(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 878 980 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.01.2008 Bulletin 2008/03

(51) Int Cl.:
F24F 11/00 *(2006.01)* ***F24F 1/00*** *(2006.01)*

(21) Application number: **07250860.9**

(22) Date of filing: **01.03.2007**

(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 MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **13.07.2006 KR 20060065884**

(71) Applicant: **LG ELECTRONICS INC.**
Seoul (KR)

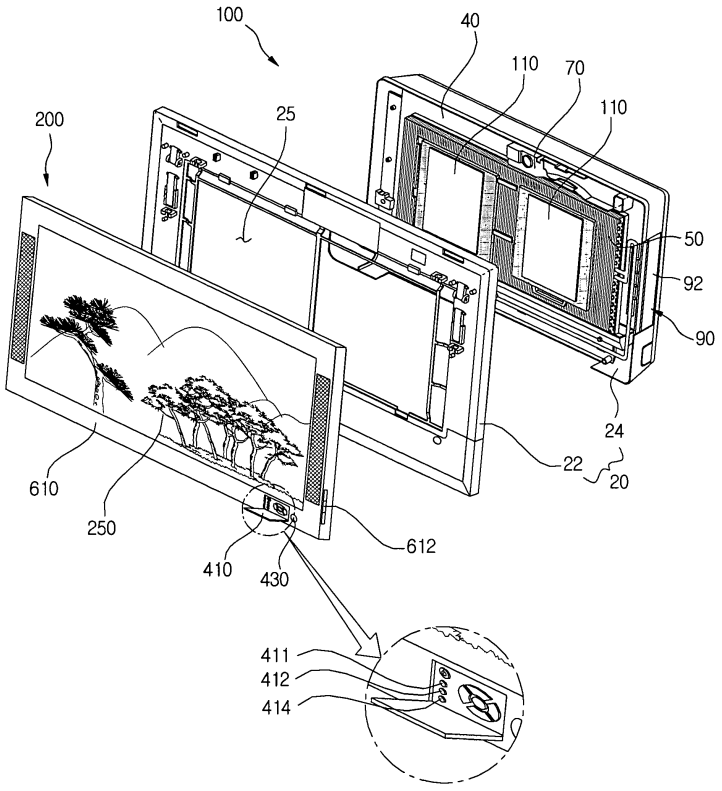
(72) Inventor: **Kwon, Byeong Tae**
Changwon-si
Kyungsangnam-do (KR)

(74) Representative: **Palmer, Jonathan R.**
Boult Wade Tennant,
Verulam Gardens,
70 Gray's Inn Road
London WC1X 8BT (GB)

(54) **Air conditioner having image display function**

(57) The air conditioner according to the present invention, comprises: an air conditioning unit (100) has at least one of the heat, cool and air purifying feature; and a display unit (200) provided with an image panel, which is bonded to the air conditioning unit, on which at least one of the status of the air conditioning unit or the image is displayed.

FIG.2



EP 1 878 980 A2

Description

Field of the invention

[0001] The present invention relates to an air conditioner, and more particularly to an air conditioner having image display function by installing an image display device in the front of an indoor unit.

Description of the related art

[0002] Generally, an air conditioner includes a heater, a cooler, an air purifier etc, and it is installed indoors to heat, cool or purify the air, resulting pleasant environment to a human being.

[0003] Recently, by installing a thin turbo fan inside the air conditioner, minimizing the air conditioner indoor unit's total thickness so as to install the air conditioner indoor unit on the wall inside homes like a frame.

[0004] Meanwhile, recently thin display devices such as liquid crystal panels are used which replaced general CRT display devices.

[0005] From here there was a defect that, if the air conditioner indoor unit and image display device was separately installed on separate places inside the room, the space efficiency will decrease because too much space was occupied.

[0006] Also, the need to satisfy the user, who desired to use the front part of the frame typed air conditioner in many ways, was raised.

Summary of the invention

[0007] The present invention is directed to address one or more problems due to limitations and disadvantages of the related art. It would be desirable to provide an air conditioner as one body, increasing space efficiency and also providing image display function in the front part so that it could be effectively utilized.

[0008] Also, aiming to manufacture and provide the air conditioner with image display and air conditioner as one body, minimizing install area and sharing parts to minimize the manufacturing cost.

[0009] In order to address the problems, the air conditioner according to the present invention, comprises: an air conditioning unit has at least one of the heat, cool and air purifying feature; and a display unit provided with an image panel, which is bonded to the air conditioning unit, on which at least one of the status of the air conditioning unit or the image is displayed.

[0010] The air conditioner according toanother aspect of the present invention comprises: a display unit, which includes a signal receiver receiving image signal and a display panel displaying the received image signal from the signal receiver; an air conditioning unit which is connected to the display unit and includes a ventilator and a heat exchanger; and a controller which controls at least one of the display unit and the air conditioning unit.

[0011] The air conditioner according toanother aspect of the present invention comprises: an air conditioning unit, which performs at least one of cooling, heating and air purifying function; a display unit, coupled to the air conditioning unit, which displays at least one of status of the air conditioning unit or image; a control unit which controls at least one of the display unit and the air conditioning unit; and an operational unit for inputting the command for operation of at least one of the display unit and the air conditioning unit.

[0012] The air conditioner according toanother aspect of the present invention comprises: An air conditioner having image display function, comprising: a cabinet formed with inlet and outlet; a ventilator provided inside the cabinet which sucks and discharges room air for air conditioning; a heat exchange unit provided inside the cabinet which exchanges heat with the room air; a display panel installed in the cabinet which displays broadcasting signal; a signal receiver which receives the broadcasting signal to display on to the display panel; a signal converter which converts the received broadcasting signal from the signal receiver;and a control unit which controls at least one of the heat exchange unit, the ventilator, the display panel,the signal receiver and the signal converter.

[0013] According to the present invention, flat image display devices such as LCD or PDP is embedded in the air conditioner, which will result increasing in space efficiency.

[0014] Also, according to the present invention, since the air conditioner is embedded with image display device, there is only one installation process.

[0015] Also, according to the present invention, the air flow from the inlet cools the heat generated by the image display part, which results unnecessariness of additional cooler to be needed.

[0016] Also, according to the present invention, as the image display device is installed in the front part, the exposure of the air conditioner will be minimized.

[0017] Also, according to the present invention, as the image display device , in the front part of the air conditioner, is able to display numerous images, the usage of the front part of the air conditioner will be increased and also it will make the exterior more gorgeous.

[0018] Also, according to the present invention, as the air conditioner status is displayed on the image display device, it will be easy to verify the status in the room or the air conditioners status from a place far away.

[0019] Also, according to the present invention, as the air conditioner and the image display device is controlled by a single remote controller, there would be no need to buy a separate remote controller.

Brief description of the drawings

[0020]

FIG. 1 is a block diagram showing the structure of

an air conditioner having image display function according to the present invention.

FIG. 2 is a disassembled perspective view showing the display unit and the air conditioner unit's bonding relations according to the present invention.

FIG. 3 is a disassembled perspective view showing the entire structure of the air conditioner according to the present invention.

FIG. 4 is a front view showing only the air conditioner unit with display unit excluded according to the present invention.

FIG. 5 is a disassembled perspective view showing the display unit bonding with the front panel of the air conditioner according to the present invention.

FIG. 6 is a perspective view illustration of the operation status of the air conditioner according to the present invention.

FIG. 7 is an operation status view when only the air conditioner unit is under operation according to the present invention.

FIG. 8 is an operation status view when only the display unit and air conditioner unit is under operation according to the present invention.

FIG. 9 is an actual example of another method of displaying the status of the air conditioner unit on the display panel according to the present invention.

FIG. 10 is a block diagram showing the structure of the air conditioner according to the 2nd actual example of the present invention.

FIG. 11 is a front perspective view of the air conditioner according to the 3rd actual example of the present invention.

FIG. 12 is a disassembled perspective view of the air conditioner according to the 3rd actual example of the present invention.

Detailed description of the invention

[0021] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to accompanying drawings.

[0022] FIG. 1 is a block diagram showing the structure of The air conditioner according to the present invention.

[0023] Referring to FIG. 1, The air conditioner according to the present invention includes the air conditioning unit 100 with cooling and heating features, and a display unit 200 which displays images are installed together.

[0024] The display unit 200 is provided in [present on] the front side of the air conditioning unit 100, and minimizes the exposure of the air condition unit to users.

[0025] The display unit 200, installed on the air conditioner, is able to display public TV images, satellite/ground wave DMB images or movies and etc.

[0026] Also, the air conditioning unit 100 of the air conditioner is consisted of the exterior part and the interior part and achieves air conditioning processes such as cooling, heating, dehumidification, air purifying and etc is done, on this example.

[0027] The air conditioning unit 100 according to the present invention comprises: a compressor 11,which compresses refrigerant; an outdoor heat exchange unit 12 which exchanges heat of the exterior air and refrigerant; an exterior ventilator which ventilates the outdoor heat exchanger; an expansion valve 14 which sprays condensed liquid state refrigerant; an indoor heat exchange unit 50 which exchanges heat of the room air and refrigerant, an indoor ventilator which ventilates the indoor heat exchange unit 50; an sensor unit 15 which senses the outflow pressure and temperature of the compressor 11, the temperature of the indoor heat exchange unit 50 or the outdoor heat exchange unit 12, and the indoors or the outdoors temperatures.

[0028] Also, the display unit 200 according to the present invention comprises: a display panel 250 which displays images; an audio output unit 260 which outputs audio; a signal receiver 210 which receives signal; a signal converter 220 which appropriately converts the signal to the display panel or the audio output unit; and a memory unit 270 which stores numerous information and data. the signal receiver 210 is to receive the frequency from the TV tuner, DMB and etc. In detail, the signal receiver 210 is to receive digital broadcasting service or analog broadcast and etc from satellite or base station and etc, for example, there is a Digital Multimedia Broadcasting (DMB), Digital Video Broadcasting-Handheld(DVB-H), Media Forward Link Only(MediaFLO) and etc for digital broadcasting service, for the analog broadcasting there is public broadcasting from general base station.

the signal receiver 210 is a device to receive frequencies sent from the DMB, DVB-H, MediaFLO and etc. the DMB is a new idea of mobile multimedia broadcasting service, where broadcasting and communication is bonded, and the DMB is sorted by the transmission type and network structure to terrestrial DMB and satellite DMB. Also, the DMB can provide CD quality sound and data service and watch multi-channel multimedia broadcastings while moving with receivers from mobile phones, PDA or vehicles and because of this it is called the next generation broadcasting service.

[0029] Meantime, terrestrial DMB and satellite DMB has the following features. Terrestrial DMB uses technical standard Eureka-147 of europe digital radio broadcast (DAB) as a standard. Currently in 2004, by using a vacant VHF 12th channel a mobile receivable multimedia broadcasting is done, by dividing a channel 3 blocks appear and for each block so many video and audio channel is produced, 174~216MHz frequency is used and uses MPEG4 compression technology. The radio waves have diffraction feature, adequate for long distances. KBS, MBC, SBS, YTN, CBS and etc are promoting their broadcasting services to those who normally uses the service inside their vehicles.

[0030] On the other side, satellite DMB uses a satellite for their broadcasting service, different from terrestrial DMB. So, if there is a place where the reception is low, a relay unit called gap filler is used to make a better re-

ception for broadcasting. The frequency is over 2.605GHz and it uses the same compression like the terrestrial broadcast. There are under 20 video channels and under 50 audio channels.

[0031] Also, DVB-H is a technical standard to enhance the reception for mobile terrestrial digital television, and the H stands for 'Handheld'. It will provide high quality audio and video mobile multimedia broadcast anywhere, anytime, while driving or walking.

[0032] The DVB-H is developed by Nokia, a european communication company, and it is superior than terrestrial DMB at frequency utilization and has the advantage of using UHF bandwidth. But, in january, 2004, a standard draft has been made and is now on to the 'ETSI' waiting for results.

[0033] On the other hand, terrestrial DMB is a technical standard developed to enhance the defects of mobile reception of american DTV, the terrestrial DMB is a technology using VHF frequency.

[0034] Also, the MediaFLO is a new portable broadcasting technology suggested by americas Qualcamm company, which uses the current VHF frequency broadband broadcasting network, used by domestic terrestrial broadcasting companies, but bonding with CDMA mobile communication network. In detail, the MediaFLO can create new broadcasting and merged communication business model where it is being proposed for domestic portable broadcasting standards along with terrestrial DMB and DBV-H. MediaFLO is in competition with a real time streaming, download and play clipcasting DMB services.

[0035] Also, the analog broadcasting signal is generally a tuner installed on a TV receiver, a device with certain amount of coil and condenser mixed together. Generally, in most cases, one or both sides of the coil and condenser is made adjustable so that it could be tuned to other frequencies in the future. For example, on a radio receiver, an adjustable condenser is used to receive global broadcasting frequencies. TV receiver, for instance, from the input part to the middle frequency conversion part of the antenna is integrated to make enough electric shield to work as a tuner.

[0036] Also, the signal converter 220 which amplifies and decodes the received signal, converts received analog signal to a digital signal. Also, the audio output unit 260, outputs the audio signal to the user which signal is from the converted signal from the signal converter 220.

[0037] From here, the display unit 200 is a image display device composed of Flat display panel, and there are examples of this such as, liquid crystal display(LCD) TV, Plasma display panel(PDP) TV and etc, and the audio output unit is connected through the cabinet and connection unit 600(refer to FIG. 5)

[0038] On the other hand, the air conditioner according to the present invention further includes: a power unit 300, which supplies power to the respective component of the air conditioning unit 100 and the display unit 200 ; a operating unit 400, which inputs commands for the air conditioning unit 100 and the display unit 200; and an operational unit 500, which controls the air conditioning unit 100 and the display unit 200 from the commands that has been received by the controller unit.

[0039] In detail, the power unit 300 is to supply power to the air conditioning unit 100 and the display unit 200. In detail, since the air conditioning unit 100 and the display unit 200 has different voltage, the power unit 300 has to control the voltage so that it will supply the correct voltage to each of the air conditioning unit 100 and the display unit 200. For example, if the display panel 250 of the display unit 200 is a PDP panel, the power unit will deliver the reset voltage for the process of discharge, scan voltage and sustain voltage to each of the operational unit of a control board. Also, the power unit controls, the voltage to activate a compressor 11 of the air conditioning unit 100, the voltage for the motor 32 of a ventilator 13, 30 for the interior and the exterior, the voltage to activate the outlet device and the sensor unit 15, the voltage to activate the expansion valve 14.

[0040] The operational unit 400 is to input users control commands for the air conditioning unit 100 or the display unit 200, for this example the operational unit 400 includes; a operational panel 410 supplied with the display unit 200 box, a wireless remote controller 420 which has a wireless communication function and is supplied additionally, and a receive unit 430 that transmits the wireless signal to the operational unit 500.

[0041] FIG. 2 is a disassembled perspective view showing the display unit and the air conditioner unit's bonding relations according to the present invention and FIG. 3 is a disassembled perspective view showing the entire structure of the air conditioner according to the present invention.

[0042] Referring to FIG. 2 and FIG. 3, as described, the present invention consists of the display unit 200 and the air conditioning unit 100.

[0043] In detail, the air conditioning unit 100, precisely inside the air conditioner includes a cabinet 20 consists of the front panel 22 and the base panel 24 that forms the external view; a indoor ventilator 30 which is installed inside the cabinet 20; an orifice 40 which makes the air flow inside to the ventilator fan 30; an indoor heat exchange unit 50 which is installed in the front of the orifice 40 so that it will exchange heat with the air flowing inside with the refrigerant; a control box 70 which controls the air conditioning unit 100; a drain pan 80 which collects the condensation water which has been condensed in the surface of the indoor heat exchanger; and a filter 60 which is placed in the front part of the cabinet to filter any unnecessary substances in the air. In detail, a inlet 25 is formed inside the cabinet 20 and the inlet 25 is covered with the filter 60. Also, the front panel 22 is joint fixed on to the base 24, and numerous outlet 26 is formed in the base 24. Also, on the base 24, an outlet unit 90 which is selectable switching the outlet 26 is provided. Also, the outlet unit 90 consists of, a vane 92, which switches the outlet, and a drive motor(not indicated), which drives the vane.

[0044] Also, the indoor ventilator 30 is installed on the base 24 and is a centrifugal blower, which outlets air which is taken in by the axial direction to a radial direction.

[0045] Also, to prevent the collision of the outlet air from installation of multiple ventilator on the base, the base interior is divided by a partition 24a. Also, an air guide 24b is installed on each upper side of the interior of the base, where the air, from the indoor ventilator, which outflows to the top side is turned and guided to the outlet on the side.

[0046] Also, a plasma filter 110 is installed on the surface of the heat exchange unit 50, so that it will collect dust and unnecessary substances from the air flowing through the inlet.

[0047] Also, a piping cover 21 is installed on the edges of the cabinet 20, the piping cover 21 is constructed on the edge of the base 24 to form the exterior part of the air conditioning unit 100.

[0048] From here, the piping cover 21 is formed on a multiple places of 4 edges of the cabinet 20, in this example 2 places in the low edge is installed. Also, the exterior refrigerant pipe penetrates the piping cover 21 and is guided to the interior of the cabinet 20.

[0049] On the other hand, the display unit 200 installed on the surface of the air conditioning unit 100 includes; a display panel 250, which displays images, and a case 610, which the display panel is placed.

[0050] In detail, at least on one part of the case 610, precisely on the exterior border part of the display panel 250, a speaker 616 is installed. Also, a receiver unit 430 is provided on the other part of the case 610, which receives signal from the controller panel 410 and remove controller 420. From here, the FIG. 1 controller unit 410 includes; the controller panel 420, remote controller 420 and controller unit 400.

[0051] In detail, the controlling panel 410 provides; controlling button 411/412, which turns the air conditioning unit 100 and the display unit 200 on and off, and a popup button, which turns the status of the air conditioning unit 100 on and off on to the display panel 250. Obviously, the controlling butting 421/422 and popup button 424 is provided to the remote controller 420. Also, a memory slot 612 is installed on the other side of the case 610, which connects external memory, and a internal memory is installed on the interior of the case 610. Also, MMC/SD, CF, XD, MS and etc is included on the memory slot 612.

[0052] The following explains the working process of the air conditioner and the working process of the air conditioning unit.

[0053] First of all, when the user inputs a command through the controlling panel 410 or the remote controller 420, the control unit 500 controls at least one of the air conditioning unit 100 or the display unit 200 by the input command.

[0054] From here, when the user inputs a command to drive the air conditioning unit 100, the control unit 500 will drive the air conditioning unit 100 by the input command.

[0055] For example, when the user inputs a command to cooling, the control unit 500 will sense the temperatures of indoor air, outdoor air, pipe of the indoor heat exchange unit 50 and etc from the sensor unit 15, then will compare it with the desired temperature of the air conditioning unit 100 and will drive the air conditioning unit 100.

[0056] In detail, the control unit 500 will drive the compressor 11 to compress the refrigerant and the compressed refrigerant is condensed in the outdoor heat exchange unit 12 and then the condensed refrigerant will be expanded to a low temperature and low pressure when penetrating through the expansion valve 14. Also, the refrigerant penetrated through the expansion valve 14 will be vaporized by the heat suction from the room air and the vaporized refrigerant will be moved back to the compressor 11. From here, the room air will loose its heat through the indoor heat exchanger it and the room temperature will be low to the temperature setting.

[0057] Also, when the user drives the display unit 200 with a control command, the control unit 500 will drive the display unit 200 by the control command of the user. From here, the user can input command to display the indoor temperature and humidity through the display method of the display. In detail, the indoor temperature, humidity and etc is displayed on to the display panel 250 by receiving signal from the sensor unit 15 of the air conditioning unit 100 from the control unit 500.

[0058] Also, when the air conditioning unit 100 and the display unit 200 is driven at the same time, the display panel 250 will display, the status of the air conditioning unit 100 and the image display from the signal receiver 210, by the display method inside the display. Detailed explanation will be done below.

[0059] FIG. 4 is a front view showing only the air conditioner unit with display unit excluded according to the present invention and FIG. 5 is a disassembled perspective view showing the display unit bonding with the front panel of the air conditioner according to the present invention.

[0060] Referring to FIG. 4 and FIG. 5, a front panel is combined to the surface of the base of the present invention and on the interior of the front panel 22 a fixed sized outlet is formed covered by a filter 60. Also, between the front panel 22 and the base 24, various components for installed for air conditioning (refer to FIG. 3).

[0061] Also, the display unit 200 consists; the case, which is detachable to the cabinet through the connecting unit 600, and a display panel 250, which is fixed on the interior of the case 610. Also, the audio output unit 260, the signal receiver 210 and the signal converter 220 is installed on the interior of the case 610. Also, a external input terminal 614 (for example, DVI, RGB, Component, S-Video, Composite, Optical, AV terminal, HDMI, and etc) is installed to receive external signal on the interior of the case. Also, the external input terminal 614 is connected to the signal converter 220.

[0062] Also, in detail, the case 610 constitutes; a front

cover 611, which is installed to cover the surface edge of the display panel 250, and the front base 613, which is combined with the front cover 611 situated on the back of the front cover 611.

[0063] From here, the display panel 250 is installed between the front cover 611 and the front base 613 and signal receiver 210, signal converter 220 and control unit 500 installed on the back of the display panel 250 is shielded by the front base 613.

[0064] Also, an internal memory is installed inside the memory slot 612, which connects external memory, on the case 610.

[0065] From here, the external memory and the internal memory is the memory unit 270 in FIG. 1, and the memory slot 612 or the external input terminal 614 can be installed on the cabinet 20 of the air conditioning unit 100 referring to the installation place of the control unit 500.

[0066] Also, the audio output unit 260, as described, is to output the audio signal, from the converted signal that went through the signal converter 220, to the user, where the speaker 616 for the audio output and the external output terminal (not indicated) is installed on the case.

[0067] On the other hand, the display unit 200 is combined with the front panel 22 by the connecting unit 600. In detail, the connecting unit 600 connects the case of the display unit 200 and the front panel 22 of the air conditioning unit 100, so that when the exchange or cleaning of the filter 60 , or when detaching, opening and closing of the display unit 200 is done with ease.

[0068] In detail, the connection unit 600 constitutes; the 1st link 620 and the 2nd link 630 is each hinge connected to the back of the case 610 and the front panel 22. Also, the 2nd link 630 is situated in the lower part of the 1st link 620, and is formed longer than the 1st link 620. Also, in this example, all the ends of the 1st link 620 and the 2nd link 630 is connected, where all the ends are to be turned in up and down direction.

[0069] Also, on the back of the case 610, a bracket 622/632 is formed on each of one end of the 1st link 620 and the 2nd link 630 so that the both link could be hinge connected, and on the front of the front panel 22 a bracket 623/633 is formed on each of the other end of the 1st link 620 and the 2nd link 630 so that the both link could be hinge connected. Also, the other end of the 2nd link 630 is combined with the bracket 633 to be able to slide with the bracket. Especially, when the display unit 200 and the air conditioning unit 100 is separated, the other end of the 2nd link 630 will rise following the bracket 633 and is separated from the front panel 22.

[0070] Also, the case 610 and the front panel 22 are fit bonded. In detail, a hook 642 is formed on the back of the case 610, and hook bracket 644 is formed on the front panel 22, which is fit bonded with the hook 642. So, when the display unit 200 and the cabinet 20 is bonded, and when the case 610 of the display unit 200 where the 1st link 620 and the 2nd link 630 is hinge connected, the hook 642 and the hook bracket 644 is fit bonded. Also, a grill 650 is formed on the back of the case 610, and the case 610 and the front panel 22 is lifted in a fixed amount.

[0071] FIG. 6 is a perspective view illustration of the operation status of the air conditioner according to the present invention.

[0072] Referring to FIG. 6, when the air conditioning unit 100 is activated, the indoor ventilator 30 is activated, and the room air is circulated from the activated above indoor ventilator 30 through the cabinet 20.

[0073] In detail, the room air flows in through the inlet 25 formed in the front panel 22, then flows out through each outlet 26 of the base 24.

[0074] Especially, in this example, since the inlet 25 is formed in the front panel 22, the room air flows in through the space between the case 610 of the display unit 200 and the front panel 22, and moves to the indoor ventilator 30 through the filter 60.

[0075] On the other hand, each outlet unit 26 installed in the outlet 26 is controlled by the control unit 500, and only when the air conditioning unit 100 is activated the outlet 26 is opened by the vane 92 turning.

[0076] From here, when the air conditioning unit 100 is activated, the air flowing from the lifted space between the front panel 22 and the case 610 moves to the inlet 25, contacting with the back of the display unit 200. So, the air from the inlet will act to cool the heat unit of the display unit 200. In detail explanation, the air from the inlet absorbs the heat discharged from the display panel 250 and electronic parts when contacting the back of the display unit 200. Also, the air with high temperature, which absorbed the heat, is cooled when penetrating the indoor heat exchange unit 50 of the air conditioning unit 100. Also, the cooled air, from the indoor heat exchange unit 50, goes out though the outlet 26 back to the room.

[0077] So, when the display unit 200 and the air conditioning unit 100 is both active, even though at hot situations the temperature of the display unit 200 will not rise. So, the inlet air to cool the room air will also act to cool the display unit 200 at the same time.

[0078] Contrary, when the heat function is activated, the inlet room air absorbs heat primary from the display unit 200, the air penetrating indoor heat exchange unit 50 will rapidly be heated, increasing the heat efficiency.

[0079] Also, since the air conditioning unit 100 is situated in the back of the display unit 200, the exposure area of the air conditioning unit 100 will be minimized to the user.

[0080] Also, when only the display unit 200 is active, and when only the indoor ventilator 30 from other components of the air conditioning unit 100 is active by the control unit 500, the heat unit of the display unit 200 will be cooled due to the air flow. So, it will be unnecessary to install the cooler unit for the display unit 200, resulting minimizing the component requirement for the display unit.

[0081] FIG. 7 is an operation status view when only the air conditioner unit is under operation according to

the present invention.

[0082] Referring to FIG. 7, when the display unit 100 is inactive and the air conditioning unit is active, the control unit 500 displays the status of the air conditioning unit 100 on the display panel 250.

[0083] For example, by the control unit 500, the room temperature, humidity, desired temperature, outdoor temperature, airflow meter and etc is displayed on the display panel 250. Also, the status of the air conditioning unit 100 can be displayed in part or in full of the display panel 250.

[0084] On the other hand, in this present invention the air conditioning unit 100 circulates the refrigerant through the compressor 11-indoor heat exchange unit 50-expansion valve 14-outdoor heat exchange unit 12 and also drives as a heat cycle.

[0085] FIG. 8 is an operation status view when only the display unit and air conditioner unit is under operation according to the present invention.

[0086] Referring to FIG. 8, while the air conditioning unit 100 is active, if the user inputs a command through the controller 400 to the display unit 200, the control unit 500 will activate the display unit 200 as the user has commanded.

[0087] From here, when the user commands to turn on the TV, the control unit 500 will receive the signal through the TV tuner, through signal conversion, then display the received image signal on the display panel 250.

[0088] Especially, when the image is displayed while the air conditioning unit 100 is activated, the image of the status of the air conditioning unit 100 will be displayed in part of the display panel 250 as a picture in picture(PIP) 251.

[0089] Also, when the display unit 200 is activated, the user can turn off the status display of the air conditioning unit 100 by controlling commands through the operational unit 410. In other words, by pressing the popup button 414/424 provided on the remote controller 420 or the control panel 410 to turn the active status display of the air conditioning unit 100 on and off on the display panel 250.

[0090] FIG. 9 is an actual example of another method of displaying the status of the air conditioner unit on the display panel according to the present invention.

[0091] Referring to FIG. 9, the status bar, which displays the status of the air conditioning unit 100 on the display panel 250, can be moved at a specific direction. By this flexible movement of the status bar, it will minimize the interference with the image the user is viewing.

[0092] Also, when only the display unit 200 is activated by the user control commands, the control unit 500 will only activate the display unit 200 as commanded by the user.

[0093] Also, by a user inputting the commands to the operational unit 400, the room temperature and humidity can be displayed as a picture in picture. Also, the room temperature, humidity and etc is displayed on the display panel 250 by receiving the signal from the sensor unit 15 of the air conditioning unit 100 on the control unit 500.

[0094] FIG. 10 is a block diagram showing the structure of the air conditioner according to the 2nd actual example of the present invention.

[0095] Referring to FIG. 10, the air conditioner according to the 2nd example differs to the 1st example, where the control unit 500 constitutes; a control unit 510 for air conditioning unit 100, which controls the conditioning unit 100, and control unit 520 for display panel 250, which controls the display unit 200, and the main control unit 530, which controls the control unit 510 for air conditioning unit and receives the input commands from the user and the control unit 520 for display panel.

[0096] From here, since the power unit 300 is controlled by the main control unit 530, by the user's command, it supplies power to the control unit 510 for air conditioning unit or the control unit 520 for the display unit.

[0097] Also, the operation panel 400, like the 1st example, consists of the control panel 410, remote controller 420 and the receiver 430 which transmit the control command by the user to the main control unit 530.

[0098] The following of the 2nd example components will not be dealt, since it is identical to the 1st example.

[0099] FIG. 11 is a front perspective view of the air conditioner according to the 3rd actual example of the present invention and FIG. 12 is a disassembled perspective view of the air conditioner according to the 3rd actual example of the present invention.

[0100] Referring to FIG. 11 and FIG. 12, the air conditioning unit 100 includes; a front panel 22, which the display unit 200 is installed to, and a cabinet 20, which constitutes of the base assembled on the back of the front panel 22, and a speaker 616, which is provided on both side of the cabinet 20, and a indoor ventilator 30, which is installed inside the cabinet 20, and orifice 40, indoor heat exchange unit 50 and a drain pan 80 is installed and included.

[0101] Also, on the interior of the front panel 22 and the base 24, the indoor heat exchange unit 50, orifice 40, indoor ventilator 30 and etc is fixed inside so that it will stay internally.

[0102] From here, a display panel 22, which constitutes of the display unit 200, is installed on the surface of the front panel 22, and a multiple of outlet is formed between the edge part of the display panel 250 and the edge part of the front panel 22. Also, the display panel 250 is installed inside the front panel 22, where the display panel 250 will be placed to form identical flat position with the front panel 22.

[0103] Also, an inlet 25 is formed to intake the room air on the back of the base 24. In detail, more projected protrusion 29 is formed on the back of the base 24, and the inlet 25 is formed in part or in all of the protrusion 29.

[0104] Also, a filter is provided on the front of the inlet 25, to purify the room air.

[0105] Also, on one side of the back of the base 24 provides; an external input terminal 614, which takes in

audio output terminal 618 and external signals such as DVI, RGB, Component, S-Video, Composite, AV terminal, HDMI, DVI and etc, and a joint hole 806c, which corresponds with the joint hole 241 formed on the support plate 806 of the support unit 800. Also, a memory slot 612, which connects external memory, is installed on the side edge of the base 24.

[0106] Also, 2 of the indoor ventilator 30, as a centrifugal blower, is installed on the inside of the cabinet 20, and each indoor ventilator 30 constitutes; a fan 32, and a motor 34 which drives the fan 32.

[0107] On the other hand, on the front part of the front panel 22, an outlet 26/27 is formed on each left, right and up, down side. Also, a partition 20a is formed on the center part of the back of the front panel 22, to prevent the collision of the outlet air from the multiple indoor ventilator 30. Also, the outlet 26/27 which is formed on the front panel 22 is connected to the outlet flow route 36, which the outlet air from the fan 32 by radial direction is flown and guided to the front.

[0108] From here, the front panel 22 constitutes; a front cover 21, which the display panel 250 is installed, and an inner panel 23, which is situated on the back of the front cover 21 to guide the outlet air from the indoor ventilator 30 and where the outlet flow route 36 is formed.

[0109] In detail, a hole to fit the display panel 250, and outlet 26 is formed on the front cover 21. Also, on the inner panel 23, a drive motor imprisoning part and partitioning 20a and outlet flow route 36 is formed.

[0110] So, the inlet air from the indoor ventilator 30 is outlet on a radial direction, following the outlet flow route 36, which is formed on the inner panel 23, to the outlet 26/27 of the front cover.

[0111] From here, the outlet flow route 36 is formed from the very edge of the interior of the front panel 22 to guide the air to curve on a fixed curvature.

[0112] Also, on the outlet 26/27 a outlet unit 90 (refer to FIG. 12), which opens and closes, is installed and the outlet unit 90 constitutes; a vane 92, which opens and closes the outlet 26, and a motor 94 which drives the vane 92. In this example, the outlet unit 90 is installed on the inner panel 23 and on the outlet 26/27, only the vane 92 is exposed.

[0113] On the other hand, the orifice 40 is installed between the base 24 and the indoor ventilator 30, and guides the inlet air from the inlet 25 to the fan 32. Also, the heat exchange unit 50 is installed between the base 24 and the orifice 40, and in this example the heat exchange unit 50 is fixed on to the orifice 40.

[0114] Also, on the heat exchange unit 50, a connection pipe 52 is installed on one side so that the refrigerant pipe(not indicated), which is installed from the exterior, could be connected, and the connection pipe 52 is formed through the side or the low part of the heat exchange unit 50. Also, on the orifice 40, a member 40a is projected and formed, which divides the bended connection pipe 52.

[0115] From here, the heat exchange unit 50 is formed larger then the inlet 25 area, so that the inlet air from the inlet 25 will efficiently exchange heat. Also, on the lower side of the heat exchange unit 50, a drain pan 80 is installed to store or discharge the condensed water from the heat exchange unit 50, and the drain pan 80 is fixed on to the orifice 40 as well as supporting the lower part of the heat exchange unit 50.

[0116] On the other hand, the 1st hinge bracket 660 is formed on one side of the front panel 22, and on one side of the base 24, the 2nd hinge bracket 670 is installed, which is hinge bonded with the 1st hinge bracket 660. So, the front panel 22, installed on the display panel 250, is turnable centering the edge of one side of the base 24. Also, the user or the service man is able to identify the interior of the indoor unit by opening the front panel 22.

[0117] On the other hand, the opening unit 615 is formed on the inner panel 23, and the heat generated from the display unit 200 is discharged to the back of the inner panel 23 through the opening unit.

[0118] From here, since the ventilator 30 is installed and active on the back of the inner panel 23, the opening unit 615 is formed on the edge of the fan 32 to efficiently radiate by the discharged outlet air on a radial direction, when turned, of the fan 32.

[0119] So, the heat from, the signal receiver 210 of the display unit 200, which is situated between the inner panel 23 and the front cover 21, and the signal converter 220, and the display panel 250 and the control unit 500, is generated through the opening unit 615.

[0120] Especially, multiple of the opening unit 615 is installed on the edge of the fan 32, and the air, between the inner panel 23 and the front cover 21, is moved effectively to the back of the inner panel 23 by the outlet pressure of the outlet air.

[0121] Also, the outlet air from the indoor ventilator 30 is formed at a lower temperature than the room temperature when the air conditioning unit 100 is active, the cooling of the display unit 200 is formed efficiently. Also, when only the display unit 200 is active, the air conditioning unit 100 will only activate the indoor ventilator 30, not any other components, so that the heating of the display unit 200 can be done.

[0122] The following, according to the 3rd example, other compositions will not be explained due to the identical features to the 1st example.

Claims

1. An air conditioner having image display function, comprising:

   an air conditioning unit has at least one of the heat, cool and air purifying feature; and

   a display unit provided with an image panel, which is bonded to the air conditioning unit, on which at least one of the status of the air conditioning unit or the image is displayed.

2. The air conditioner according to claim 1, further comprising a control unit which selectively or simultaneously controlling the air conditioning unit and the display unit.

3. The air conditioner according to claim 1, further comprising:

a control unit for air conditioning unit which controls the air conditioning unit,
a control unit for display unit which controls the display unit, and
a main control unit, which controls the control unit for air conditioning unit and the control unit for display unit, while receiving input commands for the air conditioning unit or the display unit, at the same time.

4. The air conditioner according to claim 1, further comprising an operational unit for inputting operational command of at least one of the air conditioning unit or the display unit.

5. The air conditioner according to claim 4, wherein the operational unit includes a control panel provided on one side of the display unit.

6. The air conditioner according to claim 4, wherein the operational unit includes a receiver which is provided on one side of the display unit and receives remote signal, and a remote controller which wirelessly transmits operational commands to the operational unit.

7. The air conditioner according to claim 5 or claim 6, wherein the operational unit further comprises a control button which turns on and off the air conditioning unit or the display unit.

8. The air conditioner according to claim 5 or dlaim 6, wherein the operational unit further comprises a pop-up button, which turns on and off a screen showing the status of the air conditioning unit on the display panel.

9. The air conditioner according to claim 1, further comprising a sensor unit which is provided on the air conditioning unit and senses at least one of the indoor temperature, indoor humidity, outdoor temperature and indoor heat exchange unit temperature.

10. The air conditioner according to claim 9, wherein the information sensed by the sensor unit is selectively displayed on the display unit.

11. The air conditioner according to claim 1, wherein the part or the whole of the display unit may be detached from the air conditioning unit.

12. The air conditioner according to claim 1, wherein the display panel is an LCD or PDP.

13. The air conditioner according to claim 1, wherein the room air is sucked through the bonded part of the display unit and the air conditioning unit.

14. An air conditioner having image display function comprises;
a display unit, which includes a signal receiver receiving image signal and a display panel displaying the received image signal from the signal receiver;
an air conditioning unit which is connected to the display unit and includes a ventilator and a heat exchanger; and
a controller which controls at least one of the display unit and the air conditioning unit.

15. The air conditioner according to claim 14, wherein the display unit is coupled to a front part of the air conditioning unit, with being spaced out in a predetermined distance from the air conditioning unit.

16. The air conditioner according to claim 14, wherein the display panel is a flat display panel.

17. The air conditioner according to claim 14, wherein the signal receiver is at least one of TV tuner, DMB, external input terminal.

18. The air conditioner according to claim 14, further comprising:

a power unit which supplies electricity to at least one of the display unit and the air conditioning unit.

19. The air conditioner according to claim 14, wherein an air flow passage to cool down the display unit by means of the inlet air sucked by the ventilator is formed.

20. The air conditioner according to claim 14, further comprising a connection unit which connects the display unit onto the air conditioning unit.

21. An air conditioner having image display function comprises;
an air conditioning unit, which performs at least one of cooling, heating and air purifying function;
a display unit, coupled to the air conditioning unit, which displays at least one of status of the air conditioning unit or image;
a control unit which controls at least one of the display unit and the air conditioning unit; and
an operational unit for inputting the command for operation of at least one of the display unit and the air

conditioning unit.

22. The air conditioner according to claim 21, wherein the operational unit is a controlling panel provided on one side of the display unit.

23. The air conditioner according to claim 22, wherein the controlling panel is provided with a controlling button for making the air conditioning unit and the display unit perform selectively or simultaneously.

24. The air conditioner according to claim 21, wherein the display panel displays one or both of the status of the air conditioning unit and the received image.

25. The air conditioner according to claim 21, further comprising a sensor unit which senses indoor temperature, indoor humidity, outdoor temperature, indoor heat exchange unit temperature,
wherein the sensed information by the sensor unit or the status of the air conditioning unit is displayed onto the display panel by means of PIP.

26. The air conditioner according to claim 21, wherein the operational unit is a remote controller for inputting wireless signals to the control unit.

27. The air conditioner according to claim 21, wherein the operational unit provided on one side of the display unit is a receiver that receives wireless motion signal.

28. An air conditioner having image display function, comprising:

a cabinet formed with inlet and outlet;
a ventilator provided inside the cabinet which sucks and discharges room air for air conditioning;
a heat exchange unit provided inside the cabinet which exchanges heat with the room air;
a display panel installed in the cabinet which displays broadcasting signal;
a signal receiver which receives the broadcasting signal to display on to the display panel;
a signal converter which converts the received broadcasting signal from the signal receiver; and
a control unit which controls at least one of the heat exchange unit, the ventilator, the display panel, the signal receiver and the signal converter.

29. The air conditioner according to claim 28, wherein an air flow passage is formed to cool down at least one of the display panel, the signal receiver, the signal converter and the control unit using the intake air by the ventilator.

30. The air conditioner according to claim 28, wherein the signal receiver is at least one of a digital broadcasting receiver, TV tuner and external input device.

31. The air conditioner according to claim 30, wherein the external input device is at least one of composite, component, S-video, AV, HDMI, USB and DIV.

32. The air conditioner according to claim 28, wherein the converted broadcasting signal from the signal converter is transferred to the display panel directly or after passing through the control unit.

33. The air conditioner according to claim 28, wherein the control unit displays one or both of the air conditioning status and the converted broadcasting signal at the same time on the display panel.

34. The air conditioner according to claim 28, wherein the control unit displays the status of the air conditioning using a pop-up image on the display panel.

35. The air conditioner according to claim 34, wherein the pop-up image is displayed by the PIP method.

36. The air conditioner according to claim 28, further comprising an operational unit,
wherein a specific frequency among the several received frequencies is selected by the input command through the operational unit.

37. The air conditioner according to claim 36, wherein the operational unit includes at least one of a controlling panel or a remote controller.

38. The air conditioner according to claim 28, further comprising a case supporting the display panel, wherein the cabinet is link-bonded to the case.

39. The air conditioner according to claim 28, wherein the cabinet includes a front panel containing the display panel and a base rotatably engaged to the front panel.

FIG.1

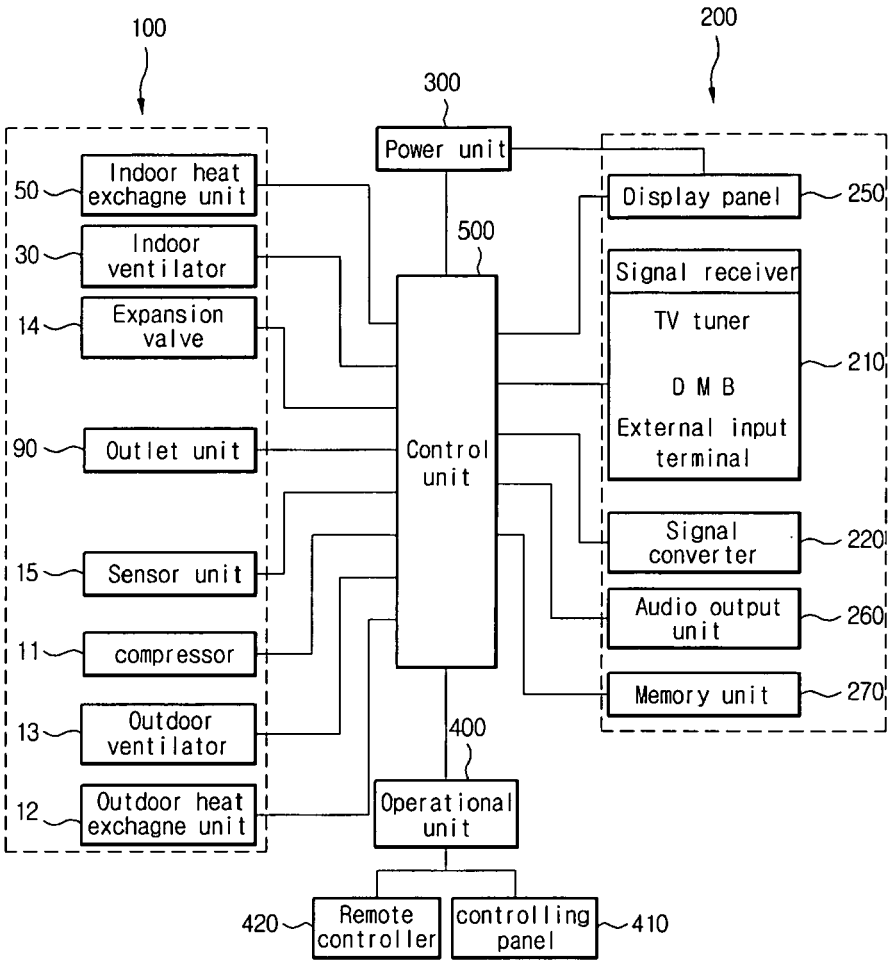

100
200
300
Power unit
50
Indoor heat exchagne unit
30
Indoor ventilator
14
Expansion valve
90
Outlet unit
15
Sensor unit
11
compressor
13
Outdoor ventilator
12
Outdoor heat exchagne unit
500
Control unit
400
Operational unit
420
Remote controller
controlling panel
410
Display panel
250
Signal receiver
TV tuner
D M B
External input terminal
210
Signal converter
220
Audio output unit
260
Memory unit
270

FIG.2

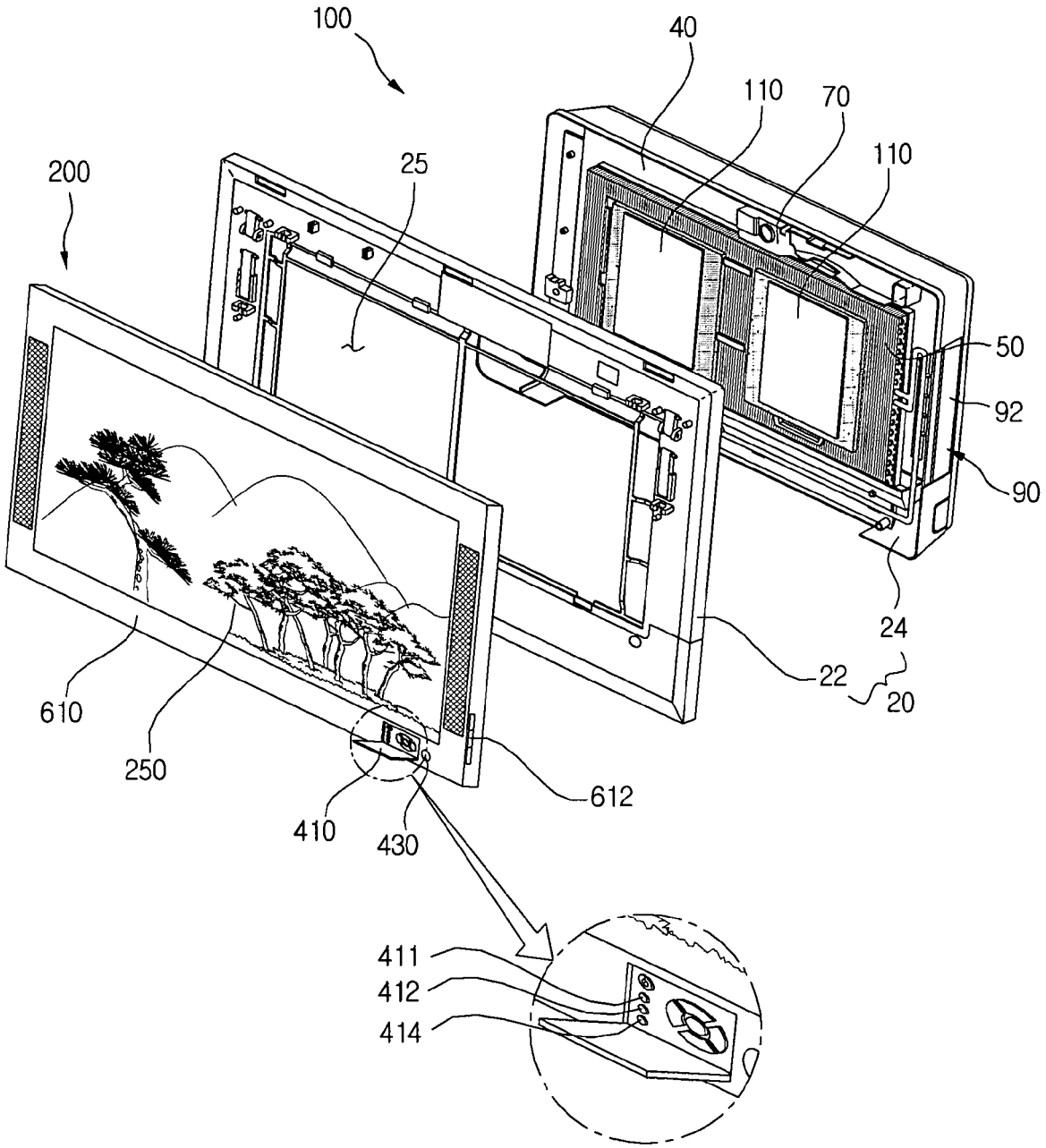

100
40
110
70
110
200
25
50
92
90
24
22
20
610
250
612
410
430
411
412
414

FIG.3

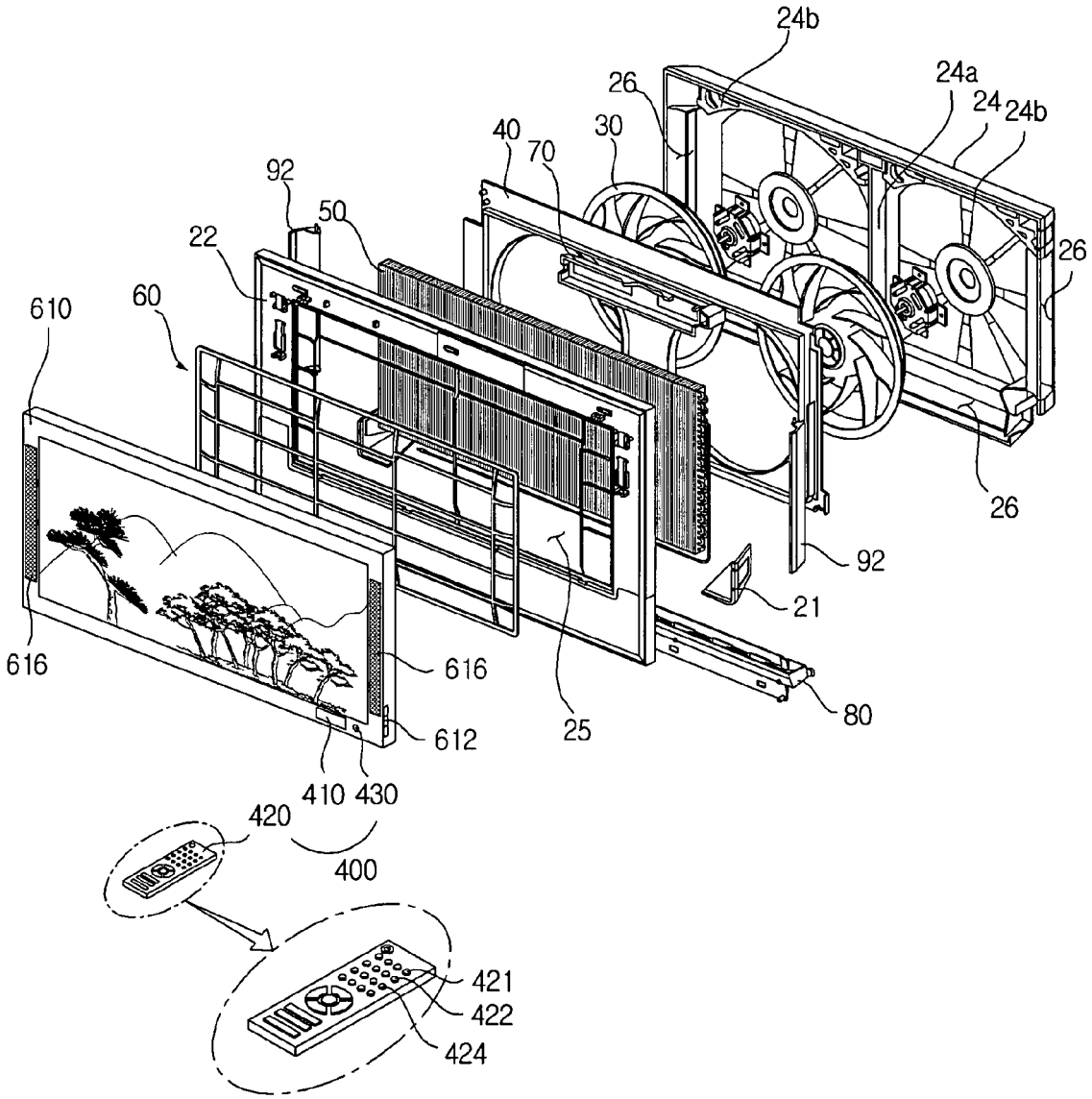

24b
26
24a
24
24b
40
70
30
92
50
22
26
610
60
26
92
21
616
616
25
80
612
410
430
420
400
421
422
424

FIG.4

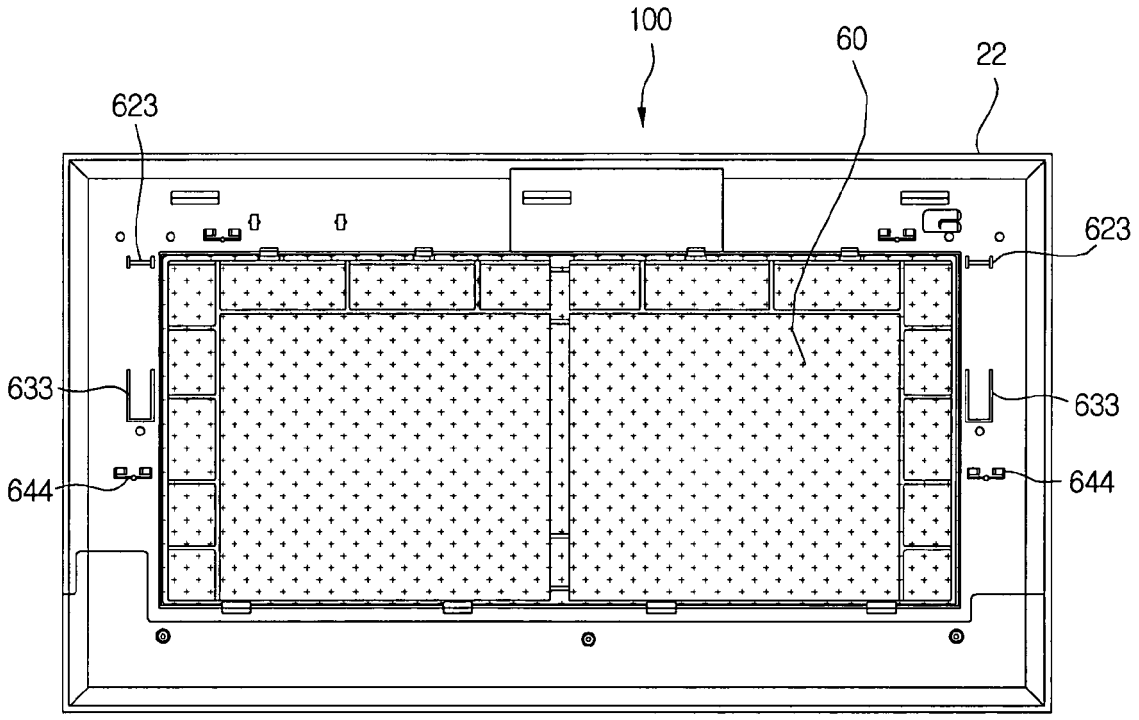


FIG.5

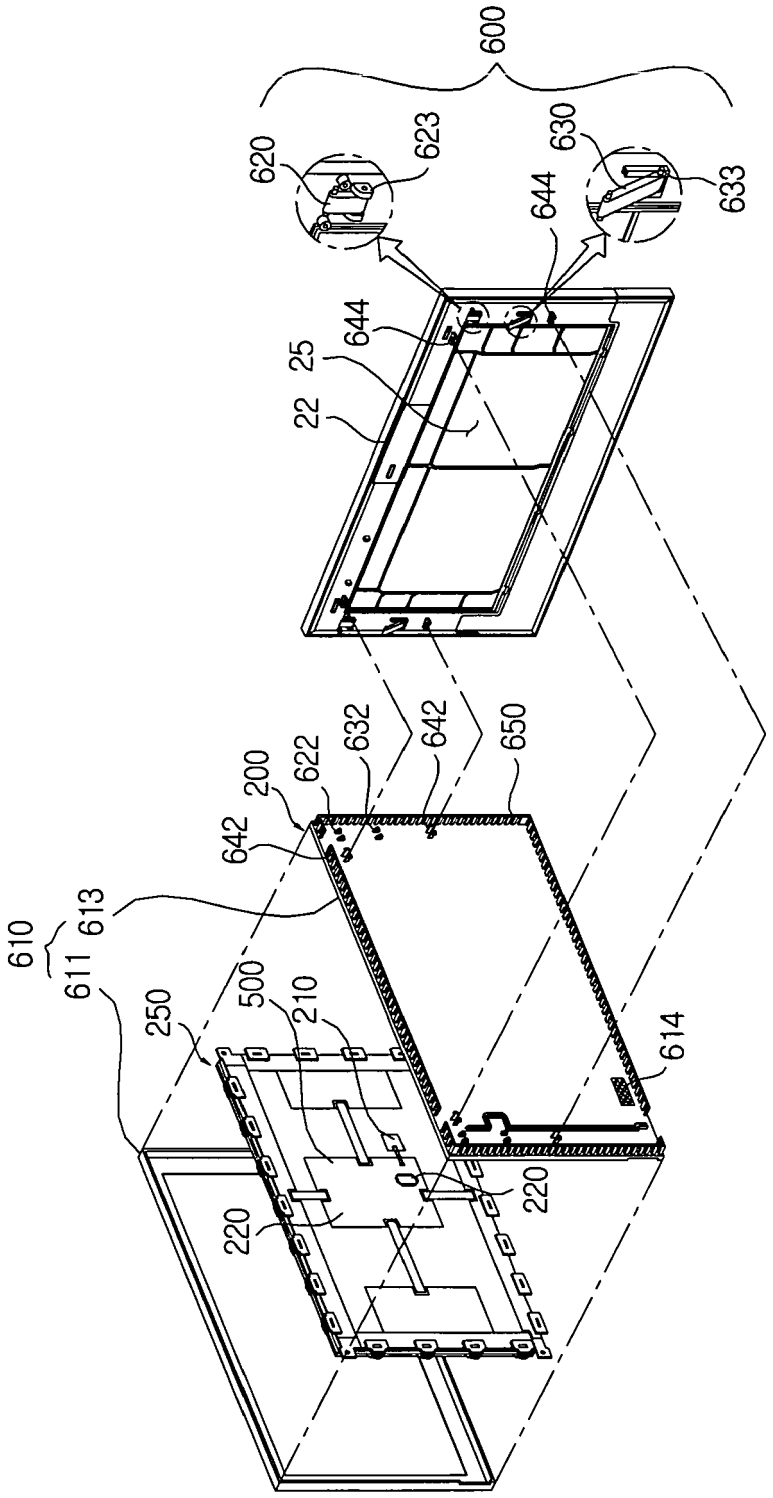

600
620
623
630
633
644
644
25
22
642
632
622
650
200
642
610
613
611
500
210
250
614
220
220

FIG.6

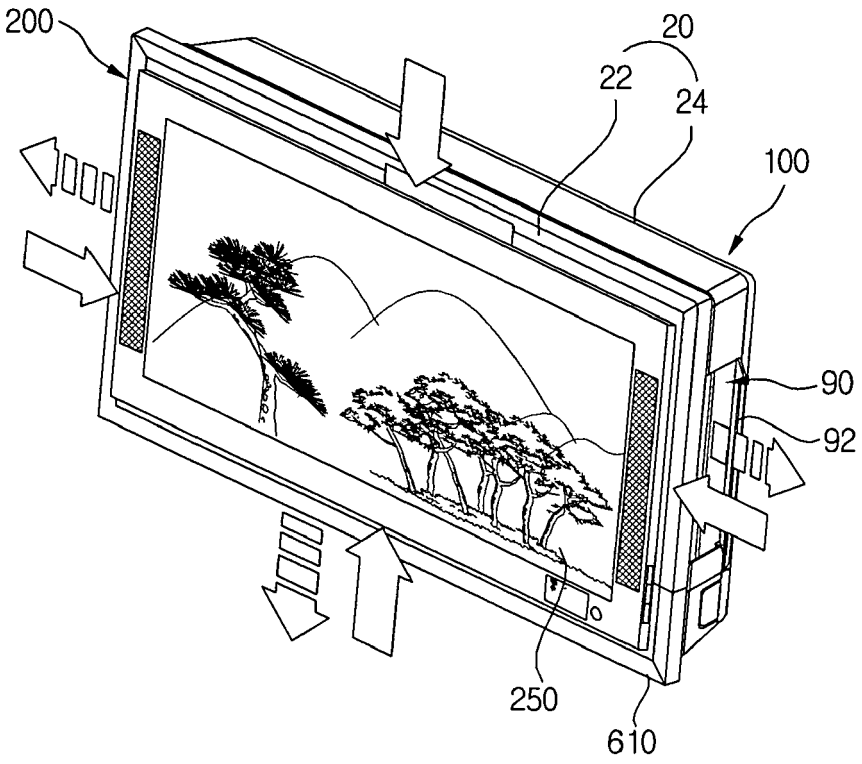


FIG.7

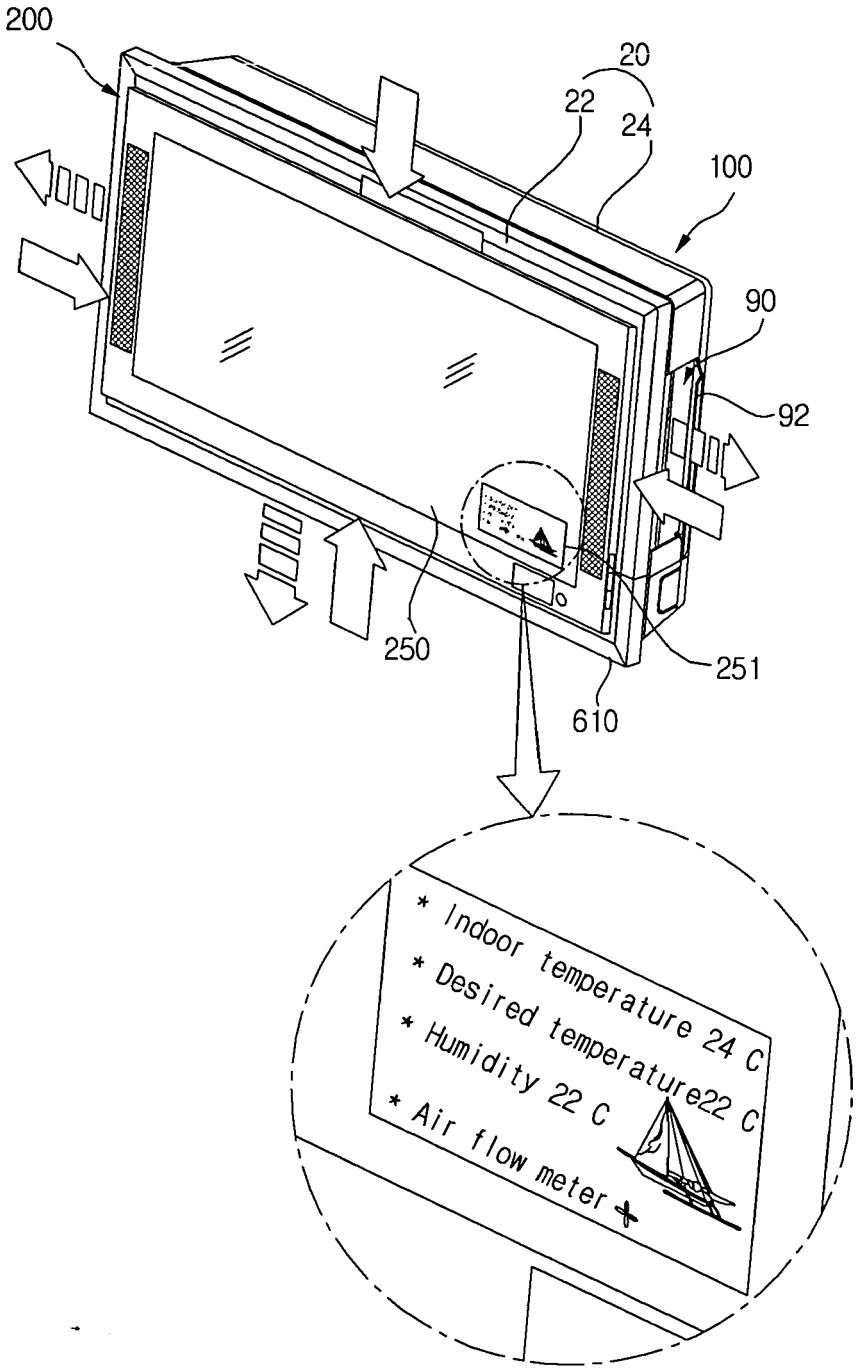

200
20
22
24
100
90
92
250
251
610
* Indoor temperature 24 C
* Desired temperature22 C
* Humidity 22 C
* Air flow meter

FIG.8

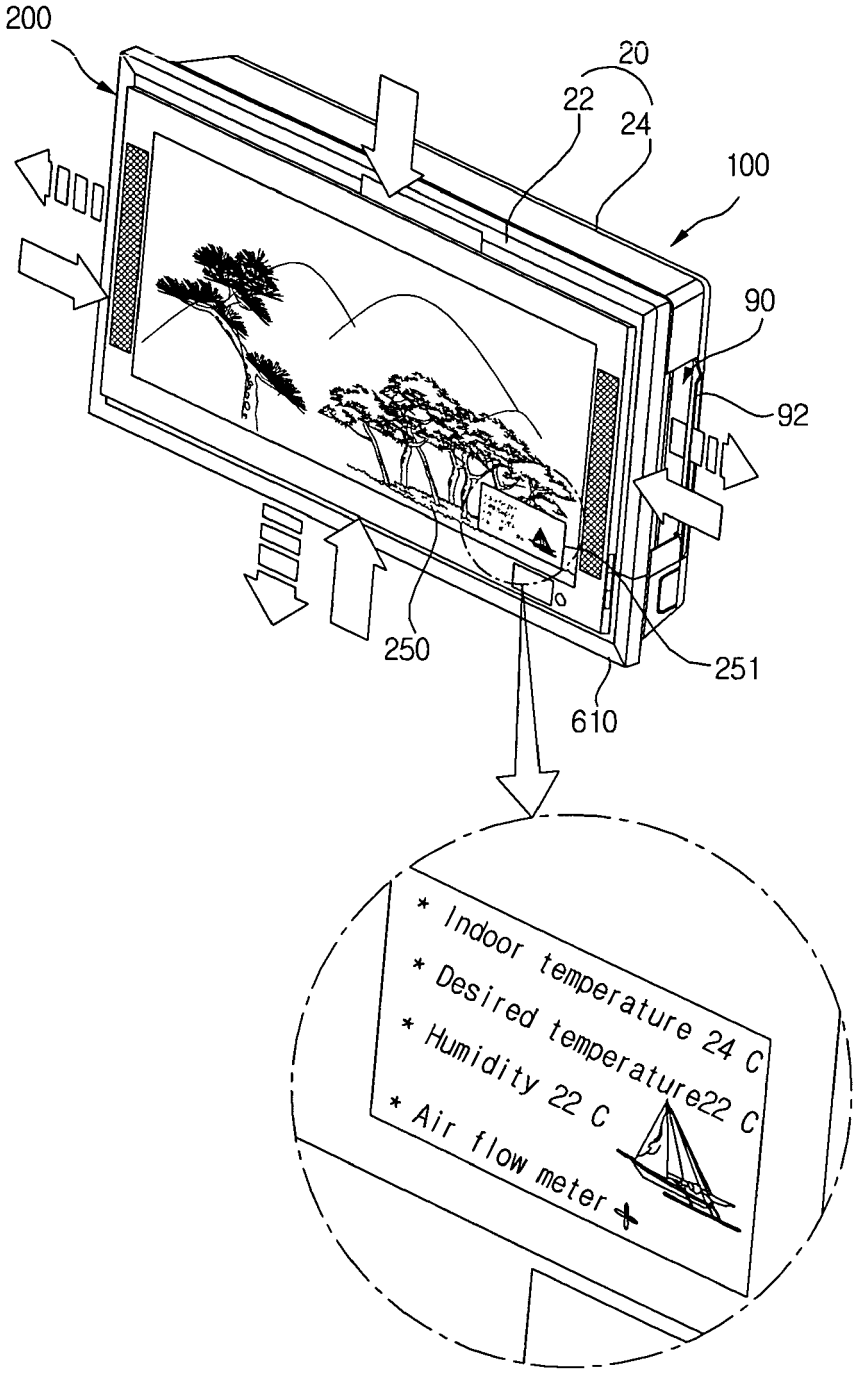

200
20
22
24
100
90
92
250
251
610
* Indoor temperature 24 C
* Desired temperature22 C
* Humidity 22 C
* Air flow meter

FIG.9

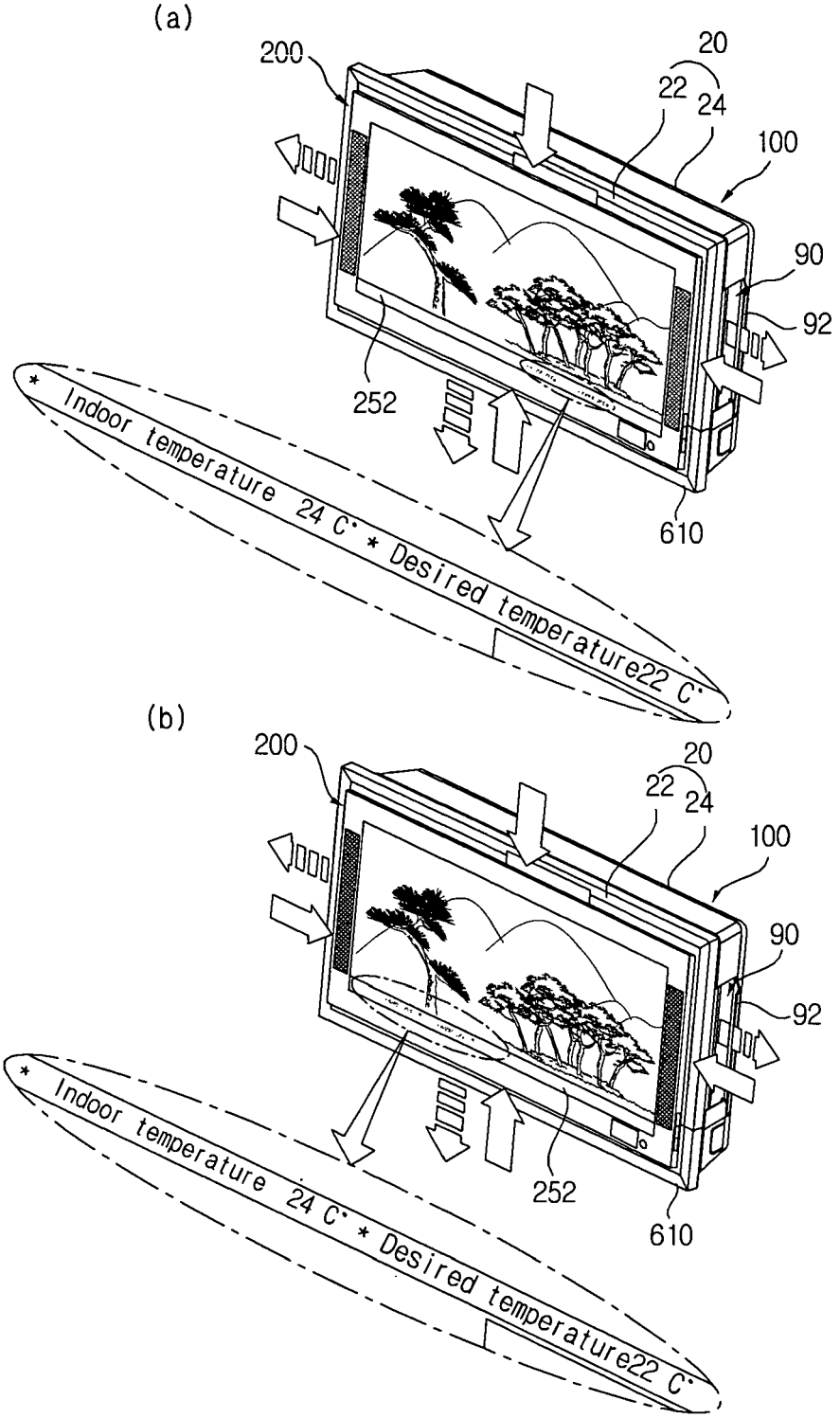

(a)
200
20
22
24
100
90
92
252
610
* Indoor temperature 24 C˚ * Desired temperature22 C˚
(b)
200
20
22
24
100
90
92
252
610
* Indoor temperature 24 C˚ * Desired temperature22 C˚

FIG.10

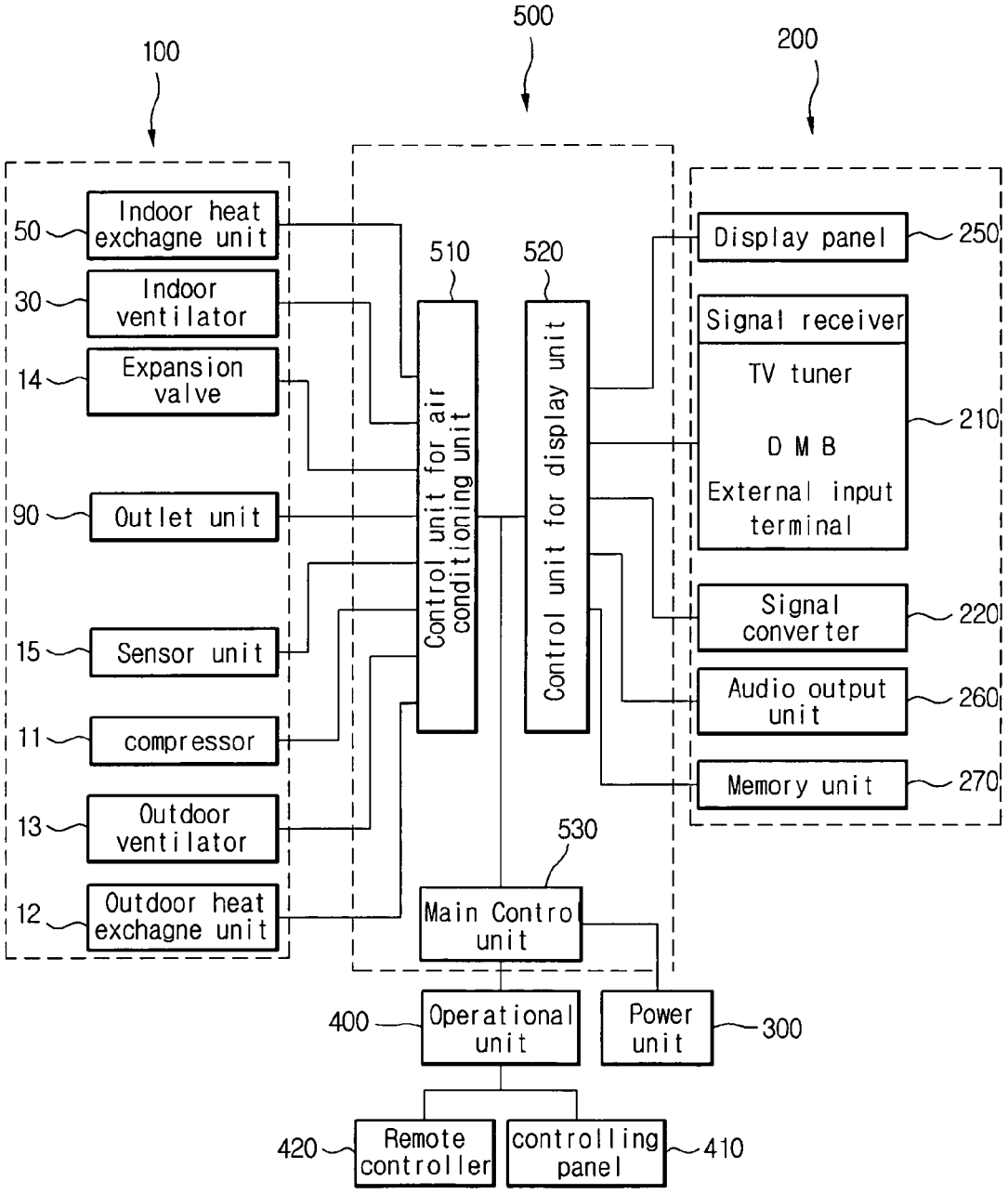

100
500
200
50
Indoor heat exchagne unit
30
Indoor ventilator
14
Expansion valve
90
Outlet unit
15
Sensor unit
11
compressor
13
Outdoor ventilator
12
Outdoor heat exchagne unit
510
Control unit for air conditioning unit
520
Control unit for display unit
530
Main Control unit
400
Operational unit
Power unit
300
420
Remote controller
controlling panel
410
Display panel
250
Signal receiver
TV tuner
D M B
External input terminal
210
Signal converter
220
Audio output unit
260
Memory unit
270

FIG.11

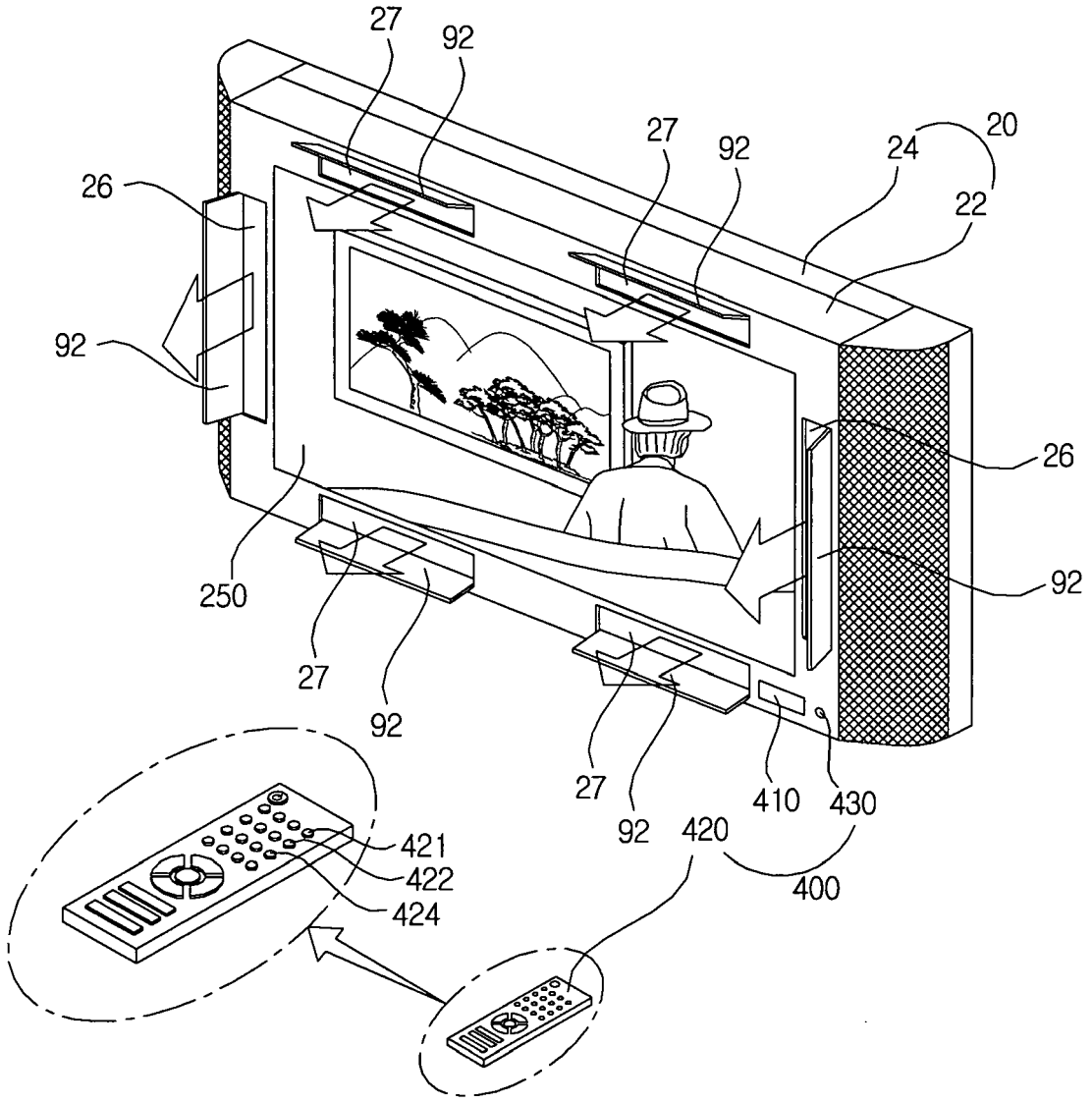
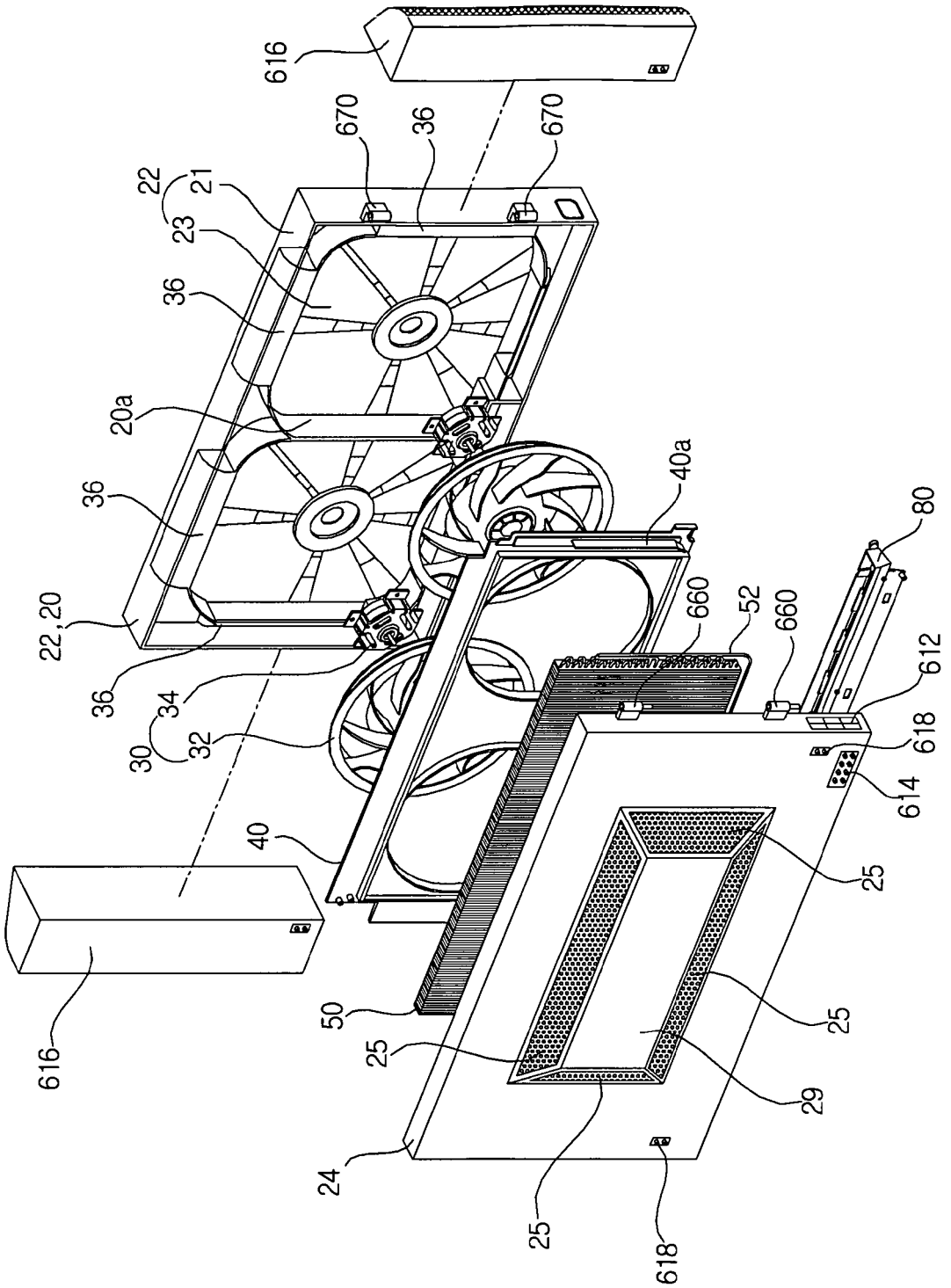

27
92
27
92
24
20
22
26
92
26
92
250
27
92
27
92
410
430
420
400
421
422
424

FIG.12


616
670
36
670
22
21
23
36
20a
36
40a
80
22,20
660
52
660
612
36
34
618
30
32
614
40
25
616
50
25
25
29
24
25
618