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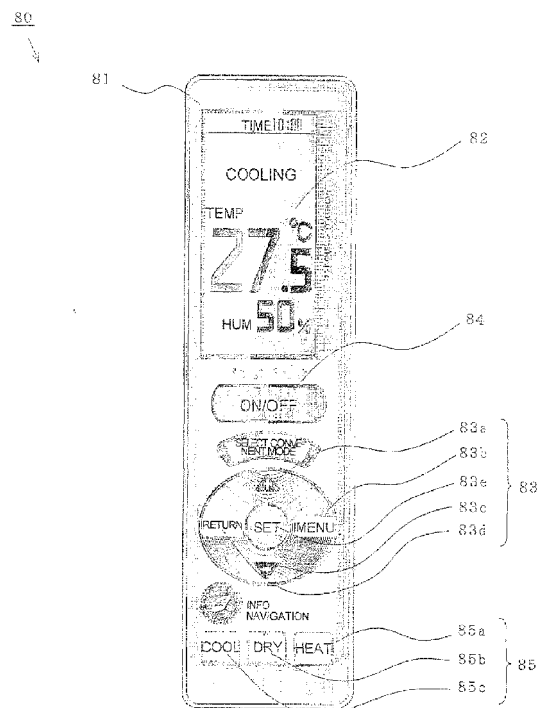
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(54) **Air-conditioning apparatus and support system of the same**

(57) When a user thinks "Is it a malfunction?" and wants to relieve this doubt and worry, the user first pushes a menu button (83b) on the remote control (80) and further pushes a minus button (83c) or a plus button (83a) to set the cursor on the "In a case such as...(inquiry menu)". Here, when the set button (83e) is pushed, two menu items, namely, "During heating operation..." and "From the outdoor unit..." are displayed. Further, when the set button (83e) is pushed while the cursor is set to the "During heating operation...", "The horizontal flaps will be in a horizontal state at the start of operation, during defrosting, and when temperature has become above the set temperature. It is not a malfunction" is displayed on the display unit (82).

FIG. 7



Description

[Technical Field]

[0001] The present invention relates to an air-conditioning apparatus and a support system of the same. More particularly, the invention relates to an indoor unit of an air-conditioning apparatus including a remote control (in the invention, referred to as a "remote control unit") provided with an interface display and a support system of the air-conditioning apparatus including a highly functional mobile phone (smartphone).

[Background Art]

[0002] Hitherto, there has been many cases in which a user wonders, "Is it a malfunction?" when a situation different from normal operation is encountered or when a display not usually seen is displayed on the main body during operation of the air-conditioning apparatus. In such cases, the user is unable to immediately judge "whether it is a malfunction or whether it is not a malfunction and is a normal operating state". As such, the user makes a judgment by reading an "instruction manual" that explains how to use the air-conditioning apparatus or by viewing the "website (site on the Internet)", which is time consuming. Furthermore, it is difficult for the user to immediately check information in a case in which the user has lost the instruction manual or when the user is unable to access the website.

[0003] Note that as regards the operation and state that causes the user to wonder, "Is it a malfunction?" of the air-conditioning apparatus, there are cases in which there is actually a malfunction in the air-conditioning apparatus leading to operation stop or abnormal operation, whereby there are cases in which although the air-conditioner seems to be operating in an abnormal way, it is not a malfunction but a normal operation (state). Further, there is a case in which the user can repair the malfunction by himself/herself when there is a malfunction and a case in which the user cannot repair the malfunction. Accordingly, there has been demand for making the user capable of understanding (judging) "what kind of situation" the present situation is under. Accordingly, there is disclosed a voice notification device of an air-conditioning apparatus that is capable of notifying information on the state of the air-conditioning apparatus (hereinafter, referred to as "state information") including the abnormal state, a self-diagnosis result, and the operation state of the air-conditioning apparatus by means of voice.

[Citation List]

[Patent Literature]

[0004] [Patent Literature 1] Japanese Unexamined Patent Application Publication No. 2000-81242 (pages 9

to 12, Fig. 3)

[Summary of Invention]

5 [Technical Problem]

[0005] However, the voice notification device of the air-conditioning apparatus disclosed in Patent Literature 1 has the following disadvantages:

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a. Since state information is notified by voice, the voice may be drowned out by the surrounding sound or may be mixed with the surrounding sound causing a case in which the voice is unable to accurately reach the user in need of the state information, as well as the voice itself that has been notified becoming a noise to users other than the user in need of the state information, thus causing discomfort.

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b. When an error check command from the remote control is received while there is no error flag stored in the control unit, only a voice stating "No abnormality" will be produced. The user has dispatched the error check command to relieve doubts and worries caused by a situation that is rarely encountered during daily operation. Although the user will understand that there is no abnormality, ultimately, the doubts and worries will not be relieved.

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[0006]

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c. The user has dispatched the error check command from the remote control because a situation that is rarely encountered during daily operation has occurred; however, the remote control does not allow the user to designate the content (parts and situation, for example) of the doubts and worries. Accordingly, the user will be unsure if the abnormality check has been performed to the content that the user intends to know, and confidence towards the voice notification device is undermined.

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d. The user is notified by voice when operation modes are switched from automatic operation or defrosting operation, or when a cold-air-blast prevention operation is performed during heating operation. Accordingly, frequent notification of the state information becomes disturbing to the ear and becomes information of no interest to the user, thus causing discomfort.

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[0007] The invention has been made to overcome the above disadvantages and provides an air-conditioning apparatus that is capable of notifying the user of the state information of the air-conditioning apparatus in a simple and prompt manner.

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[Solution to Problem]

[0008] An air-conditioning apparatus of the invention

includes components performing a refrigeration cycle; a body control unit controlling the components; and a remote control unit being capable of two-way communication with the body control unit, in which the remote control unit includes a display unit that displays a predetermined projected image and a selection means to select the projected image displayed on the display unit, the projected image is provided with an inquiry menu to inquire about a state that occurs in low frequency during steady operation, and when the inquiry menu is selected by manipulation of the selection means, a projected image explaining a content of the state is displayed subsequent to the inquiry menu on the display unit by communication between the remote control unit and the body control unit.

[Advantageous Effects of Invention]

[0009] The air-conditioning apparatus according to the invention is provided with the inquiry menu to inquire about the state that has low frequency of occurrence during steady operation, and when the inquiry menu is selected, the projected image explaining the content of the situation is displayed by communication between the remote control unit and the body control unit; hence a user can be informed on the state of the air-conditioning apparatus surely and conveniently, in particular, the user can be promptly informed that it is not a malfunction. Accordingly, the air-conditioning apparatus is capable of promptly relieving the doubts and worries without having the user read the instruction manual or access the website, and enables comfortable use of the air-conditioning apparatus to continue.

[Brief Description of Drawings]

[0010]

Fig. 1 is a cross-sectional view of an indoor unit of an air-conditioning apparatus according to Embodiment 1 of the invention viewed from the side.

Fig. 2 is a perspective view illustrating a portion (a filter and a filter cleaning device) of the indoor unit pulled out therefrom.

Fig. 3 is a perspective view illustrating a portion (the filter and the filter cleaning device) of the indoor unit pulled out therefrom.

Fig. 4 is a perspective view illustrating a portion (a filter guide device and the filter cleaning device) of the indoor unit pulled out therefrom.

Fig. 5 is a perspective view illustrating a portion (the filter guide device and the filter cleaning device) of the indoor unit pulled out therefrom.

Fig. 6 is a perspective view illustrating a portion (the filter guide device) of the indoor unit pulled out therefrom.

Fig. 7 is a front view of a portion (a remote control) of the indoor unit.

Fig. 8 is a front view illustrating an example of a display unit when there is a malfunction or inappropriate installation.

Fig. 9 is a front view illustrating an example of the display unit to solve the inappropriate installation (removing).

Fig. 10 is a front view illustrating an example of the display unit to solve the inappropriate installation (installing).

Fig. 11 is a front view illustrating a menu displayed on one of the display units (the remote control).

Fig. 12 is a front view illustrating an example of a display in response to the doubts and worries displayed on the display unit of one of the display units (the remote control).

Fig. 13 is an organized flowchart of the flow of the display of one of the display units (the remote control).

Fig. 14 is a front view illustrating an example of the display unit when there is a "content that the user wants to know".

Fig. 15 is a block diagram schematically illustrating a configuration of a support system of an air-conditioning apparatus according to Embodiment 2 of the invention.

Fig. 16 is a flowchart illustrating an operation flow of the support system of the air-conditioning apparatus shown in Fig. 15.

Fig. 17 is a flowchart illustrating the operation flow of the support system of the air-conditioning apparatus shown in Fig. 15.

Fig. 18 is a flowchart illustrating the operation flow of the support system of the air-conditioning apparatus shown in Fig. 15.

Fig. 19 is a schematic diagram of an air-conditioning apparatus according to Embodiments 1 and 2.

[Description of Embodiments]

[Embodiment 1]

[0011] Figs. 1 to 7 describe an indoor unit of an air-conditioning apparatus according to Embodiment 1 of the invention. Fig. 1 is a cross-sectional view of the whole indoor unit of the air-conditioning apparatus viewed from the side, Figs. 2 and 3 are perspective views each illustrating a pulled out portion (a filter and a filter cleaning device), Figs. 4 and 5 are perspective views each illustrating a pulled out portion (a filter guide device and the filter cleaning device), Fig. 6 is a perspective view illustrating a pulled out portion (the filter guide device), and Fig. 7 is a front view illustrating a portion (a remote control) of the indoor unit. Note that each of the drawings is schematically illustrated and the invention is not limited to the illustrated form of each drawing.

(Indoor Unit of Air-Conditioning Apparatus)

[0012] Referring to Figs. 1 and 2, an indoor unit 100 of an air-conditioning apparatus 1000 (hereinafter, also simply referred to as "indoor unit") includes an indoor unit body 10 constituted by a housing, a blower fan 20 that is disposed in the indoor unit body 10 and that sucks in air and blows out the suction air (to be exact, conditioned air), a heat exchanger 30 that is disposed in the air passage formed by the blower fan 20 and that conditions the suction air, and an air filter (hereinafter, referred to as "filter") 40 that catches dust in the suction air, a filter advancing and retracting device 50 that advances and retracts (moves) the filter 40, a filter guide device 60 that turns over the upper and lower side of the filter 40, and a filter cleaning device 70 that removes dust attached to the filter 40.

Note that the air-conditioning apparatus 1000 includes an outdoor unit 110, as shown in Fig. 19. Further, a refrigeration cycle is performed by a refrigerant compressor, an outdoor heat exchanger, and a refrigerant expansion means mounted in the outdoor unit 110; a heat exchanger 30 mounted in the indoor unit 100; and a refrigerant circuit 130 that sequentially connects these components. In order to perform an optimum refrigeration cycle, an outdoor blower fan is mounted in the outdoor unit 110. Accordingly, "component performing a refrigeration cycle" in the invention is a general term referring to at least the refrigerant compressor, the outdoor heat exchanger, the refrigerant expansion means, the heat exchanger 30, the refrigerant circuit, the outdoor blower fan, and the blower fan 20 collectively or individually.

[0013] The air-conditioning apparatus 1000 further includes a body control unit 120 (shown in Fig. 19) that controls the devices such as the blower fan 20 and the heat exchanger 30 and a remote control unit (hereinafter, referred to as a "remote control") 80 that is capable of two-way communication with the body control unit (to be exact, a transmitter-receiver (not shown) connected to the body control unit). The body control unit 120 may be mounted in the indoor unit 110.

Note that the filter 40 refers to a left side filter 40L and a right side filter 40R that are disposed on the left and right, respectively. A common filter advance/retraction driving motor box 51 is disposed between the two that advances and retracts the two. Note that the invention is not limited to the above form, and an independent (separate) filter advance/retraction driving motor box 51 may be disposed to each filter 40 to advance and retract the filters. Furthermore, the filter 40 is not limited to the left and right paired filters.

(Indoor Unit Body)

[0014] The indoor unit body is a housing with both sides (not shown) covered, is opened on the top side (upper side in Fig. 1, equivalent to the upper area of the indoor unit body) in which an opening is formed as an inlet port

11 that sucks in air, is partially opened on the bottom side (lower side in Fig. 1) and is opened on the front side (area on the left side close to the bottom side in Fig. 1, equivalent to the lower area of the indoor unit body) in which an opening is formed as an outlet port 12 that discharges the air that has been sucked in from the inlet port 11. Additionally, the front side (the left side in Fig. 1) is opened in which a design panel 13 that open/close the opening is disposed. Note that the rear side (the right side in Fig. 1) is covered.

(Blower Fan)

[0015] The blower fan 20 is disposed between the inlet port 11 and the outlet port 12 of the indoor unit body 10 when viewed from the side and generates an air flow from the inlet port 11 to the outlet port 12. A discharge side air passage 19 between the blower fan 20 and the outlet port 12 is a space that is located substantially between an air passage front plate 14 and an air passage rear plate 15. The discharge side air passage 19 is disposed with vertical louvers (not shown) that control the orientation of the discharged conditioned air in the horizontal direction. Furthermore, the outlet port 12 is disposed with horizontal flaps 16 and 17 that control the orientation of the discharged conditioned air in the vertical direction.

Note that the horizontal flaps 16 and 17 are detachable, and when not installed in their regular positions, a sensor (not shown) detects this and transmits the detection signal to the body control unit, which then issues a command forbidding the startup of the air-conditioning apparatus 1000.

(Heat Exchanger)

[0016] The heat exchanger 30 conditions (cool, heat, dry, etc.) suction air and is constituted by a first heat exchanger 31 that is disposed on the lower portion of the front side, a second heat exchanger 32 that is disposed from the upper portion of the front side to the top side, and a third heat exchanger 33 that is disposed from the top side to the upper portion of the rear side. These heat exchangers are disposed between the inlet port 11 and the blower fan 20 (equivalent to the upstream side of the blower fan 20) so as to be disposed around the blower fan 20 in a substantially lambda (λ) shape or a substantially inverted U-shape when viewed from the side.

Further, a drain pan 34 and a drain pan 35 that captures the dripping drain from the first heat exchanger 31 and the third heat exchanger 33, respectively, are provided below each of the respective heat exchangers.

Note that air that has been conditioned is referred to as "conditioned air" in the invention. Furthermore, the form of configuration and arrangement of the heat exchanger 30 is not limited to the form illustrated in the diagram.

(Filter)

[0017] The air filter (hereinafter, referred to as a "filter") 40 is advanced (pulled out) so as to cover the entire inlet port 11 during normal condition, is positioned between the inlet port 11 of the indoor unit body 10 and the heat exchanger 30, that is, on the upstream side of the heat exchanger 30 and is moved (winded, for example) so as to retract from the inlet port 11 with the filter advancing and retracting device 50 during filter cleaning, and in Fig. 1, either one or both of the left side filter 40L on the left side when viewed from the front side and the right side filter 40R on the right side when viewed from the front side is illustrated.

Since the left side filter 40L and the right side filter 40R are same in form, when describing contents that are common to the two in the following description, the "left side, right side" in their names and the suffix "L, R" in their reference signs are omitted. Furthermore, as regards other components that are disposed to the left and right when viewed from the front, the "left side, right side" in their names and the suffix "L, R" in their reference signs are also omitted.

[0018] Referring to Fig. 2, the filter 40 is provided with a pair of filters that are disposed to the left and right of the indoor unit body 10 (having therebetween the filter advance/retraction driving motor box 51 of the filter advancing and retracting device 50). Further, the filter 40 has a substantially rectangular shape in which the length in the front-back direction (the depth) is longer than that in the left-right direction and is constituted by a vent filter (mesh filter) 41 and a substantially square-blocked filter frame 42 to which the vent filter 41 is provided.

A filter driven tooth 43, which have a concave-convex pattern at even intervals, are formed on one side of the filter frame 42 in parallel portions in the front-back direction. Further, the filter frame 42 is formed of a flexible material and is tabular when formed; however, since it is flexible, when it is mounted in the indoor unit 100 of the air-conditioning apparatus, it can be shaped into a substantially J-shaped curve or a rollable substantially spiral-shape, when viewed from the side.

(Filter Advancing and Retracting Device)

[0019] Referring to Fig. 3, the filter advancing and retracting device 50 is disposed on the upper front side (a position substantially in the middle in the top-bottom direction or in the upper portion close to the top side) of the indoor unit body 10 and includes a filter driving gear 53 that meshes with the filter driven tooth 43 of the filter 40, a filter drive shaft 52 to which the filter driving gear 53 is fixed, and the filter advance/retraction driving motor box 51 that houses the drive motor (not shown) that rotatably drives the filter drive shaft 52. Further, the filter advance/retraction driving motor box 51 is disposed close to the front side of the indoor unit body 10 substantially in the middle in the left-right direction.

Furthermore, one end of the filter drive shaft 52 is rotatably supported by a bearing (not shown) that is provided in the filter advance/retraction driving motor box 51 and the other end of the filter drive shaft 52 is rotatably supported by a bearing (not shown) that is provided in the indoor unit body 10.

(Filter Guide Device)

[0020] Referring to Figs. 4 to 6, the filter guide device 60 guides the filter 40 such that the side of the filter that is on the upstream side of the air passage when the filter 40 is advanced into the air passage becomes the downstream side when the filter 40 is retracted (guides the filter 40 such that the bottom side when advanced becomes the upper side when retracted).

The filter guide device 60 is a housing with its bottom side opened and is formed by, when viewed from the side, a substantially J-shaped guide top plate 61 that includes a substantially arcuate liner area 61a and a substantially arcuate area 61b; a guide front side plate 62 extending downwards from the front edge of the substantially arcuate area 61b of the guide top plate 61; a guide rear side plate 63 extending downwards from the rear edge of the substantially arcuate area 61b; and a pair of guide end plates 64 that covers the end portions of the substantially arcuate area 61b and that are disposed in the substantially arcuate area 61b, the guide front side plate 62, and the guide rear side plate 63.

[0021] Further, in each of the pair of guide end plates 64, a surface cleaning brush bearing 65 that slidably supports (repeats a normal rotation and a reverse rotation within a predetermined rotation angle) the corresponding one of the two ends of a surface cleaning brush rocker shaft 73 and a mounting hole 68 in which a mounting protrusion 75 of a dust box (equivalent to a dust chamber) 74, which forms the filter cleaning device 70, are provided.

Furthermore, in a position corresponding to the nadir of the substantially J-shaped guide top plate 61 when viewed from the side, dust through holes 66 that are penetration grooves with a predetermined width are formed, and scraping protrusions 67a and 67b (hereinafter, either one or both may be referred to as "scraping protrusion 67") having a substantially wavy shape protruding downwards are provided on the bottom side of the guide tip plate 61 along the side edges of the dust through holes 66 in the longitudinal direction (equivalent to the left-right direction of the indoor unit body 10) or in parallel to the side edges (with a predetermined distance from the side edges).

[0022] Additionally, when the filter advancing and retracting device 60 is disposed in the indoor unit body 10, the upper side of the guide top plate 61 faces the filter driving gear 53 of filter advancing and retracting device 50 while forming a predetermined gap therebetween. That is, one side of the filter 40 abuts on the guide top plate 61 while the filter driven tooth 43 formed on the

other side are meshed with the filter driving gear 53.

Note that the filter 40 is detachable, and when not installed in the regular position with respect to the filter guide device 60, a sensor (not shown) detects this and transmits the detection signal to the body control unit, which then issues a command forbidding the startup of the air-conditioning apparatus 1000.

(Filter Cleaning Device)

[0023] Referring to Fig. 1, the filter cleaning device 70 includes a surface cleaning brush 72 that is abutable to the surface of the filter 40 on the lower side that has been guided by the filter guide device 60, a back surface cleaning brush 71 that is abutable to the surface of the filter 40 on the upper side, and the dust box 74 that stores dust that has been removed from the filter 40 therein. Note that the back surface cleaning brush 71 may be omitted.

(Dust Box)

[0024] The dust box 74 is a housing with a released upper side and is disposed under the surface cleaning brush 72 (equivalent to under the guide top plate 61 of the filter guide device 60). The upper end portion of the dust box is arranged in close contact with the guide front side plate 62, the guide rear side plate 63, and the pair of guide end plates 64 of the filter guide device 60. Here, since each of the mounting protrusions 75 protruding in the left-right direction that are provided to the dust box 74 penetrate through the corresponding mounting hole 68 that is formed in the guide end plate 64, the dust box 74 does not fall off from the filter guide device 60. Accordingly, since the dust box 74 is in a state with a lid thereon with the substantially arcuate area 61b of the guide top plate 61 of the filter guide device 60 and through the guide front side plate 62, the guide rear side plate 63, and the pair of guide end plates 64, dust that has dropped into the dust box 74 does not scatter to the surroundings.

(Cleaning Brush)

[0025] The surface cleaning brush 72 is disposed (embedded) in the surface cleaning brush rocker shaft 73, and the surface cleaning brush rocker shaft 73 is rotatably supported by the surface cleaning brush bearings 65 that are disposed under the guide top plate 61 (to be exact, the substantially arcuate area 61b) of the filter guide device 60. Here, the surface cleaning brush 72 is embedded in the surface cleaning brush rocker shaft 73 in the range of substantially 15 degrees in the circumferential direction; however, the invention is not limited to the above range and may be, preferably, in the range approximately under 90 degrees.

Further, the surface cleaning brush rocker shaft 73 is parallel to the lowermost line of the substantially arcuate area 61b (to be exact, since dust through holes are

formed, the imaginary lowermost line) of the guide top plate 61.

[0026] Furthermore, the surface cleaning brush rocker shaft 73 is connected to a rocking means (not shown) and is rocked in a predetermined angular range (90 degrees in the front and back direction with respect to a vertical line, for example).

In addition, the back surface cleaning brush 71 is disposed above the guide top plate 61 of the filter guide device 60 and is fixed to the indoor unit box 10 with its end facing downwards.

Accordingly, when the filter 40 slidably advances or retracts in the substantially arcuate area 61b, the end of the surface cleaning brush 72 is abutted to one side of the filter 40 while sliding in the front-back direction and the end of the back surface cleaning brush 71 is abutted to the other side of the filter 40 while sliding.

[0027] Accordingly, dust captured by the filter 40 is removed with the surface cleaning brush 72 and the back surface cleaning brush 71 and is dropped into the dust box 74 through the dust through hole 66.

Further, dust that is still attached to the surface cleaning brush 72 is scraped off by the scraping protrusion 67 and drops into the dust box 74.

Note that the dust box 74 are detachable, and when not installed in the regular position, a sensor (not shown) detects this and transmits the detection signal to the body control unit, which then issues a command forbidding the startup of the air-conditioning apparatus 1000.

(Remote Control)

[0028] Referring to Fig. 7, the remote control 80 is capable of two-way communication with the body control unit. The method may be either an infrared two-way communication or a wireless two-way communication. Further, a triaxial acceleration sensor may be mounted (as for this, it will be described in detail separately).

The remote control 80 includes an interface display unit (hereinafter, referred to as "display unit") 82, which displays a predetermined menu or a predetermined image thereon, disposed on the surface of the remote control body 81; a selection button 83 to manipulate the image displayed on the display unit 82; ON/OFF button instructing a start/stop of an operation; and a mode selection button 85 to select an operation mode.

[0029] The display unit 82 is constituted by, for example, a full dot (255*160) liquid crystal display and displays characters and images (still images or moving images) described later (anything displayed is collectively referred to as "projected image" in the invention). Note that data of the above projected images (characters and images) may be pre-stored in a storage unit in the remote control 80 or may be stored in a storage unit in the body control unit and transmitted to the remote control 80 as required.

[0030] The selection button (equivalent to the selection means) 83 includes a plus button (also a cursor up

button) 83a, a menu button 83b, a minus button (also a cursor down button) 83c, and a return button 83d that are circularly arranged in substantially equal angular intervals and a set button 8 that is arranged in the middle of the circle. The application method of each button will be described in detail separately.

The ON/OFF button 84 instructs the start or stop of the operation of the air-conditioning apparatus, and by pushing the button, switching is performed from OFF to ON or from ON to OFF.

The mode selection button 85 includes a heating selection button 85a to select a heating mode, a drying selection button 85b to select a dehumidification mode, and a cooling selection button 85 to select a cooling mode.

(Display of Display Unit)

[0031] Referring to Fig. 7, when the ON/OFF button is pushed and the air-conditioning apparatus is turned on, a displayed content that had been displayed on the display unit 82 when the air-conditioning apparatus had been turned off previously is displayed. Fig. 7 indicates that the air-conditioning apparatus had been stopped during cooling operation when the set temperature was 27.5 degrees C and the set humidity was 50 %, and indicates that the operation will be resumed under the above conditions. Further, if the ON/OFF button is pushed to turn off the air-conditioning apparatus, the display on the display unit 82 will disappear.

However, when there is a failure in a portion of the device (for example, when a temperature sensor for control is damaged) or when there is a nonconformance in which a portion of the detachable components are not installed properly (the horizontal flaps 16 and 17 not installed in exact location and the like), there will be no display of "the operation mode, the set temperature, and the set humidity" as above on the display unit 82.

Note that although the selection button 83 is provided separately from the display unit 82, the invention is not limited to this and the selection button may be provided integrally with the display unit 82 by means of a touch panel.

[0032] Figs. 8 to 14 describe the air-conditioning apparatus according to Embodiment 1 of the invention. Figs. 8(a) and (b) are front views illustrating examples of the display unit when there is a malfunction and Fig. 8(c) is a front view illustrating an example of the display unit when there is inappropriate installation. Fig. 9 is a front view illustrating an example of the display unit (procedures to remove the flaps) to solve the inappropriate installation. Fig. 10 is a front view illustrating an example of the display unit (procedures to install the flaps) to solve the inappropriate installation. Fig. 11 is a front view illustrating a menu displayed on one of the display units (the remote control). Fig. 12(a) is a front view illustrating an example of a display corresponding to the doubts and worries displayed on the display unit (the flap is in a horizontal state) of one of the display units (the remote con-

trol). Fig. 12(b) a front view illustrating an example of a display in response to the doubts and worries displayed on the display unit (water or white smoke is coming out) of one of the display units (the remote control). Fig. 13 is an organized flowchart of the flow of the display of one of the display units (the remote control). Fig. 14 is a front view illustrating an example of the display unit when there is a "content that the user wants to know".

Note that each of the drawings is schematically illustrated and the invention is not limited to the illustrated form of each drawing.

(Indication of Malfunction)

[0033] Fig. 8 illustrates examples of the display of the display unit 82 of the remote control 80 based on instructions of the body control unit in a case in which there is a malfunction or a nonconformance in a portion of the device before the operation is started, such as when the ON/OFF button is pushed and the apparatus is turned on or when the remote control 80 that is mounted with an acceleration sensor is picked up by a user and the acceleration sensor has detected that the remote control 80 has been moved, or in a case when a malfunction has occurred during a normal operation.

[0034] Referring to Fig. 8(a), "Failure of the temperature sensor for control Please call service center" is displayed on the display unit 82. That is, since a malfunction that the user cannot deal with has occurred, it is explicitly displayed that "it is a malfunction" and "contact to the service center is required".

Here, when the set button 83d is pushed, "The address, the telephone number, fax number, and the like of the service center" is displayed on the display unit 82 (see Fig. 8(b)). Accordingly, since the user can promptly deal with the malfunction, it will be possible to promptly resume the operation.

Note that since there are many types of malfunction, the message is changed in accordance with the content of the malfunction. Further, in order to ensure accuracy when the user contacts the service center, along with the message indicating the content of the malfunction, a malfunction code indicating the content of the malfunction may be displayed as well. Generally, when the user tries to know the meaning of the malfunction code, the user will be referring to an instruction manual; however, since the content of the malfunction is displayed as a message on the display unit 82, the user does not have to refer to the instruction manual. Furthermore, by knowing the malfunction code, a richer content as compared to that displayed on the display unit 82 as a message can be obtained in the service center.

[0035] In addition, when the set button 83d is pushed, a message and a bar code (hereinafter, referred to as "QR code (registered trademark)") 89 such as "Read QR code below to display content of the malfunction" is displayed on the display unit 82 (see Fig. 8(c)). Accordingly, the user can not only promptly deal with the malfunction

but can also understand the content of the malfunction that has occurred.

That is, since a QR code 89 that stores a URL of the website for mobile phone terminals is displayed on the display unit 82, by having the mobile phone read the QR code 89, the content of the malfunction that has occurred is displayed on the screen (not shown) of the mobile phone. Specifically, detailed information related to the air-conditioning apparatus that states the content in the instruction manual and that on the website is pre-registered in the above website and the malfunction code that corresponds to the content of the malfunction that the air-conditioning apparatus has determined is embedded in the QR code 89. Accordingly, the content of the malfunction that has occurred is selected from the pre-registered information and is displayed on the screen of the mobile phone.

Note that if the user does not need to know the content of the malfunction that has occurred, then the user may successively push the set button 83d to re-display the display illustrated in Fig. 8(a).

(Display of Inappropriate Installation)

[0036] Referring to Fig. 8(d), "Horizontal flaps are not installed properly Please remove and reinstall the flaps" is displayed on the display unit 82 when attempting to start the operation. That is, it is informed that although the air-conditioning apparatus is not operable, the situation can be dealt with by the user.

Here, when the set button 83d is pushed, procedures to resolve the inappropriate installation (a procedure for removing the flaps (see Fig. 9) and a procedure for installing the flaps (see Fig. 10)) are sequentially displayed on the display unit 82 by means of schematic diagrams and messages.

(Display for Resolving Inappropriate Installation)

[0037] Referring to Fig. 9(a), "Push down the small flap at the back" is displayed as the first step for removing the flaps.

Referring to Fig. 9(b), a state in which "the safety stoppers are moved" is displayed as the second step for removing the flaps.

Referring to Fig. 9(c), a state in which "the small flap at the back is pulled out" is displayed as the third step for removing the flaps, and that the first step to the third step be carried out to the other flaps is displayed.

[0038] Referring to Fig. 10(a), a state in which "a flap is inserted" is displayed as the first step for installing the flaps.

Referring to Fig. 10(b), a state in which "the safety stoppers are surely inserted" is displayed as the second step for installing the flaps.

Referring to Fig. 10(c), "a message informing what kind of situation will occur when the flaps are not installed properly" is displayed along with a schematic diagram.

Accordingly, in a case in which the air-conditioning apparatus is not malfunctioning but is not operable, the user can understand the content and, further, can promptly and readily deal with the situation, thus it will be possible to promptly resume the operation.

[0039] Note that since there are many types of inoperable situations where it is not a malfunction (for example, the filter 40 or the dust box 74 is not set in its regular position), the message is changed in accordance with the content thereof and the display indicating the procedure to resolve the inappropriate installation (for example, an outline for removing and installing the filter 40 or an outline for removing and installing the dust box 74) is also changed.

Note that a "detachable component" in the invention is a general term referring to a component configured to be installable and detachable by the user, such as the design panel 13, the horizontal flaps 16 and 17, and the filter 40, as well as the dust box 74 when equipped with a filter cleaning device 70, collectively or individually.

("Is It a Malfunction?")

[0040] Incidentally, as above, since various operations and states in which the user wonders, "Is it a malfunction?" are different from those that the user is usually accustomed to, even if it appears to be an abnormal operation or state, there are many cases in which it is not a malfunction but a normal operation or situation. Furthermore, much of the cases in which the user wonders, "Is it a malfunction?" concentrates to limited operations or states (not malfunctioning). Accordingly, the air-conditioning apparatus 1000 allows displays as below on the display unit 82 of the remote control 80 to promptly and appropriately relieve the doubts and worries of the user related to the limited operations or states.

(Menu Display)

[0041] Referring to Fig. 11 (a), when the user feels "there might be a malfunction", in order to relieve his/her doubt and worry, the menu button 83b in the remote control 80 is pushed. That is, when the menu button 83b is pushed during operation (in a state in which the ON/OFF button is in an on state), a plurality of menu items (for example, from first item to the sixth item) are displayed on the display unit 82 (see Fig. 11 (a)).

Here, when the minus button 83c is pushed, the cursor displayed in the uppermost row moves down and when the cursor reaches the lowermost row and further when the minus button 83c is pushed, a new menu item (the seventh menu item) is displayed in the lowermost row and the menu items that has been displayed shifts up a row while the menu item that has been displayed in the uppermost row (the first menu item) disappears.

[0042] On the other hand, when the plus button 83a is pushed, in contrast to when the minus button 83c was pushed, the cursor moves upwards and a new menu item

is displayed in the uppermost row.

Accordingly, by further pushing the menu button 83b, the menu items from the third item to the eighth item that has been displayed before is displayed (see Fig. 11 (b)).

Similarly, each time the minus button 83c is pushed, the menu item in the uppermost row disappears and a new menu item is displayed in the lowermost row.

[0043] Thus, by pushing the minus button 83c or the plus button 83a, the cursor can be moved to the desired menu item (for example, the eighth item "In such a case as..." corresponds to the "inquiry menu" in the Solution to Problem) (see Fig. 11 (b)). Here, when the set button 83e is pushed, items of the respective menu item "In such a case as..." is displayed (see Fig. 11 (c)). In the "In such a case as..." display, two menu items, namely, "During heating operation..." and "From the outdoor unit...", are displayed while the cursor is set to either one and explain text "the content that is to be displayed on the screen next" is displayed.

[0044] Note that when the content of the doubt and worry is related to "During cooling operation" and "Indoor unit" and when the minus button 83c is pushed, "From the outdoor unit..." is displayed on the upper row and "During cooling operation..." is displayed on the lower row on the display unit 82 while the cursor is set to the lower row. When the minus button 83c is further pushed, the "During cooling operation..." is displayed on the upper row and "From the indoor unit..." is displayed on the lower row on the display unit 82 while the cursor is set to the lower row (both of the above is not shown).

[0045] Referring to Fig. 11 (c), since the cursor is set to the "During heating operation...", "FAQ during heating operation will be displayed" is displayed, which explains the content that is to be displayed when the set button 83e is further pushed.

Referring to Fig. 11 (d), the minus button 83c has been pushed to move the cursor down from the state of Fig. 11 (c). The cursor is set to "From the outdoor unit...", and "FAQ during related to the outdoor unit will be displayed" is displayed, which explains the content that is to be displayed when the set button 83e is further pushed.

[0046] Referring to Fig. 12(a), a figure and a message that are displayed on the display unit 82 after the set button 83e is pushed when the cursor is set to the "During heating operation..." on the display unit 82 as shown in Fig. 11(c) is illustrated. That is, in Fig 12(a), "Horizontal flaps are in a horizontal state" is stated and the state is depicted in a schematic diagram.

Accordingly, if the point of doubt and worry of the user is the above, the doubt and worry of the user is relieved when the user reads "The horizontal flaps will be in a horizontal state at the start of operation, during defrosting, and when temperature has become above the set temperature It is not a malfunction" that is jointly stated.

[0047] Note that if the horizontal flaps 16 and 17 are not actually in a horizontal state, since it will be meaningless to display the display in Fig. 12(a), a content "During heating operation" that encounters doubts and wor-

ries the second most number of times, for example, "The filter cleaning machine is under operation because 50 hours has continuously elapsed since the heating operation. It is not a malfunction" is alternatively displayed by means of a message and a schematic diagram (not shown).

These displayed contents are preregistered in the indoor unit body 10 or the remote control 80 in a state in which the order of priority to display the content is set. Accordingly, the body control unit displays the meaningful content in line with the order of priority. That is, when the horizontal flaps 16 and 17 are actually in a horizontal state, the display in Fig. 12(a) is displayed and when the filter advancing and retracting device 50 has been activated, "...filter cleaning machine is under operation...It is not a malfunction" is displayed.

[0048] On the other hand, if the doubt and worry of the user are not what is displayed in Fig. 12(a) that has been displayed in line with the order of priority, the user further pushes the set button 83e. Then, the content "During heating operation" that encounters doubts and worries the next most number of times, for example, "The filter cleaning machine is under operation because 50 hours has continuously elapsed since the heating operation. It is not a malfunction" or the like is displayed by means of a message and a schematic diagram (not shown).

[0049] Referring to Fig. 12(b), a figure and a message that are displayed on the display unit 82 after the set button 83e is pushed when the cursor is set to the "From the outdoor unit..." on the display unit 82 as shown in Fig. 11 (d) is illustrated. That is, in Fig 12(b), "There is water or white smoke coming out" is stated and the state is depicted in a schematic diagram.

Accordingly, if the point of doubt and worry of the user is the above, the doubt and worry of the user is relieved when the user reads "Water and steam may come out of the outdoor unit during heating operation It is not a malfunction" that is jointly stated.

When the user further pushes the plus button 83a or the minus button 83c, "It is not a malfunction but if the wetting is causing a problem, please consult the service center for drainage work" is displayed. When the user pushes the plus button 83a or the minus button 83c again, then "Information (name, telephone number, etc.) of the service center (may include the dealer)" is displayed (not shown).

[0050] Note that if it is a situation in which water and steam could not possibly come out of the outdoor unit (for example, when during heating operation and the outdoor humidity is substantially low, or the like), then it will be meaningless to display the display in Fig. 12(b); hence, similar to the above, a content encountering the next most number of doubts and worries are alternatively displayed.

Further, these displayed contents are preregistered in the indoor unit body 10 or the remote control 80 in a state in which the order of priority to display the content is set.

On the other hand, if the doubt and worry of the user are not what is displayed in Fig. 12(b), the user further pushes the set button 83e. Then, a content encountering the next most number of doubts and worries are subsequently displayed.

[0051] Note that the above operation or state that the user feels doubt and worry does not need to be displayed repeatedly once the user has understood and memorized them. Accordingly, the air-conditioning apparatus 1000 has a function of stopping display of the contents that do not have to be displayed anymore.

That is, when the set button 83e is pushed in the state illustrated in Fig. 12(a), for example, a display "Continue to display this display?" and "Stop displaying this display?" is displayed on the display unit 82. At this time, when the cursor is set to "Stop displaying this display?" by pushing the plus button 83a or minus button 83c, and the set button 83e is pushed, from then on, display illustrated in Fig. 12(a) will not be displayed (both not shown).

[0052] Fig. 13 is an organized flowchart of the above flow of the display of the display unit 82. That is, in the air-conditioning apparatus 1000, when there is a malfunction or when a malfunction has occurred, without a particular inquiry by the user, the content of the malfunction is displayed (S11) and, further, the contact information and the like for the repair is displayed (S12). Accordingly, the user can promptly understand the situation and it will be possible to proceed to early repair and replacement. At this time, since the QR code 89 is displayed on the display unit 83, the content of the malfunction can be displayed in further detail on the screen of the mobile phone by reading the QR code 89 into the mobile phone (S13).

Further, as for the nonconformance such as inappropriate installation that the user can deal with, the content of the nonconformance is displayed (S21) without a particular inquiry by the user and the outline to resolve the nonconformance (procedure of re-installing, etc.) is displayed (S22); hence, the user can understand the situation promptly and, furthermore, it will be possible to perform early response (re-installing, etc.).

[0053] Additionally, when the user wonders, "Is it a malfunction?" upon occurrence of an operation or state that is different from the ones the user is usually accustomed to and that is not a malfunction or nonconformance such as inappropriate installation, the user can readily understand the cause by manipulating the button of the remote control 80; hence, doubts and worries can be relieved promptly.

At this time, among the doubts and worries that are consulted in which the user has wondered "Is it a malfunction?" to the service center, ones with higher frequency are displayed in descending-order (S32, S42); hence, the user can display the content that the user wants to know by simple manipulation of the button (S31, S41). Further, when the doubt and worry in which the user has wondered "Is it a malfunction?" is resolved and when it is determined that it does not have to be displayed from

then on (S33), the display thereof can be stopped (S34).

(Display of Instruction Manual)

[0054] As above, the content of the malfunction or the content of the inappropriate installation, the resolving method, or the display relieving the doubts and worries toward various operations and states that makes the user wonder, "Is it a malfunction" are displayed on the display unit 82 of the remote control 80 in the air-conditioning apparatus 1000.

Further, even if there is no malfunction or the like or any worries, if there is a "content that the user wants to know", the user can readily obtain the contents stated in the "instruction manual" or the "website (site on the Internet)". Accordingly, when the user has lost the instruction manual or when is unable to access the website, the user can immediately check the content that he/her wants to know and as such, convenience is improved.

[0055] Referring to Fig. 14(a), the menu button 83b of the remote control 80 is pushed when there is a "content the user wants to know". That is, when the menu button 83b is pushed during operation (in a state in which the ON/OFF button is in an on state), a plurality of menu items (for example, from first item to the sixth item) are displayed on the display unit 82 (equivalent to Fig. 11 (a)). At this time, the cursor can be set to the "? Instruction manual" that is the desired menu item by pushing the minus button 83c or the plus button 83a (see Fig. 4(b)). Here, when the set button 83e is pushed, the item of the respective menu item "Read the subsequent QR code to display content of the instruction manual" is displayed. When the set button 83e is further pushed, a QR code 88 that stores a URL of the website for mobile phone terminals is displayed on the display unit 82 (see Fig. 14 (d)).

[0056] Accordingly, by having the mobile phone (not shown) read the QR code 88, the content stated in the instruction manual is displayed on the screen of the mobile phone. That is, detailed information related to the air-conditioning apparatus that is stated in the instruction manual and the website is pre-registered in the above website.

The display "Read the subsequent QR code...(see Fig. 14(c))" and the display "QR code 88 (see Fig. 14(d))" may be displayed at the same time integrally on the display unit 82 (see Fig. 8(c)). Furthermore, although the QR code 88 corresponding to the entire instruction manual is displayed, the invention is not limited to this; the user may select a segmented portion of the instruction manual (for example, "Knowing the functions", "Keeping the apparatus clean", or "Trouble shooting", etc.) and a QR code corresponding to the selected portion may be displayed.

[Embodiment 2]

[0057] Figs. 15 to 18 are for explaining the support sys-

tem of the air-conditioning apparatus according to Embodiment 2 of the invention, Fig. 15 is a block diagram schematically illustrating the configuration of the system, and Figs. 16 to 18 are flowcharts illustrating the operation flow. Note that like parts or equivalent parts to Embodiment 1 are designated with like reference numerals and a portion of the description is omitted.

(Indoor Unit of Air-Conditioning Apparatus)

[0058] Referring to Fig. 15, the air-conditioning apparatus support system (hereinafter, referred to as "support system") 2000 includes an indoor unit 100 disposed in a room of a user U, a highly functional mobile phone (hereinafter, referred to as "smartphone") 200 that the user U uses, the Internet 300 connected by wireless to the smartphone 200, a terminal (a personal computer, hereinafter, referred to as "center PC") 400 that is disposed in the service center and is connected (by wireless or wire) to the Internet, and a server 500 that is connected to the terminal 400 directly or through the Internet 300. Note that in order to simplify the description, the center PC 400 and the server 500 may be collectively referred to as center PC 400.

Further, a local service center or dealer (hereinafter, "local service spot") 600 is connected (by wireless or wire) to the Internet.

[0059] As an application for the smartphone (hereinafter, referred to as "smartphone application"), a smartphone application dedicated for support of the air-conditioning apparatus (hereinafter, referred to as "support application") 210 is downloaded to the smartphone 200. The smartphone 200 is equipped with a screen 201 and a camera 202.

Note that the support application 210 is a program that allows the relevant control means (CPU and the like) to execute predetermined steps and is one that is downloaded from the server or the like that stores the program; however, instead of downloading, the program may be pre-stored in the smartphone itself.

[0060] In the air-conditioning apparatus 1000 described in Embodiment 1, convenience is improved by using the remote control 80; however, when the user U tries to communicate with the service center, the user is required to manipulate the mobile phone on the basis of the displayed information on the remote control 80.

Whereas, in the support system 2000 of Embodiment 2, the convenience of use of the air-conditioning apparatus 1000 is improved with the use of the smartphone 200 (and the support application 210) without manipulation of the remote control 80.

(Support Application)

[0061] Referring to Fig. 16, operation of the support application 210 and work associated with the operation will be described. When the user U starts up the support application 210 (S51), a display displaying that the sup-

port application 210 is "an air-conditioning apparatus support system" and "Please take a photograph of the body of the air-conditioner" is displayed on the screen 201 (S52).

5 Accordingly, the user U takes a photograph of the indoor unit 100 with the camera 202 equipped in the smartphone 200 (S53). The photographed image (hereinafter, referred to as "taken image") is sent to the center PC 400 via the Internet 300 (S54).

10 The center PC 400 analyses the taken image, compares it with the data registered in the server 500, determines the model type of the indoor unit 100 (and the air-conditioning apparatus 1000), and transmits the model type information to the smartphone 200 (S55).

15 **[0062]** The smartphone displays the "model type information" on the screen 201 as well as displaying the "select menu" on the screen 201 (S56) to ask the user U the object of the startup of the support application 210. The select menu is "Read the instruction manual" and "The air-conditioner is functioning strangely", for example (S57).

[0063] Here, when the "Read the instruction manual" is selected, "Table of contents" and "Selective keyword" are displayed (S61).

25 Hereupon, when the User U selects the "Table of contents" (S62), the relevant selected information is transmitted from the center PC 400 (or the server 500) and the table of contents of the instruction manual is sent back to the smartphone 200 (S63).

30 Further, upon display of the table of contents on the screen 201 (S64), the user U selects a certain item in the table of contents (for example, "set timer" or the like) (S65) and information of the relevant item is transmitted to the center PC 400. The content corresponding to the relevant item in the data of the instruction manual that is stored in the server 500 is sent back to the smartphone 200 (S66).

Then, the content of the certain item (for example, "Outline of setting the timer" or the like) is displayed on the screen 201 in the form of still images or moving images (S67).

40 Further, by pushing the "End" button displayed in a corner of the screen (that is displaying the still images or moving images) (S68), the smartphone application 210 is ended (S69).

45 **[0064]** On the other hand, when the "Selective keyword" is selected in (S61) where the "Table of contents" and "Selective keyword" are displayed, since a text box to input the "Selective keyword" is displayed on the screen 201, the user U inputs a certain selective keyword (for example, "Before waking up" or the like) (S71). The relevant input information is transmitted to the center PC 400, the center PC 400 determines the item (for example, "timer setting" or the like) in the data of the instruction manual corresponding to the relative selected keyword, the relevant item information is transmitted to the server 500 (S72), and the content corresponding to the relevant item in the data of the instruction manual that is stored

in the server 500 is sent back to the smartphone 200 (S73).

Then, the content of the relevant item (for example, "Outline of setting the timer" or the like) is displayed on the screen 201 in the form of still images or moving images (S74).

Further, by pushing the "End" button displayed in a corner of the screen (in which the screen is displaying the still images or moving images) (S68), the smartphone application 210 is ended (S69).

[0065] Furthermore, when "Air-conditioner is functioning strangely" is selected in (S56), "Please take a video of the air-conditioner" is displayed on the screen 201 (S81).

Further, the video of the air-conditioner is transmitted to the center PC 400 and the relevant video is displayed on a display panel 401 of the center PC 400 (S82).

Then, a staff S (who has already been informed of the model type of the indoor unit 100) that is standing by in the support center determines the state of the air-conditioner on the basis of the relevant video, namely, whether "in a state that can be left alone", "in a state in which the user U can deal with" or "in a state in which the user U cannot deal with" (S83), and the determined result is sent back to the smart phone 200 (S84).

[0066] When it is determined to be "in a state that can be left alone", then, "Do not worry, this phenomenon will stop soon", for example, is displayed on the screen 201 (S85), thus the user U can feel relieved.

Further, when it is determined to be "in a state in which the user U can deal with", then "This Phenomenon will stop with simple manipulation. Display the manipulation guidance?", for example, is displayed on the screen 201 (S91). When the user U selects "Display" (S92), the relevant selected information is transmitted to the center PC 400 (S93), the guidance of the relevant manipulation that is stored in the server 500 is sent back to the smartphone 200, and a video showing the guidance of the relevant manipulation is displayed on the screen 201 (S94). Accordingly, the user U can watch the video (or multiple still images) displayed on the screen 201 and perform a certain manipulation, thus can recover the state of the air-conditioner to its regular state.

[0067] Furthermore, when it is determined to be "in a state in which the user U cannot deal with" in (S83) or when the user U does not select "Display" in (S92), "Service by a specialist is required", for example, is displayed on the screen 201 (S101).

At this time, when the user U selects "Request service" (S102), the request is transmitted to the center PC 400 (S103), the center PC 400 selects the appropriate (nearest) local service spot 600 while referring to the positional information of the smartphone 200, and information (name, location on the map, and the like) of the relevant local service spot 600 is sent back to the smartphone 200 (S104). Moreover, the model type of the air-conditioning apparatus 1000, information on the status, and information on the user U is notified to the relevant local

service spot 600 (S105).

Note that when the user U selects "Service not requested" in (S102), the smartphone application 210 is ended (S69).

[0068] Accordingly, with the support system 2000, the user U can read the content of the instruction manual, especially the content that the user wants to know the most with simple manipulation and further in the form of video without manipulation of the remote control 80. Furthermore, the user can be informed of a proper way to respond when the air-conditioner is malfunctioning. At this time, since a specialist S views the video and the diagnosis of the state of the air-conditioner is performed, a more precise judgment can be made.

Claims

1. An air-conditioning apparatus, comprising:

components (100,110) performing a refrigeration cycle;
a body control unit (120) controlling the components (100, 110); and
a remote control unit (80) being capable of two-way communication with the body control unit (120), wherein
the remote control unit (80) includes a display unit (82) that displays a predetermined projected image and selection means (83) to select the projected image displayed on the display unit (82),
the projected image is provided with an inquiry menu to inquire about a state that occurs in low frequency during steady operation, and
when the inquiry menu is selected by manipulation of the selection means (83), the projected image explaining a content of the state is displayed subsequent to the inquiry menu on the display unit (82) by communication between the remote control unit (80) and the body control unit (120).

2. An air-conditioning apparatus, comprising:

components (100,110) performing a refrigeration cycle;
a body control unit (120) controlling the components (100,110); and
a remote control unit (80) being capable of two-way communication with the body control unit (120), wherein
the remote control unit (80) includes a display unit (82) that displays a predetermined projected image and includes an ON/OFF button (84), instructing the start or stop of an operation, or an acceleration sensor,
when there is a malfunction or a nonconform-

- ance in a portion of the components (100,110) before a start of operation, upon pushing of the ON/OFF button (84) or upon detection of movement of the remote control unit (80) by the acceleration sensor, the projected image explaining a content of the malfunction or the nonconformance is displayed on the display unit (82) by a command of the body control unit (120).
3. The air-conditioning apparatus of claim 1 or 2, wherein when the inquiry menu is selected, the projected image explaining the state that occurs in low frequency during steady operation is displayed in a pre-registered order on the display unit.
 4. The air-conditioning apparatus of any one of claims 1 to 3, wherein a content of a specified state among the state that occurs in low frequency during steady operation is allowed not to be displayed on the display unit.
 5. The air-conditioning apparatus of any one of claims 1 to 4, wherein when either one of the components is determined to be inoperable, the body control unit displays a name or a schematic diagram of the component determined to be inoperable and displays a reason of the inoperability.
 6. The air-conditioning apparatus of claim 5, wherein when a switching button is pushed while the display unit is in a state displaying the name or the schematic diagram of the component determined to be inoperable and the reason of the inoperability, a guidance to resolve the inoperability is displayed on the display unit.
 7. The air-conditioning apparatus of any one of claims 1 to 6, further comprising a detachable component that is detachably installed in an indoor unit being one of the components, wherein when the detachable component is determined to be not installed in a regular position, a name or a schematic diagram of the detachable component that is not installed in the regular position is displayed on the display unit.
 8. The air-conditioning apparatus of claim 7, wherein when a switching button is pushed while the display unit is in a state displaying the name or the schematic diagram of the detachable component that is not installed in the regular position, a guidance to re-install the detachable component to the regular position is displayed on the display unit.
 9. A support system of an air-conditioning apparatus that supports the air-conditioning apparatus (1000) through a highly functional mobile phone (200) and a terminal (400) connected to the Internet (300), wherein the terminal (400) displays on an equipped screen a projected image of the air-conditioning apparatus (1000) that has been taken by a camera installed in the highly functional mobile phone (200), and that has been transmitted through the Internet (300) from the highly functional mobile phone (200); and transmits a content of a state of the air-conditioning apparatus (1000) and an outline of dealing with the content, based on the projected image displayed on the screen, to the highly functional mobile phone (200) through the Internet (300), and the highly functional mobile phone (200) displays the content of the state of the air-conditioning apparatus (1000) and the outline of dealing with the content that has been transmitted from the terminal (400) through the Internet (300) on a screen of the highly functional mobile phone (200).
 10. The support system of the air-conditioning apparatus of claim 9, wherein the highly functional mobile phone includes an application that carries out a step of displaying a display on the screen of the highly functional mobile phone encouraging a user to take an image of the air-conditioning apparatus with the camera equipped in the highly functional mobile phone, a step of transmitting the projected image of the air-conditioning apparatus that has been taken with the camera to the terminal through the Internet, a step of displaying the projected image of the air-conditioning apparatus that has been transmitted to the terminal on the screen equipped in the terminal, a step of transmitting the content of the state of the air-conditioning apparatus and the outline of dealing with the content based on the projected image displayed on the screen of the terminal to the highly functional mobile phone through the Internet, and a step of displaying on the screen of the highly functional mobile phone the content of the state of the air-conditioning apparatus and the outline of dealing with the content that has been transmitted from the terminal through the Internet.
 11. The support system of the air-conditioning apparatus of claim 9 or 10, wherein the projected image is a video.

FIG. 1

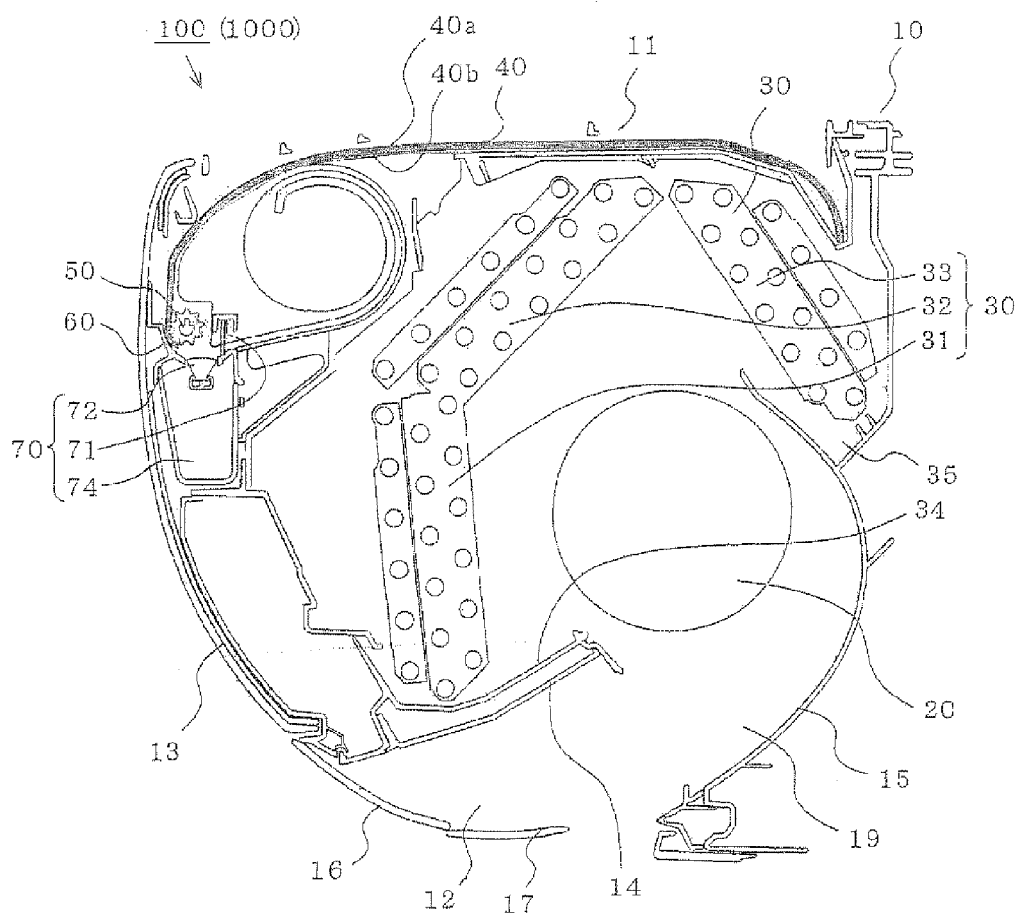


FIG. 2

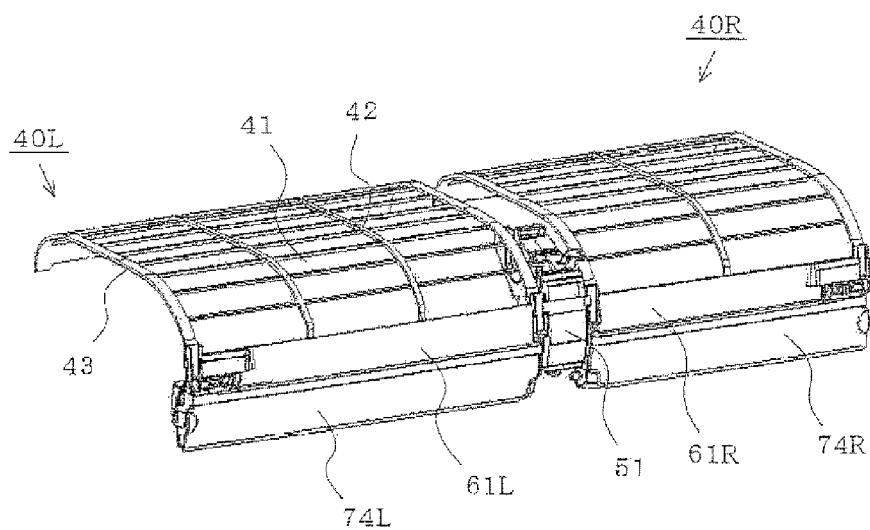


FIG. 3

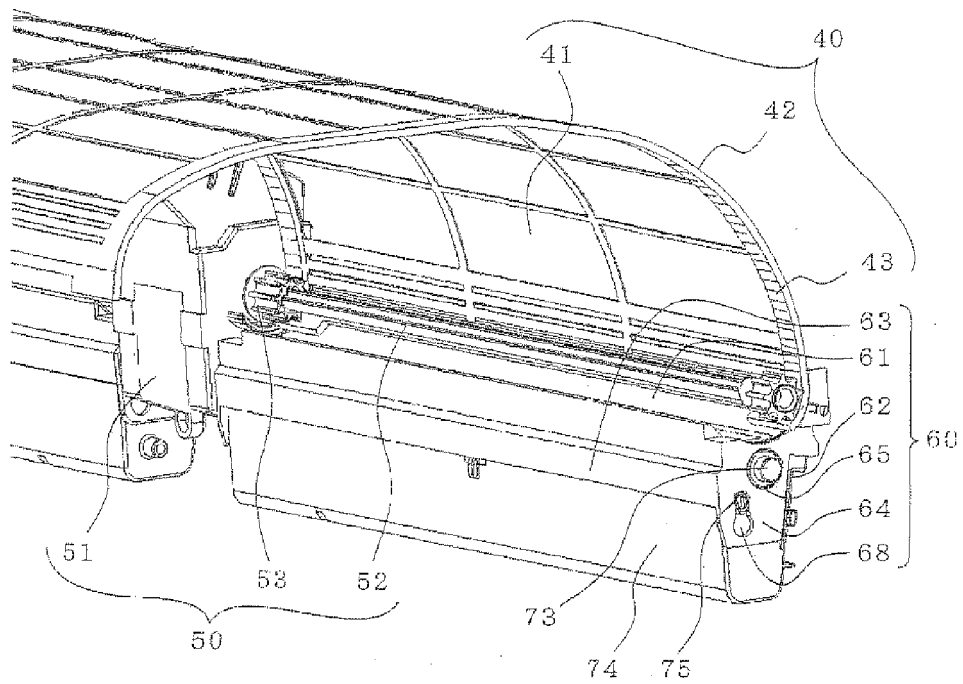


FIG. 4

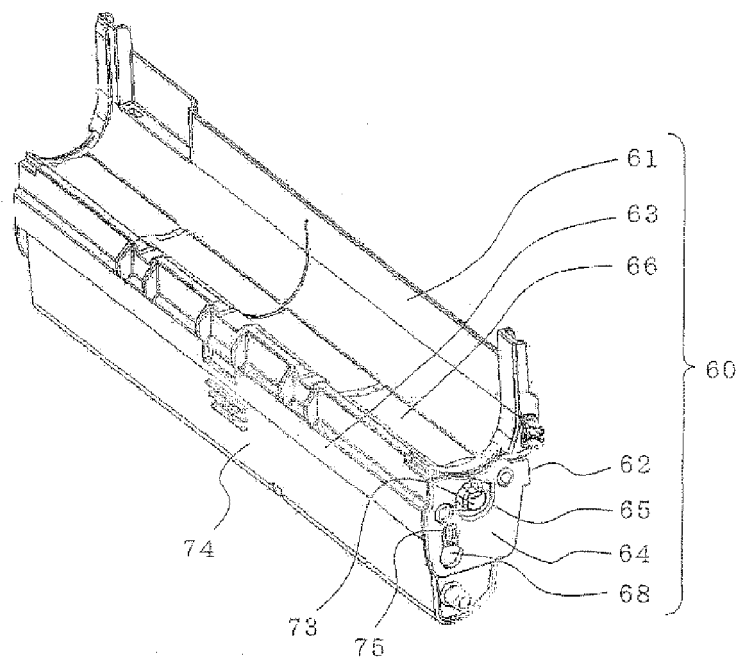


FIG. 5

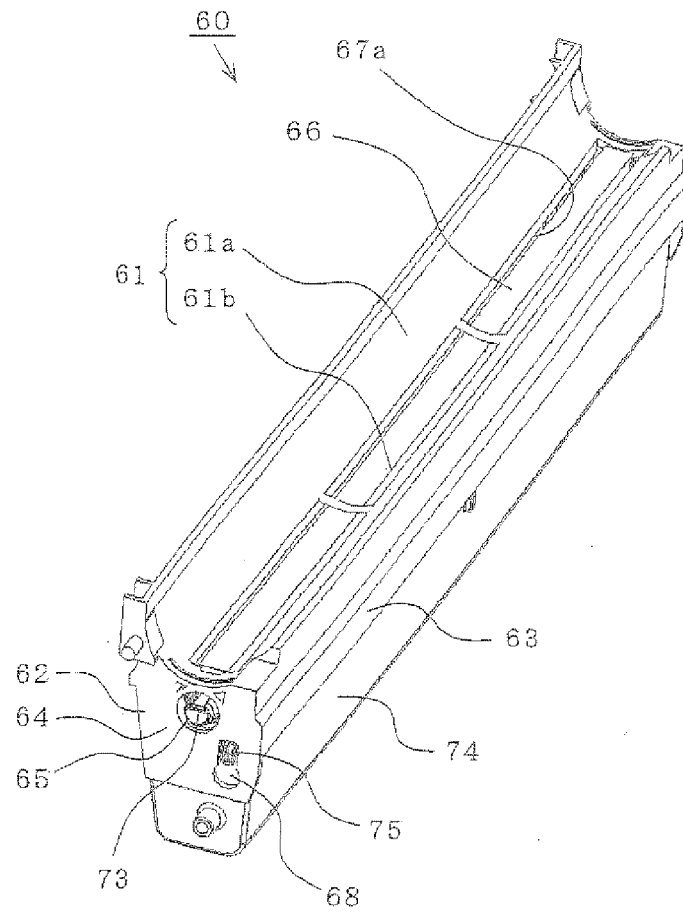


FIG. 6

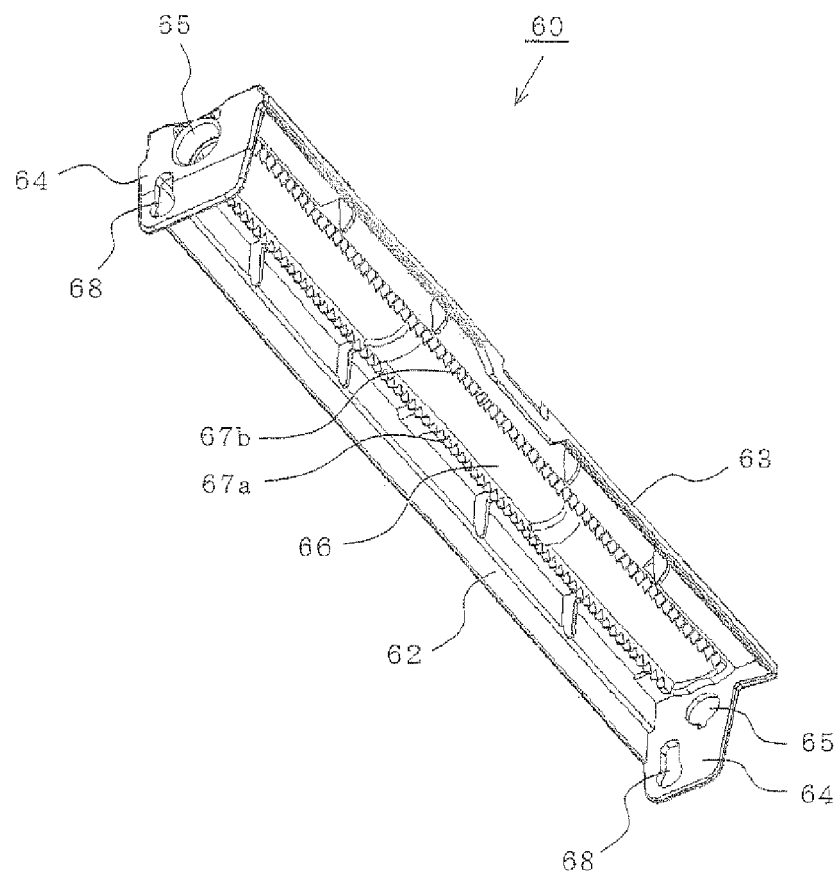


FIG. 7

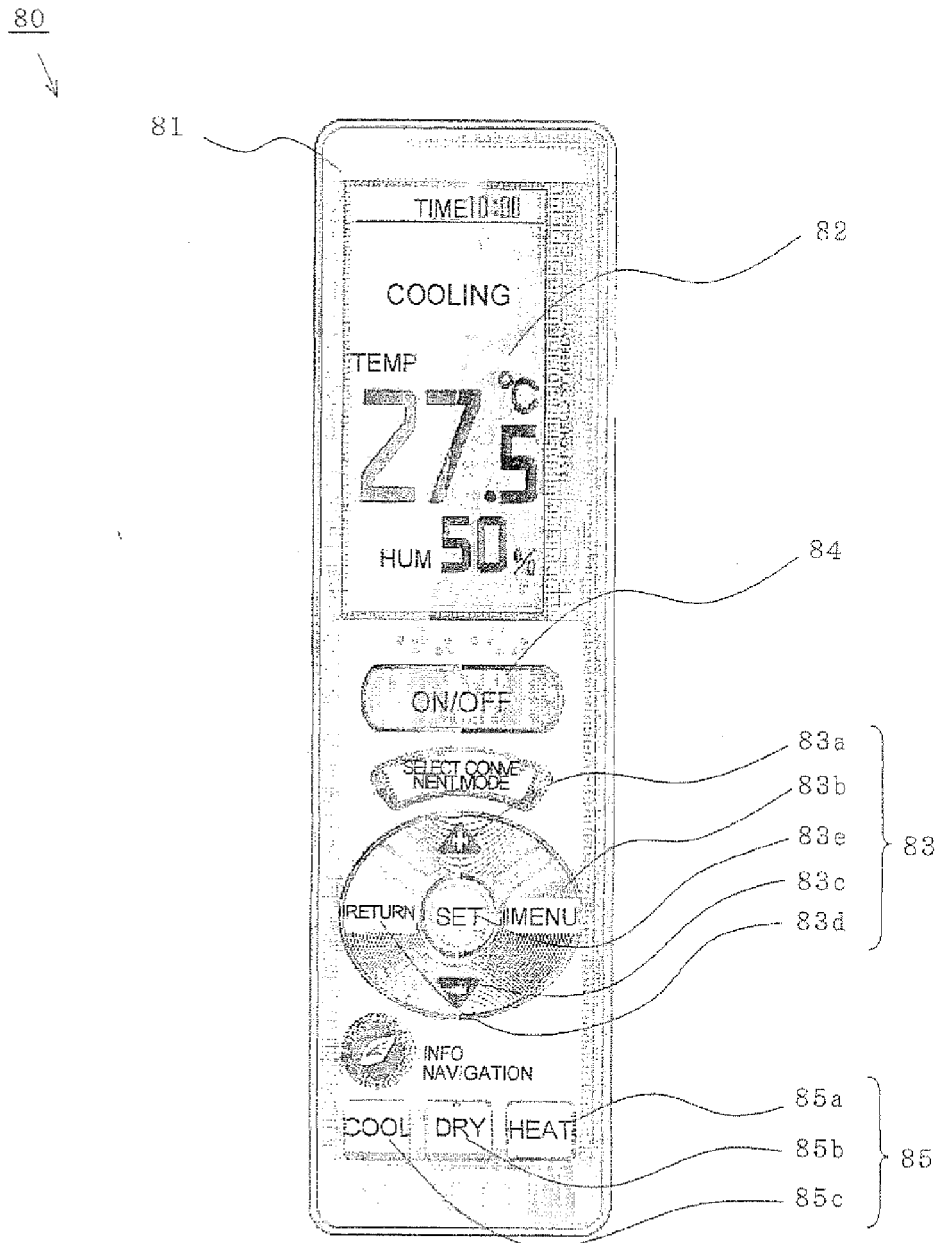


FIG. 8

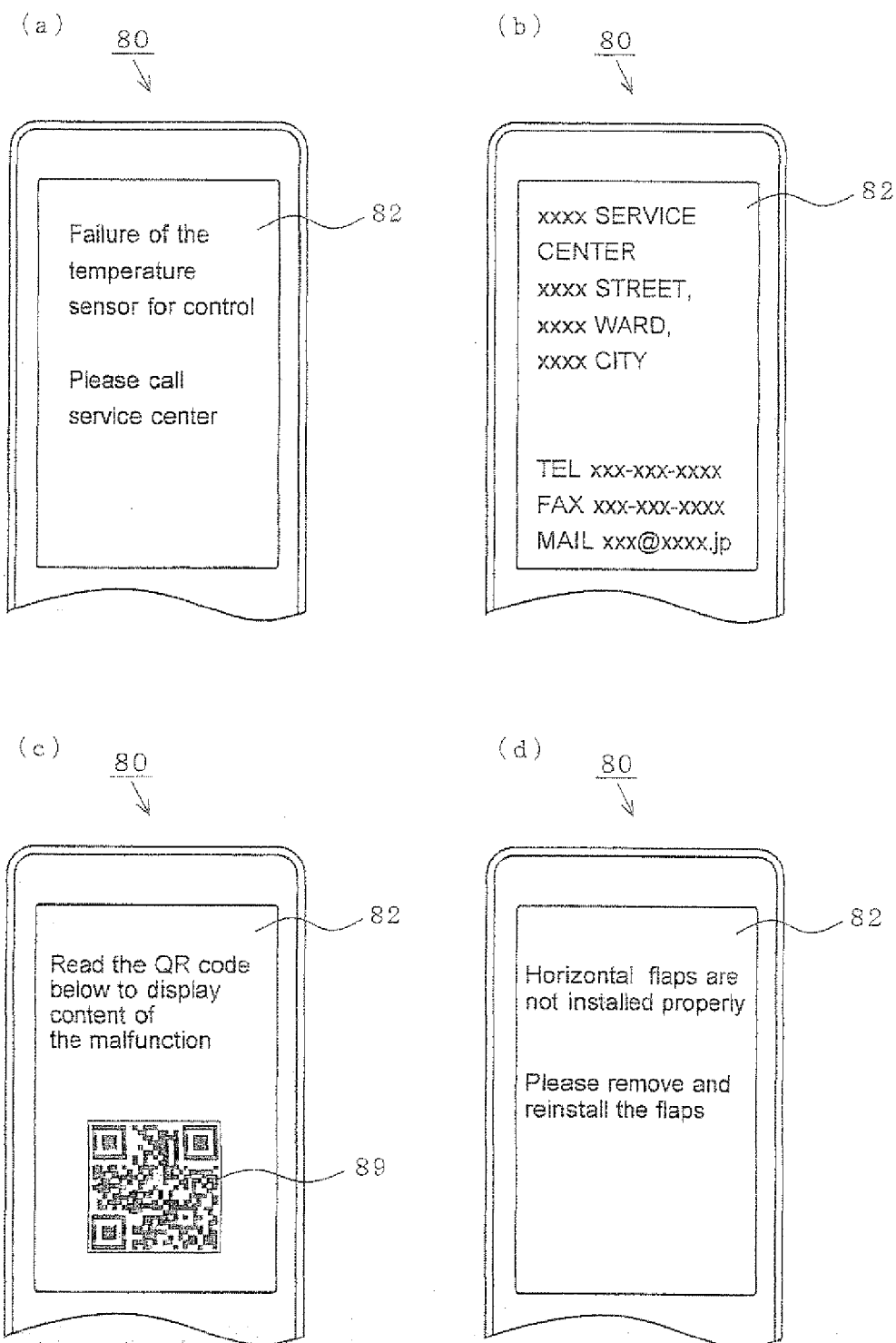


FIG. 9

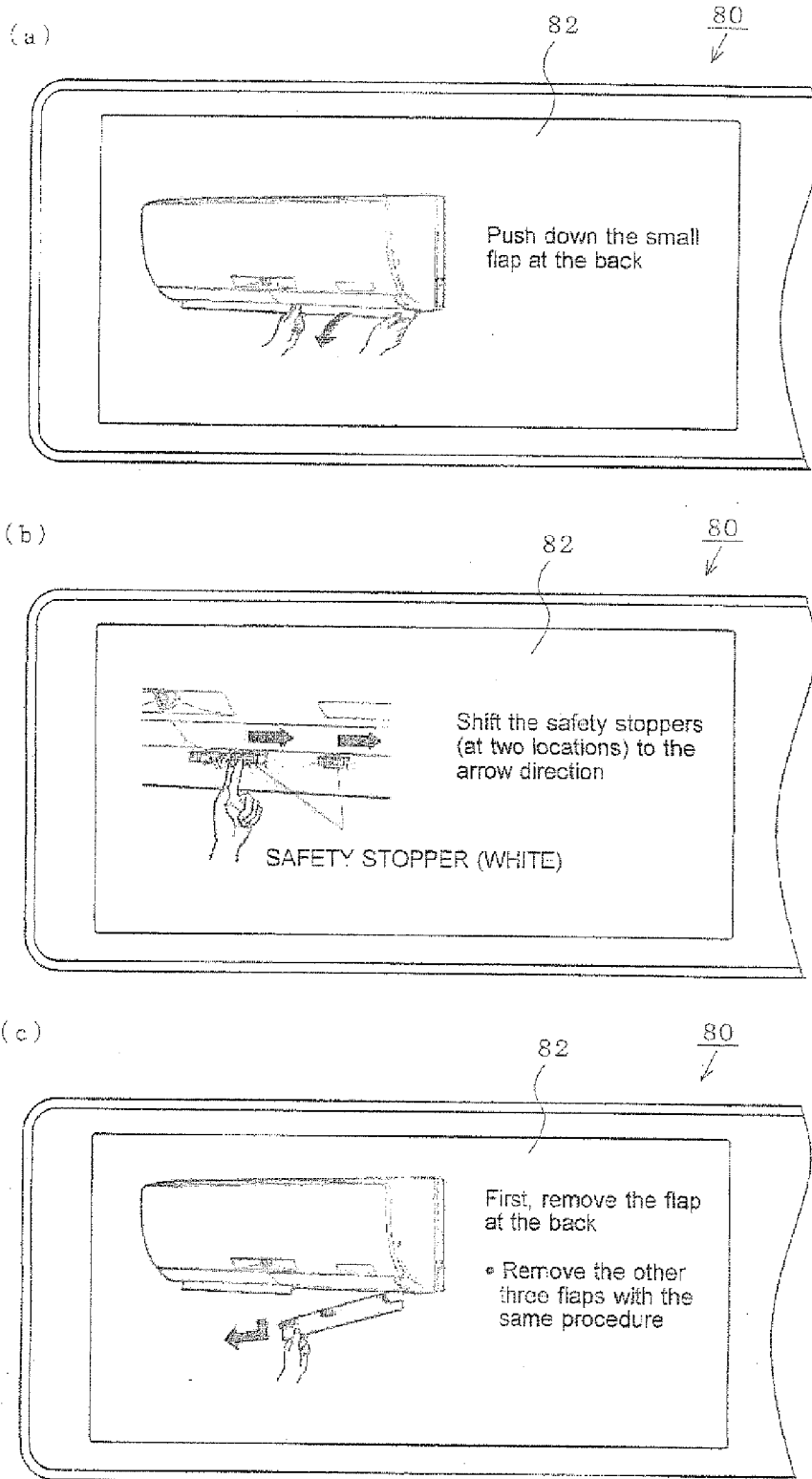


FIG. 10

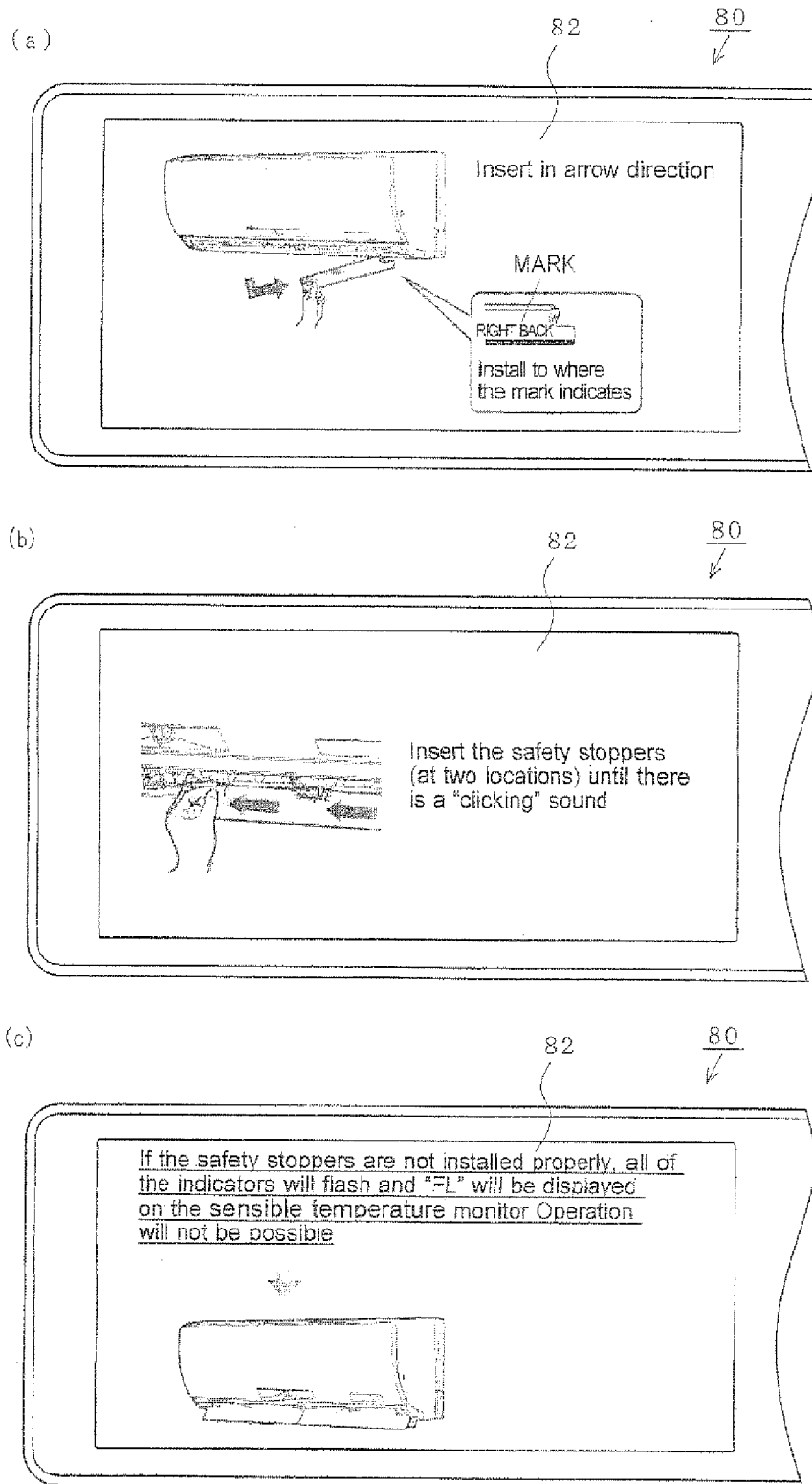


FIG. 11

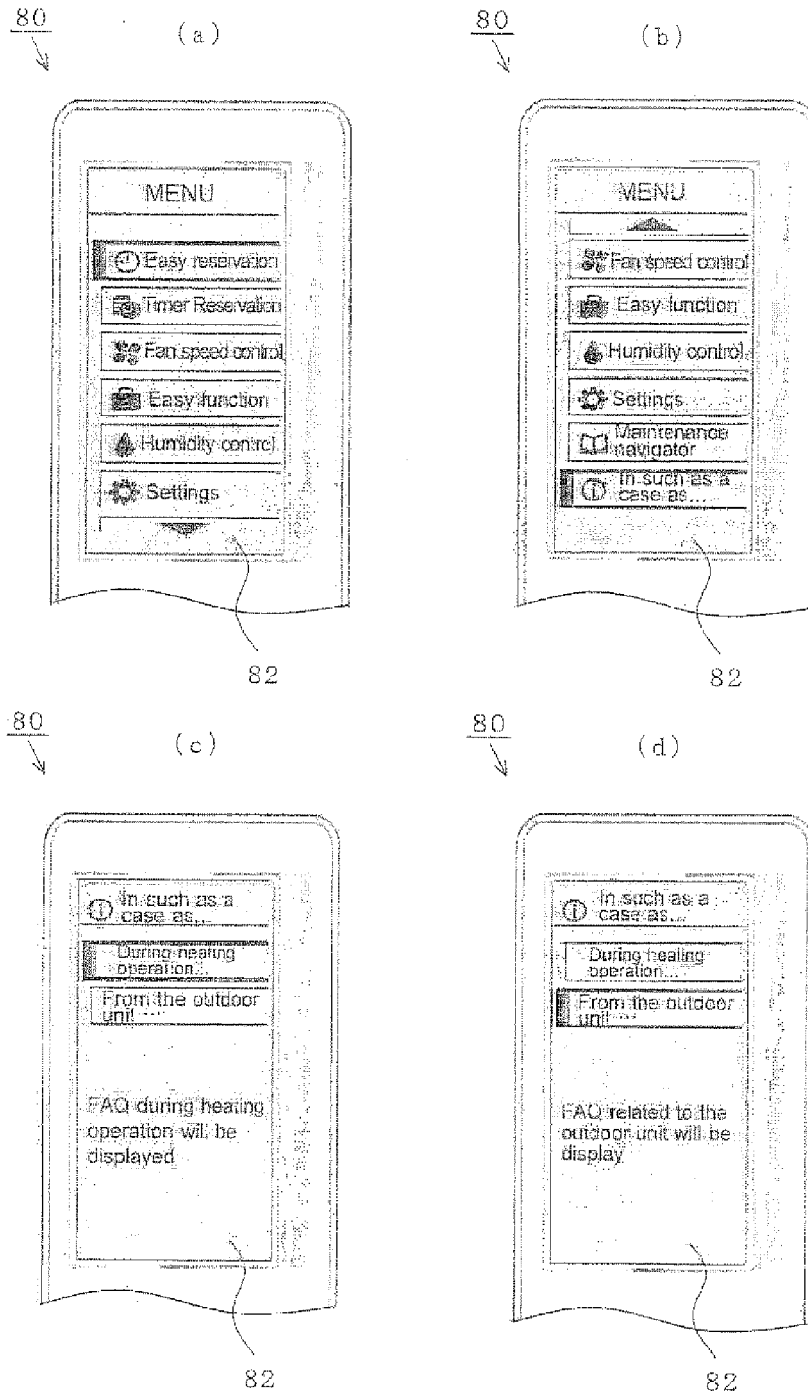


FIG. 12

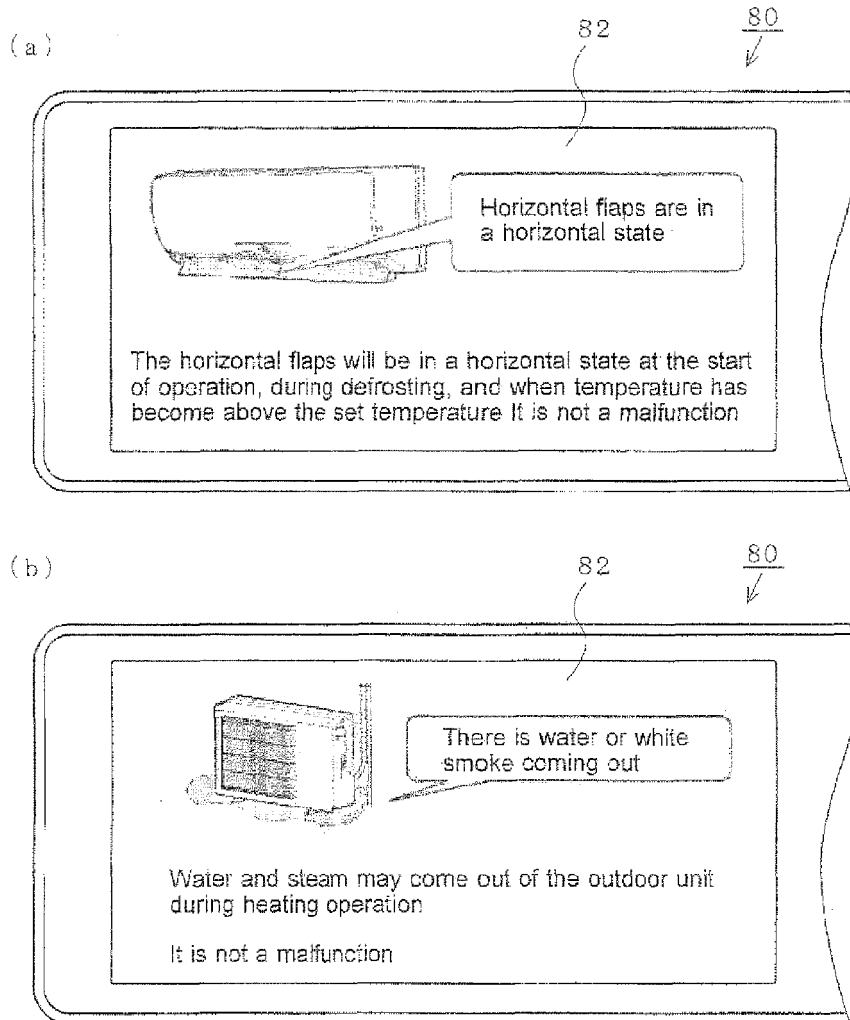


FIG. 13

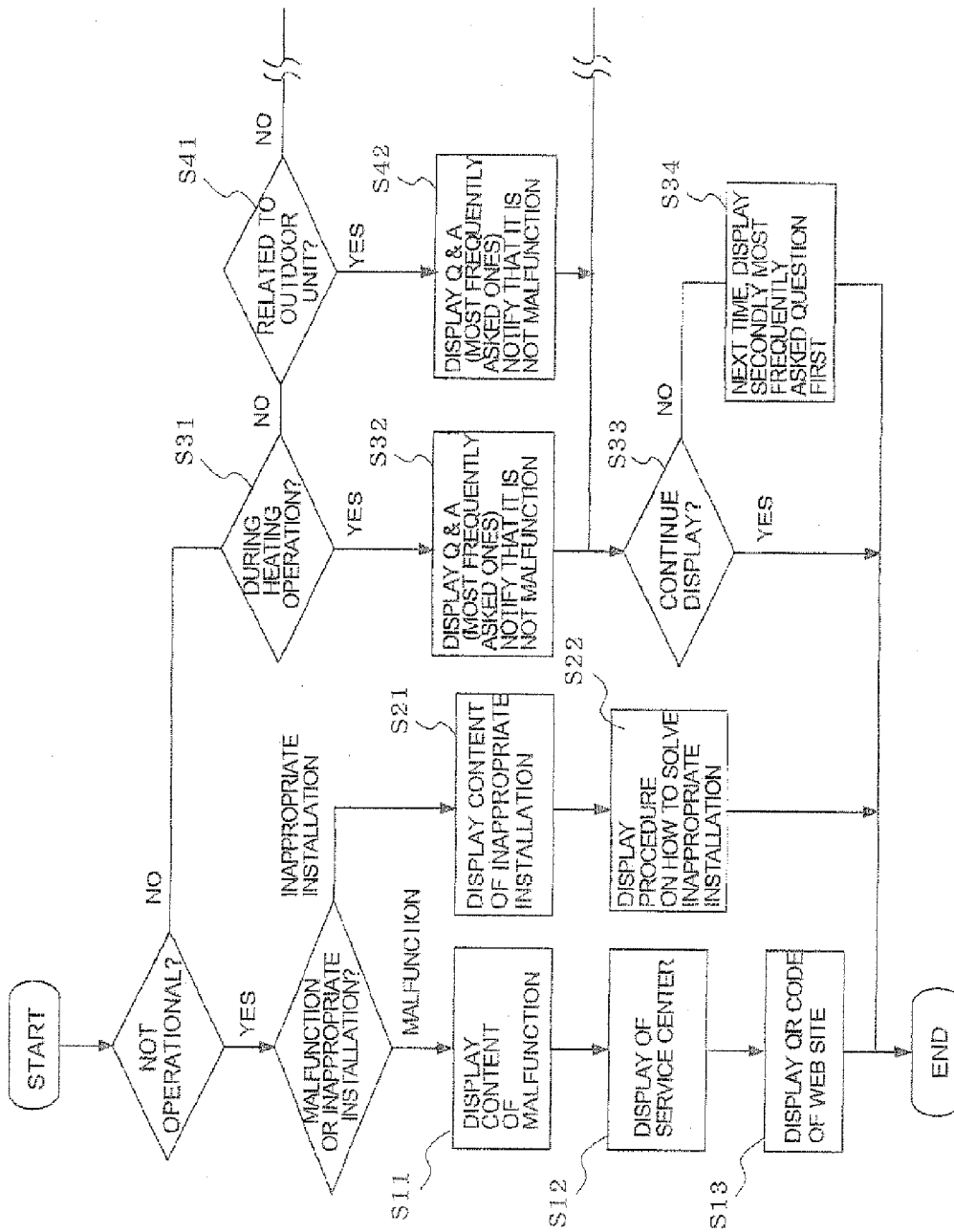


FIG. 14

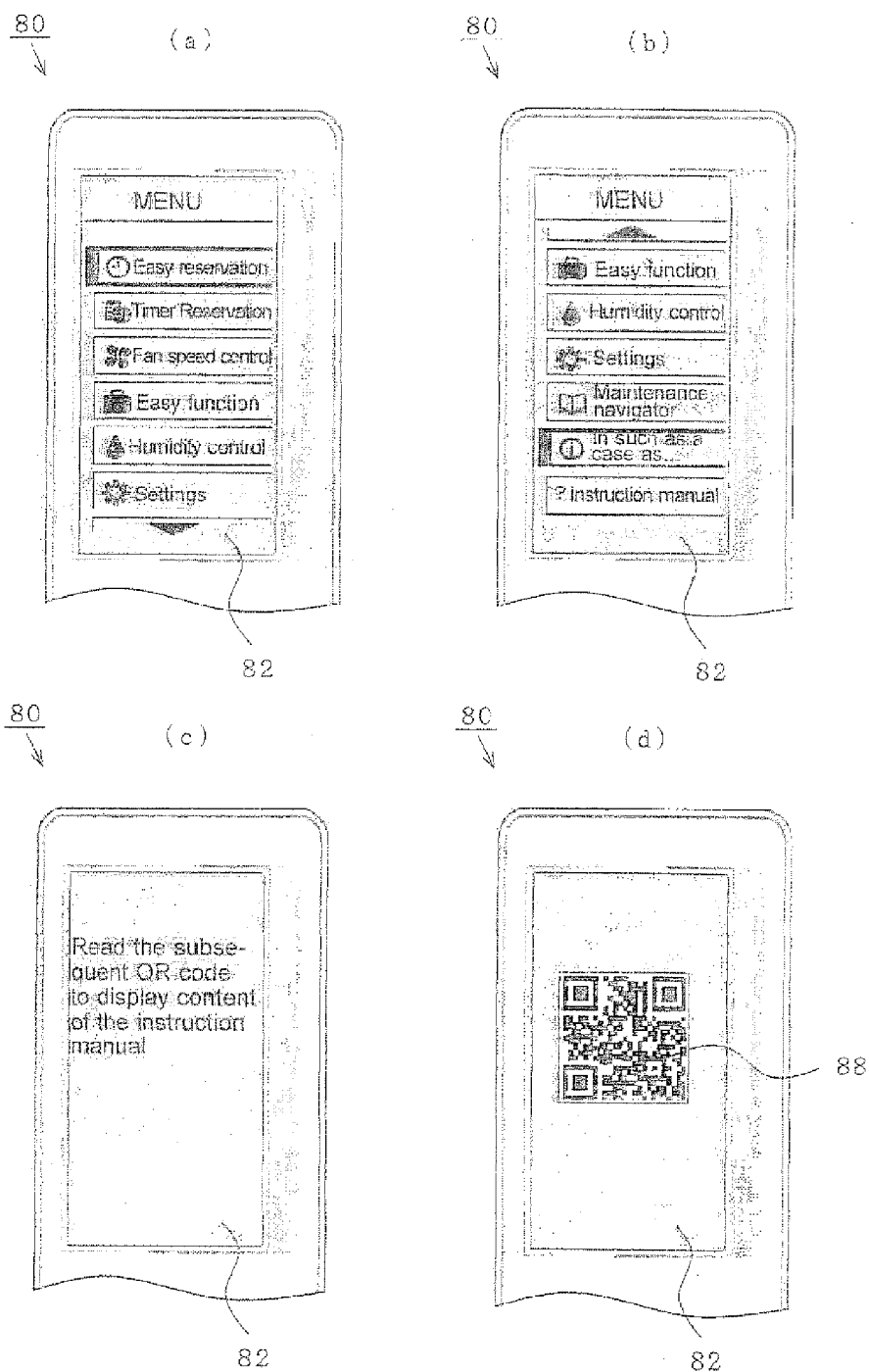


FIG. 15

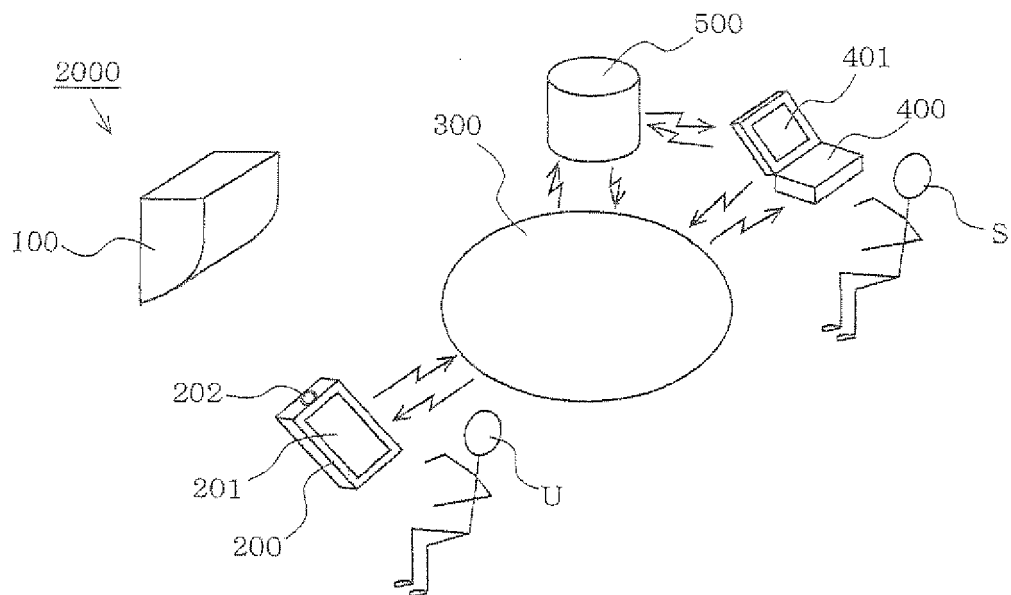


FIG. 16

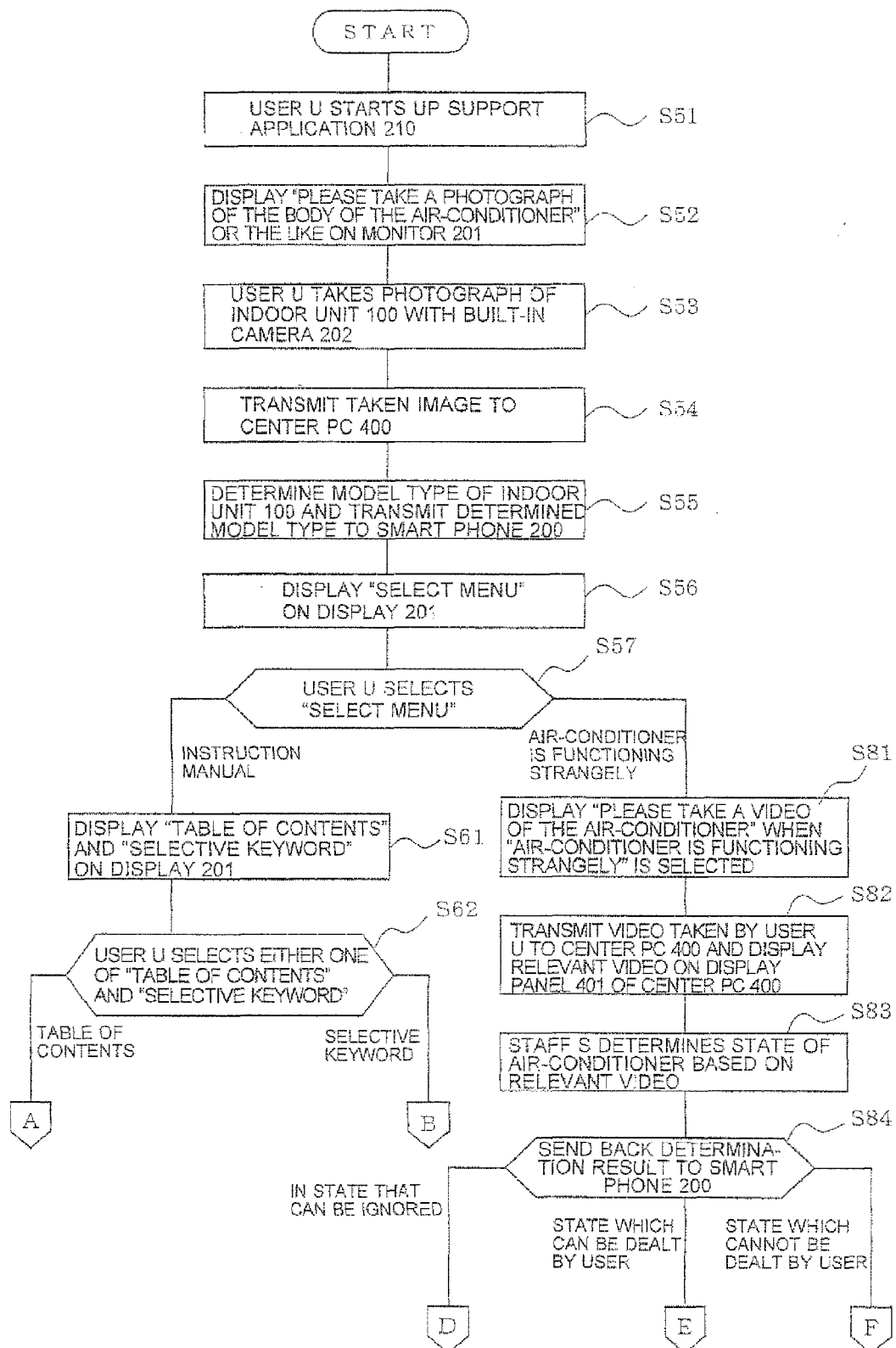


FIG. 17

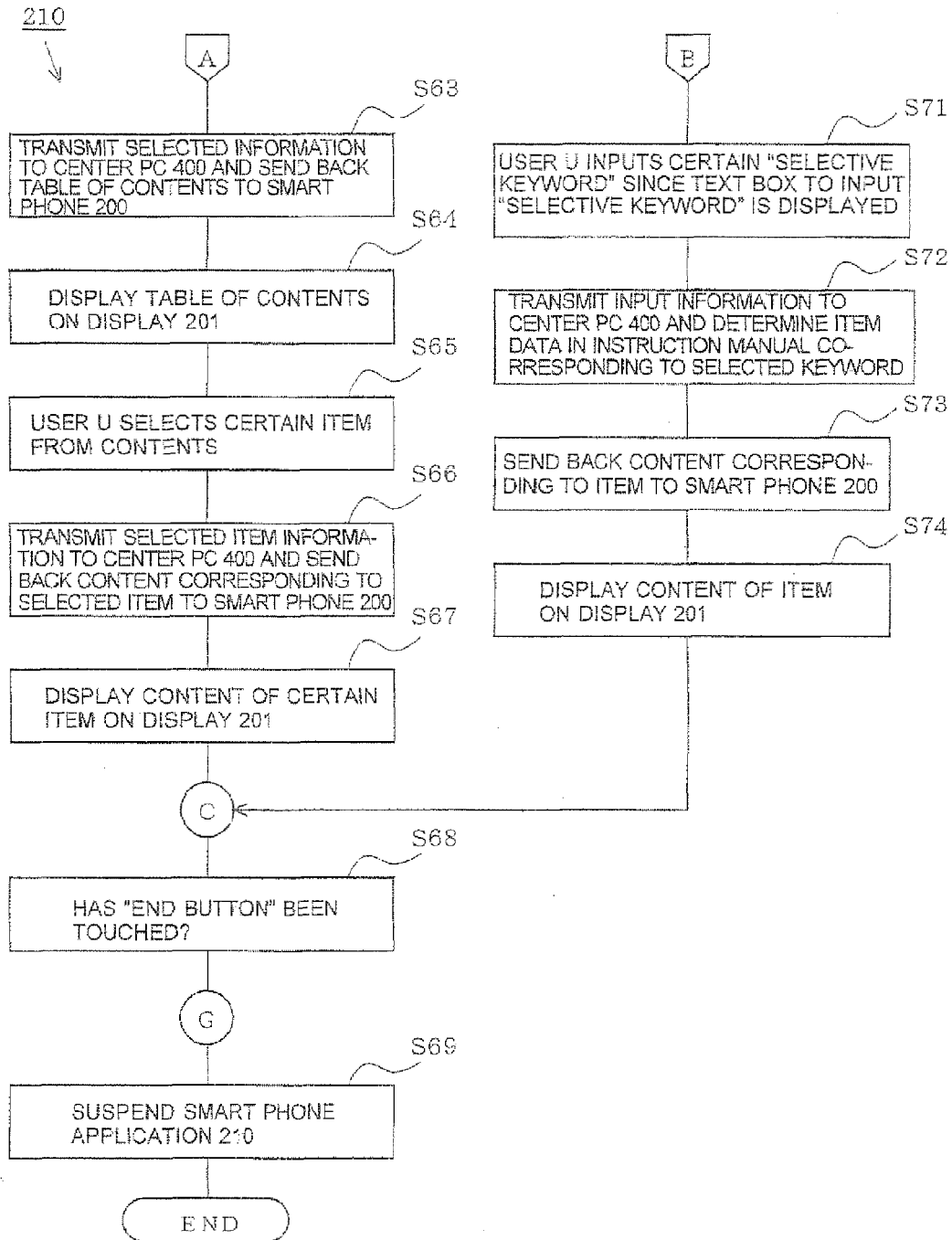


FIG. 18

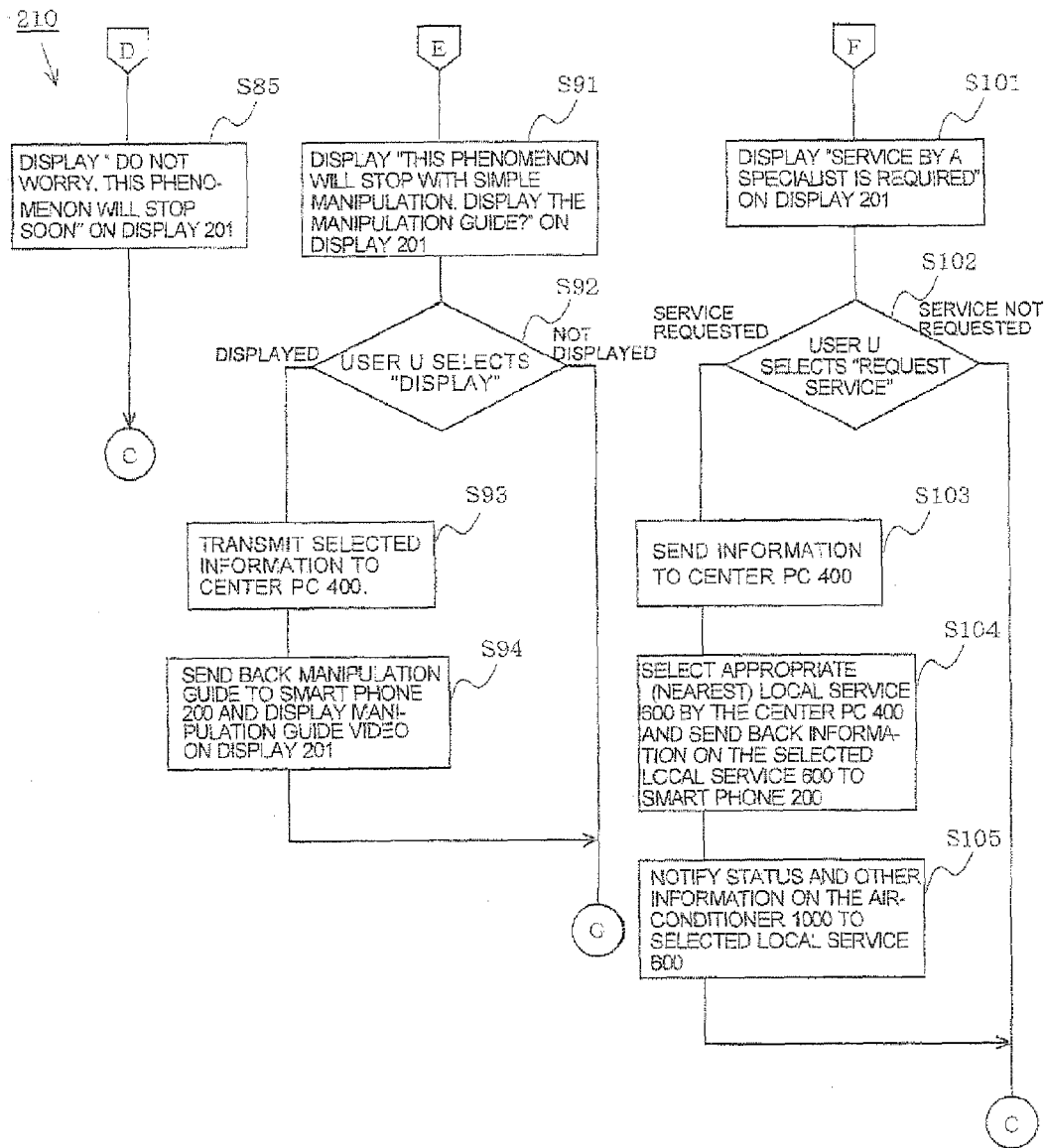
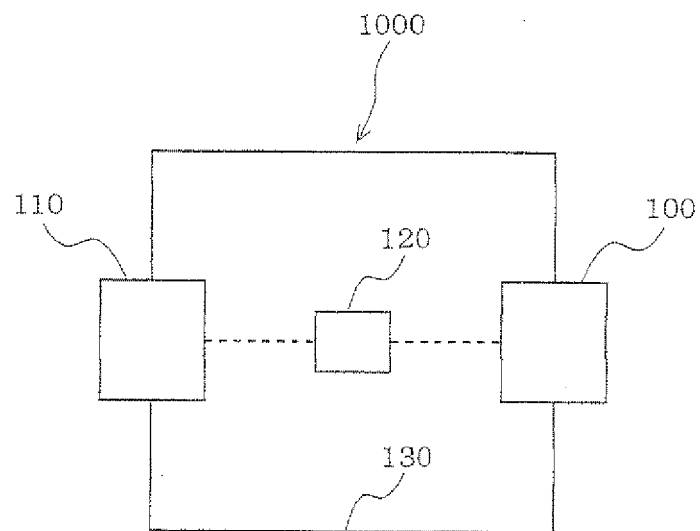


FIG. 19



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2000081242 A [0004]