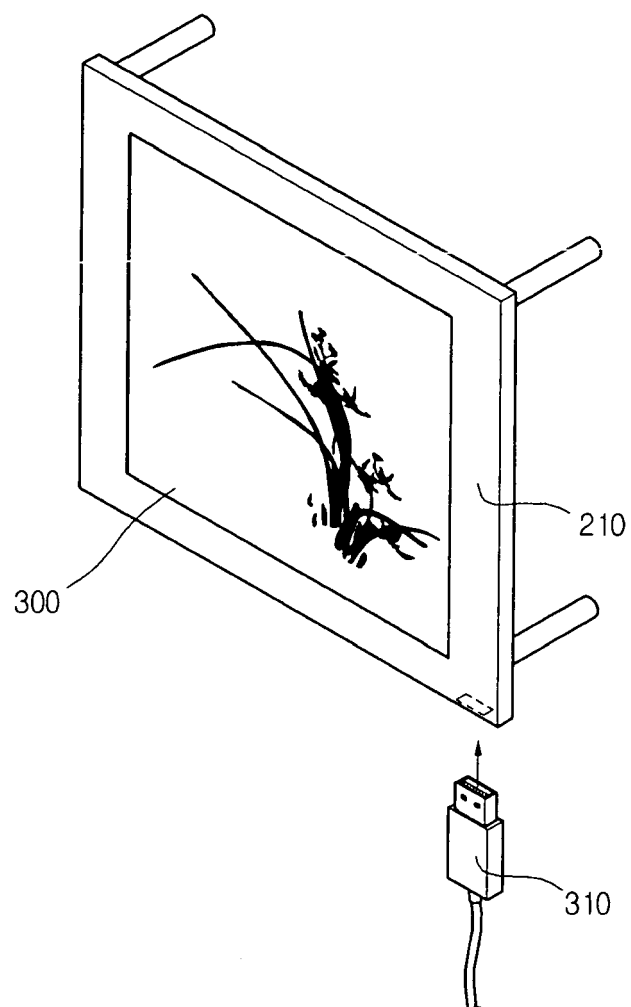


Fig.8





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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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