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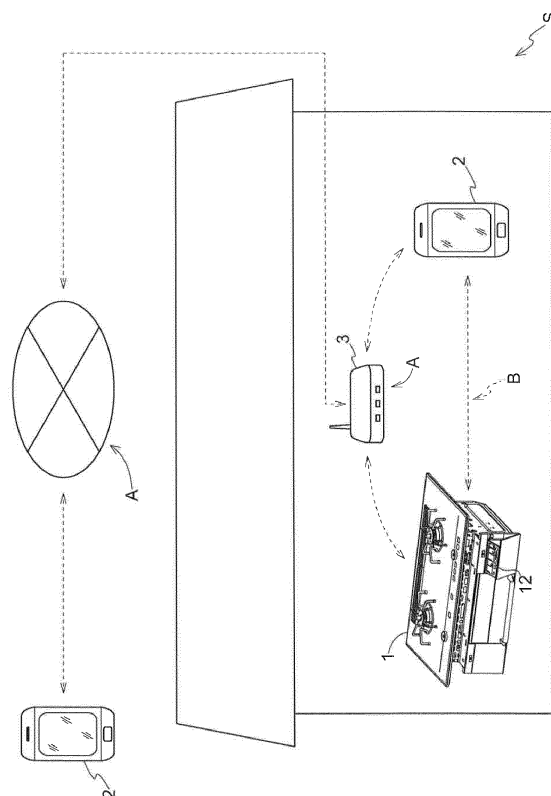
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HEAT-COOKING SYSTEM AND METHOD FOR TESTING A HEAT-COOKING APPLIANCE OF A HEAT-COOKING SYSTEM

(57)

A heat-cooking appliance (1) is provided with a memory unit (13) for storing processing content of a test mode, and test execution information d including information for instructing execution of the test mode from the portable terminal (2); the system is adapted in such a way as to enable setting of a state in which communication is performed by a direct communication method which affords direct communication between the heat-cooking appliance (1) and the portable terminal (2), and in a state of communication by the direct communication method: the portable terminal (2) acquires the test execution information from the memory unit (13) of the heat-cooking appliance (1) and is adapted in such a way as to be able to instruct execution of the test mode to the heat-cooking appliance (1) by utilizing the acquired test execution information d, and the heat-cooking appliance (1) executes the test mode of the processing content when the test mode execution is instructed.

[Fig. 1]



Description

[0001] The present invention relates to a heat-cooking system provided with: a heat-cooking appliance for heating an article for cooking, and a portable terminal for wirelessly communicating by means of an indirect communication method which affords communication with the heat-cooking appliance via a wireless relay. The invention also relates to a method for testing a heat-cooking appliance of a heat-cooking system.

[0002] A heat-cooking system which has a function for sensing the state of an article for cooking on a heat-cooking appliance such as a stove and notifying a user of the situation is known in the art, as described in JP 2003-219045 A.

[0003] This kind of heat-cooking system is provided with a heat-cooking appliance such as a gas stove and a portable terminal, and is adapted in such a way that the gas stove and the portable terminal can communicate wirelessly. The gas stove is adapted in such a way that the heating state is determined using various types of detection results which are then sent to the portable terminal.

[0004] Furthermore, when a detection result is sent from the gas stove to the portable terminal, the gas stove is adapted in such a way that the supply of fuel gas to the gas burner can be automatically shut off if a confirmation signal is not sent from the portable terminal to the gas stove by means of a user operation.

[0005] JP 2003-219045 A and in addition JP 2006-029710 A describe the use of a long-range communication function between a heat-cooking appliance and a portable terminal, in which the state of the heat-cooking appliance is communicated via the Internet using the portable terminal from outside a dwelling in which the heat-cooking appliance is provided.

[0006] Since it is possible to use the communication function from outside the dwelling, this is very convenient for the user to confirm, from the location he or she has gone to, the state of heating by means of the heat-cooking appliance when the user's family is cooking using the heat-cooking appliance at the user's home, for example, or the user can confirm from that location that the heat-cooking appliance has been switched off once cooking by means of the heat-cooking appliance has been completed, after the user has gone out.

Object and solution

[0007] When the abovementioned communication is performed, it is normally difficult to provide direct communication between the heat-cooking appliance and the portable terminal, so communication is performed between the heat-cooking appliance and the portable terminal via a wireless relay such as a wireless router.

[0008] For this reason, test operations have been carried out to achieve a reliable communication function between a heat-cooking appliance and a portable terminal

via a wireless relay such as a wireless router when a heat-cooking appliance is installed at a user's home.

[0009] As a result of these test operations, it has been found that when a defect has been confirmed in the communication function which affords communication between the heat-cooking appliance and the portable terminal via a wireless relay such as a wireless router, it is necessary to identify which of the wireless relay such as a wireless router, the heat-cooking appliance or the portable terminal a problem such as a fault has occurred in, and it is necessary to take corrective action such as maintenance or replacement of the problematic equipment from among the wireless relay such as a router, the heat-cooking appliance and the portable terminal.

[0010] However, when communication is performed between the heat-cooking appliance and the portable terminal via the wireless relay such as a router, there is an accompanying problem in terms of the difficulty in identifying which of the wireless relay such as a wireless router, the heat-cooking appliance or the portable terminal the problem such as a fault has occurred in.

[0011] An object of the present invention therefore lies in providing a heat-cooking system and a respective testing method in which it is possible to easily identify which of a wireless relay such as a wireless router, a heat-cooking appliance or a portable terminal a problem such as a fault has occurred in when a defect arises in a communication function which affords communication between the heat-cooking appliance and the portable terminal via the wireless relay.

[0012] This object is achieved by a heat-cooking system having the features of claim 1 as well as a respective testing method having the features of claim 5. Advantageous and preferred embodiments of the invention are defined in the further claims and are described in more detail in the following. Some of the features are only described with reference to the heat-cooking system or with reference to the testing method. These features shall nevertheless be applicable to the heat-cooking system as well as to the testing method in independent manner. The content of the claims is made an integral part of the description by explicit reference.

[0013] A constituent feature of the heat-cooking system according to the present invention lies in a heat-cooking system provided with: a heat-cooking appliance for heating an article for cooking, and a portable terminal for wirelessly communicating by means of an indirect communication method which affords communication with the heat-cooking appliance via a wireless relay. The heat-cooking appliance is provided with a memory unit for storing: processing content of a test mode for confirming operation of a communication function of the heat-cooking appliance, and test execution information including information for instructing execution of the test mode from the portable terminal. The system is adapted in such a way as to enable setting of a state in which communication is performed by a direct communication method which affords direct communication between the heat-cooking

appliance and the portable terminal, and in a state of communication by the direct communication method in that the portable terminal acquires the test execution information from the memory unit of the heat-cooking appliance. The portable terminal is adapted in such a way as to be able to instruct execution of the test mode to the heat-cooking appliance by utilizing the acquired test execution information. Furthermore, the heat-cooking appliance executes the test mode of the processing content stored in the memory unit when the test mode execution is instructed. The respective method is worked accordingly.

[0014] According to the abovementioned constituent feature, communication employing a direct communication method can be performed when it is not possible to perform wireless communication by means of an indirect communication method. This means that when there is an error in the indirect communication method, communication by the direct communication method is possible.

[0015] In a state of communication by the direct communication method, it is possible to instruct execution of the test mode from the portable terminal to the heat-cooking appliance. The heat-cooking appliance then stores processing content of the test, so even if a plurality of heat-cooking appliances are present, the test mode for confirming operation of the communication function matching the relevant heat-cooking appliance can be performed.

[0016] In the indirect communication method, a wireless relay acts as an intermediary between the portable terminal and the heat-cooking appliance, but with the direct communication method, a wireless relay is not present between the portable terminal and the heat-cooking appliance. According to the abovementioned constituent feature, the portable terminal receives test execution information from the memory unit of the heat-cooking appliance and an instruction for execution of the test mode is sent from the portable terminal to the heat-cooking appliance, whereby it is possible to confirm that communication can be performed in a regular manner in terms of both transmission and reception by the direct communication method. This means that when communication cannot be performed in a regular manner by the indirect communication method and it has been possible to confirm by the direct communication method that the communication function of the heat-cooking appliance is regular, it is possible to identify that there is a problem in the wireless relay or the wireless communication environment (radio wave environment).

[0017] That is to say, it is possible to provide a heat-cooking system which can easily identify the location of a problem. Furthermore, by using this heat-cooking system, an operator installing the heat-cooking system can take suitable measures such as replacing the wireless relay or improving the wireless communication environment (removing interference noise).

[0018] Furthermore, a different constituent feature lies in a heat-cooking system provided with: a heat-cooking

appliance for heating an article for cooking, and a portable terminal for wirelessly communicating by means of an indirect communication method which affords communication with the heat-cooking appliance via a wireless relay. The portable terminal stores processing content of a test mode for confirming operation of a communication function of the heat-cooking appliance. The heat-cooking appliance is provided with a memory unit for storing test execution information including information for instructing execution of the test mode from the portable terminal. The system is adapted in such a way as to enable setting of a state in which communication is performed by a direct communication method which affords direct communication between the heat-cooking appliance and the portable terminal, and in a state of communication by the direct communication method in that the portable terminal acquires the test execution information from the memory unit of the heat-cooking appliance. The portable terminal is adapted in such a way as to be able to instruct execution of the test mode to the heat-cooking appliance by utilizing the acquired test execution information, and also to send said processing content. The heat-cooking appliance executes the test mode of the received processing content when the test mode execution is instructed. The method is worked accordingly.

[0019] According to the abovementioned constituent feature, a test of the heat-cooking appliance can be executed by storing, in the portable terminal, processing content of the test mode corresponding to the heat-cooking appliance in direct communication with said portable terminal, without storing the processing content on the heat-cooking appliance side.

[0020] That is to say, it is possible to provide a heat-cooking system which can easily identify the location of a problem. Furthermore, by using this heat-cooking system, an operator installing the heat-cooking system can take suitable measures such as replacing the wireless relay or improving the wireless communication environment (removing interference noise).

[0021] A further feature lies in the fact that the heat-cooking appliance is provided with a communication unit for performing wireless communication with the portable terminal and the wireless relay, and a display unit for displaying the operating state of the heat-cooking appliance. The processing content includes processing for performing internal communication between the communication unit and the display unit inside the heat-cooking appliance, and for displaying the operating state on the display unit.

[0022] According to the abovementioned constituent feature, the test mode can be executed at the same time as a display test of the operating state in the display unit of the heat-cooking appliance. In this case, the operating state is also displayed on the display unit, so an operator who has sent a test mode execution instruction from the portable terminal can visually confirm that the test mode is conducted in a regular manner.

[0023] Furthermore, it is possible to confirm whether

operation of the display unit and internal communication between the display unit and the communication unit can be conducted in a regular manner, in addition to whether or not the communication function has been conducted in a regular manner.

[0024] That is to say, it is possible to provide a heat-cooking system which can easily identify the location of a problem while also providing a heat-cooking system which can confirm that there is no problem with internal communication in the heat-cooking appliance.

[0025] Furthermore, a different feature lies in the fact that the heat-cooking appliance is adapted to be operable from the portable terminal using the direct communication method after the test mode has been completed.

[0026] With the present heat-cooking system, an operation such as replacing the wireless relay is required if indirect communication has failed and direct communication has been successful.

[0027] According to the abovementioned constituent feature, when the indirect communication method cannot be performed and the test mode is executed by the direct communication method, then if the test mode succeeds, the heat-cooking appliance can be operated from the portable terminal using direct communication without further intervention. This means that the heat-cooking appliance can also be operated from the portable terminal until the operation such as replacing the wireless relay has been completed.

[0028] That is to say, it is possible to provide a heat-cooking system which can easily identify the location of a problem while also providing a heat-cooking system which restricts any loss of convenience for the user even if there is a problem around the wireless relay.

[0029] A further different feature lies in the fact that the heat-cooking appliance is provided with a notification unit for notifying the portable terminal that there is a high probability of a problem in the wireless relay or in the wireless communication environment mediated by the wireless relay when the test mode has been completed in a regular manner.

[0030] According to the abovementioned constituent feature, when the test mode has been completed in a regular manner, the location of a possible defect is clearly indicated on the portable terminal. For example, an operator installing the heat-cooking appliance etc. can therefore confirm the cause of a problem close at hand using the portable terminal. Furthermore, it is possible to display a larger amount of information on the portable terminal than with a heat-cooking appliance having a limited external display function (display), so more detailed information for determining a problem can be displayed.

[0031] That is to say, it is possible to provide a heat-cooking system which can easily identify the location of a problem while also providing a heat-cooking system which supports the adoption of suitable measures such as replacing the wireless relay or improving the wireless communication environment (removing interference noise).

[0032] These and further features can be gathered not only from the claims but also from the description and the drawings, wherein the individual features can in each case be realized on their own or several combined together in an embodiment of the invention and in other areas and can constitute advantageous and independently patentable configurations for which protection is claimed here. Subdividing the application into sub-headings and individual sections does not restrict the general validity of what is said therebeneath or therein.

Brief Description of the Figures

[0033]

Fig. 1 is a schematic diagram of a heat-cooking system;

Fig. 2 is a block diagram of the heat-cooking system;

Fig. 3 is an external diagram of a display unit of the heat-cooking appliance; and

Fig. 4 is a diagram illustrating a screen for instructing execution of a test mode from a portable terminal.

Detailed description of the embodiments

1. Outline configuration of the heat-cooking system

[0034] A heat-cooking system S according to a mode of embodiment of the present invention will be described with the aid of the figures.

[0035] As shown in fig. 1, the heat-cooking system S is provided with a heat-cooking appliance 1 for heating an article for cooking, and a portable terminal 2 for remotely controlling the heat-cooking appliance 1 by means of wireless communication and for displaying the state of the heat-cooking appliance 1. According to the mode of embodiment described herein, a gas stove equipped with a grill is used as the heat-cooking appliance 1 and a smartphone is used as the portable terminal 2.

[0036] The heat-cooking appliance 1 and the portable terminal 2 are adapted to be able to communicate using a wireless LAN. To be more specific, the heat-cooking appliance 1 and the portable terminal 2 are adapted to be able to communicate in either an infrastructure mode A for communicating with the heat-cooking appliance 1 via a wireless relay 3, and an access point mode B for direct one-to-one communication. A wireless router is used as the wireless relay 3. The infrastructure mode A corresponds to an "indirect communication method" while the access point mode B corresponds to a "direct communication method".

[0037] According to this mode of embodiment, the access point mode B is used as the direct communication method, so it is possible to identify more accurately the cause of a failure in wireless communication in the infrastructure mode A, compared with a case employing a different direct communication method such as an ad hoc

mode. To be more specific, when a direct communication method such as an ad hoc mode is employed, the protocols of OSI layer 3 and above are the same as the infrastructure mode A, but the OSI layer 2 protocols are different. Consequently, although there is no problem in identifying a fault such as a deterioration in the radio wave conditions, it is difficult to identify a problem when the problem arises at the OSI layer 2 protocol level. In contrast to this, when the access point mode B is employed, wireless communication can be performed using the same protocol as the infrastructure mode A including up to the OSI layer 2 protocols, so it can be easily and more accurately identified whether there is any problem such as a fault in the heat-cooking appliance 1 and the portable terminal 2 (problem isolation) in wireless communication between the heat-cooking appliance 1 and the portable terminal 2 in the infrastructure mode A.

1-1. Communication in infrastructure mode

[0038] According to this mode of embodiment, the heat-cooking appliance 1 and the portable terminal 2 are adapted in such a way as to communicate under normal circumstances by means of the infrastructure mode A. A state in which the heat-cooking appliance 1 and the portable terminal 2 communicate in the infrastructure mode A will be referred to below as the "normal communication mode".

[0039] In the normal communication mode, the heating power can be set or a timer can be set from the portable terminal 2 for the stove section or the grill section provided in the heat-cooking appliance 1, for example. Specifically, the portable terminal 2 is adapted in such a way as to be able to display a recipe downloaded in advance from an external server (not depicted). The recipe displayed on the portable terminal 2 shows the procedure for timer-cooking using the stove section or the grill section of the heat-cooking appliance 1, and the heating power or the time given in the recipe can be forwarded to the heat-cooking appliance 1 and set therein. A function such as this makes it possible to simplify the operations of the heat-cooking appliance 1 which are required during cooking, so there is excellent usability.

[0040] It should be noted that initial settings for connecting the heat-cooking appliance 1 and the portable terminal 2 to the wireless relay 3 are required in advance for the heat-cooking appliance 1 and the portable terminal 2 in order for them to communicate in the infrastructure mode A.

[0041] Specific initial settings include operations such as storing a password and SSID for connecting to the wireless relay 3, and exchanging identification information (e.g. IP address) with each other in order to enable inter-communication. The SSID and password may be stored by using a method employing an automatic setting means such as WPS or a method involving manual input by a user.

1-2. Problems relating to connection in infrastructure mode

[0042] When the initial settings have been completed, communication can be implemented in normal communication mode which allows the heat-cooking appliance 1 and the portable terminal 2 to communicate by means of the infrastructure mode A via the wireless relay 3.

[0043] However, when the initial settings have not been completed for whatever reason, it is necessary to identify the cause and to devise a solution. In particular, if an operator is installing the heat-cooking appliance 1 in a normal dwelling, for example, it would be desirable to rapidly identify the cause and to present the customer with a solution. However, communication in the infrastructure mode A involves cooperation between three devices, namely the heat-cooking appliance 1, the portable terminal 2 and the wireless relay 3, so it is not a simple matter to identify which of these devices the problem originates from.

1-3. Communication in access point mode

[0044] When the initial settings have not been completed for whatever reason, the cause can be identified by implementing communication using the access point mode B in which communication is performed directly between the heat-cooking appliance 1 and the portable terminal 2 without the intermediary of the wireless relay 3.

[0045] In the access point mode B, the heat-cooking appliance 1 acts as what is known as an access point. The heat-cooking appliance 1 already stores wireless connection settings (SSID and password) for when it functions as an access point, and wireless communication from the portable terminal 2 to the heat-cooking appliance 1 can be achieved to enable inter-communication as a result of the user of the portable terminal 2 setting said wireless connection settings (SSID and password). The heat-cooking appliance 1 and the portable terminal 2 communicate directly and wirelessly in the access point mode B without the intermediary of the wireless relay 3.

[0046] According to this mode of embodiment, when the heat-cooking appliance 1 is switched to the access point mode B by means of a predetermined operation, a web server (e.g. HTTP server) function for transmitting terminal display information d2 to the portable terminal 2 is activated. The web server function is provided in a communication unit 11.

2. Configuration of the portable terminal

[0047] The portable terminal 2 is adapted to be able to communicate using the wireless LAN and can communicate by selecting either the infrastructure mode A or the access point mode B. Furthermore, the portable terminal 2 is provided with an input unit such as a touch panel or buttons, and a display unit such as a display.

[0048] The portable terminal 2 acquires test execution

information d from a memory unit 13 of the heat-cooking appliance 1 in a state of communicating with the heat-cooking appliance 1 in the access point mode B. The portable terminal 2 is further adapted in such a way as to be able to display the acquired test execution information d on the display unit and in such a way as to enable a user to instruct execution of the test mode to the heat-cooking appliance 1 through the input unit.

3. Configuration of the heat-cooking appliance

[0049] As shown in fig. 2, the heat-cooking appliance 1 is broadly provided with: the communication unit 11 for providing wireless communication between the portable terminal 2 and an external device such as the wireless relay 3; an operation display unit 12 (display panel 122) for displaying the operating state of the heat-cooking appliance 1; the memory unit 13 for storing information relating to the test mode; and a control unit 14 for controlling internal communication inside the heat-cooking appliance 1. Here, the display panel 122 corresponds to the "display unit".

[0050] The communication unit 11 is provided in order to enable wireless LAN communication between the heat-cooking appliance 1 and the portable terminal 2, and specifically corresponds to a wireless LAN network chip. The communication unit 11 is adapted to operate in either the infrastructure mode A or the access point mode B. It should be noted that settings (SSID and password) for communication in the access point mode B are stored in advance in the memory unit 13 as factory default settings, for example.

[0051] As shown in fig. 1 and fig. 3, the operation display unit 12 is an interface for heat-cooking which is used by a user of the heat-cooking appliance 1, and it is provided with operating buttons 121 for adjusting burner ignition or heating power, and the display panels 122 by means of which the user can observe the operating state of the heat-cooking appliance 1. It should be noted that in fig. 3, a grill operation display unit provided on the front surface of the heat-cooking appliance 1 is shown as an example of the operation display unit 12, but a burner operation display unit provided on the upper surface of the heat-cooking appliance 1 may equally be used as the operation display unit 12.

[0052] The memory unit 13 is a storage device for storing data required for executing the test mode, and the test execution information d is stored therein. According to this mode of embodiment, processing content d1 of the test mode for confirming operation of the communication function of the heat-cooking appliance 1, and terminal display information d2 including information for instructing execution of the test mode from the portable terminal 2 are stored as the test execution information d.

[0053] To be more specific, the memory unit 13 stores, as the processing content d1 of the test mode, the procedure for performing internal communication between the communication unit 11 and the operation display unit

12 via the control unit 14, and the procedure for performing direct internal communication between the communication unit 11 and the operation display unit 12 without the intermediary of the control unit 14. To be more specific, the procedure for starting internal communication between the communication unit 11 and the operation display unit 12 as a result of operation of the control unit 14, and the procedure for performing direct internal communication between the communication unit 11 and the operation display unit 12 without operation of the control unit 14 but while the control unit 14 lies therebetween are stored as the processing content d1 of the test mode. As a result of these procedures, operations are performed in which the text on the display panels 122 of the display operation unit 12 shown in fig. 3 is lit in succession.

[0054] The memory unit 13 also stores, as the terminal display information d2, webpage information (e.g. HTML files) etc. including buttons or the like for instructing execution of the test mode displayed on the display of the portable terminal 2, as shown in fig. 4. The user of the portable terminal 2 can instruct execution of the test mode to the heat-cooking appliance 1 by way of the terminal display information d2 displayed on the display.

[0055] The control unit 14 is a device for performing control in such a way that the functions (11-13) of the heat-cooking appliance 1 are co-ordinated, and specifically it is possible to use a control microcomputer, for example. According to this mode of embodiment, the heat-cooking appliance 1 is adapted to perform internal communication by means of serial communication between the communication unit 11 and the operation display unit 12, via the control unit 14.

[0056] The control unit 14 receives input from the operating buttons 121 on the operation display unit 12 and controls operations such as controlling the burner etc. and lighting the display panels 122 on the operation display unit 12 correspondingly with the state of operation of the heat-cooking appliance 1.

[0057] Furthermore, the control unit 14 is provided with a test mode execution unit 141 and a notification unit 142 for implementing the test mode which will be described later. The test mode execution unit 141 reads out the test execution information d stored in the memory unit 13 and forwards the terminal display information d2 to the portable terminal 2 via the communication unit 11, and controls each unit in accordance with the processing content d1 of the test mode. Furthermore, the notification unit 142 provides notification relating to execution results of the test mode to the portable terminal 2 via the communication unit 11. The test mode execution unit 141 and the notification unit 142 will be described in detail below.

3-1. Test mode execution unit

[0058] According to this mode of embodiment, the heat-cooking appliance 1 normally communicates wirelessly with the portable terminal 2 in the infrastructure mode A, but when a predetermined operation is per-

formed, operation is switched in such a way that wireless communication is performed in the access point mode B.

[0059] Specifically, when a cooking mode selection key 121a and a heat level selection key 121b of the operating buttons 121 shown in fig. 3 have been pressed simultaneously for at least three seconds within a predetermined time after a power switch (not depicted) of the heat-cooking appliance 1 has been switched ON, the control unit 14 of the heat-cooking appliance 1 deems the abovementioned predetermined operation to have been performed.

[0060] When communication with the portable terminal 2 starts in access point mode B, the control unit 14 reads out the test execution information d stored in the memory unit 13 and sends the terminal display information d2 in the test execution information d to the portable terminal 2.

[0061] When a test execution button on the screen of the portable terminal 2 which is displayed as a result of the terminal display information d2 is touched and execution of the test mode is instructed from the portable terminal 2 to the heat-cooking appliance 1, the processing content d1 of the test mode included in the test execution information d is executed by means of the test mode execution unit 141.

3-2. Communication unit

[0062] When the test mode has been completed in a regular manner by means of the test mode execution unit 141, notification is provided by the notification unit 142 to the portable terminal 2 that there is a high probability of a problem in the wireless relay 3 or in the wireless communication environment mediated by the wireless relay 3. The notification unit 142 may, in addition to showing the location of a problem, simultaneously provide notification that there is no problem in the portable terminal 2 or the heat-cooking appliance 1.

3-3. Processing content of the test mode

[0063] The processing content d1 of the test mode included in the test execution information d will be described. According to this mode of embodiment, the processing content d1 stored in the memory unit 13 includes processing for performing internal communication between the communication unit 11 and the operation display unit 12 inside the heat-cooking appliance 1, and for displaying the operating state on the display panel 122 of the operation display unit 12. Display processing for the operating state involves a display for test mode processing on the display panel 122 of the operation display unit 12 in the heat-cooking appliance 1.

[0064] Specifically, the display for test mode processing involves successively switching the location of illumination on the display of the grill operating section shown in fig. 3 in the following order: "Fish: Grilled whole" → "Fish: Fillet" → "Roast chicken thigh" → "Roast in foil" → "Toast" → "Rice" → "Grill" → "Heat" → "Non-fry" → "Boil"

→ "Steam" → "Bread" → "High" → "Medium" → "Low".

[0065] By virtue of this arrangement, when the test mode processing is executed, it is possible to observe from the display panels 122 that the test mode processing is being executed. In addition, it can also be confirmed that the control unit 14 for controlling internal communication is functioning in an appropriate manner and internal communication is taking place in an appropriate manner between the communication unit 11 and the operation display unit 12, and also that there are no problems with the actual display panels 122.

4. Execution of test mode

[0066] If it is not possible to connect the heat-cooking appliance 1 and the portable terminal 2 via the wireless relay 3 using the infrastructure mode A when the heat-cooking appliance 1 is installed, the test mode execution procedure is implemented.

[0067] The heat-cooking appliance 1 is first of all switched to the access point mode B, after which the wireless settings of the portable terminal 2 are set in such a way that the portable terminal 2 is connected to the heat-cooking appliance 1. Here, the portable terminal 2 is switched to the access point mode B as a result of the user of the portable terminal 2 using the predetermined settings of the heat-cooking appliance 1 for access point mode B (SSID and password).

[0068] The user operates the portable terminal 2 to send a request for terminal display information d2 to the heat-cooking appliance 1 (e.g., access by HTTP communication using the IP address of the heat-cooking appliance 1), and as a result the terminal display information d2 of the heat-cooking appliance 1 is forwarded from the heat-cooking appliance 1 to the portable terminal 2, and the operating screen for executing the test mode is displayed on the portable terminal 2, as shown in fig. 4. When the operating screen of the portable terminal 2 is displayed, it can be confirmed that direct communication from the heat-cooking appliance 1 to the portable terminal 2 can be performed without any problem.

[0069] When the test mode is instructed to the heat-cooking appliance 1 on the operating screen displayed on the portable terminal 2, the abovementioned test mode processing is executed by means of the test mode execution unit 141 of the heat-cooking appliance 1.

[0070] When the test mode is executed in the access point mode B and the test mode has been successfully executed, it can be confirmed that internal communication inside the heat-cooking appliance 1 and the operation display unit 12 are operating in a regular manner, and also that direct communication from the heat-cooking appliance 1 to the portable terminal 2 is operating in a regular manner. That is to say, it can be confirmed that the heat-cooking appliance 1 and the portable terminal 2 are able to communicate directly and wirelessly without the intermediary of the wireless relay 3. As a result, it can be determined that there is a high probability of a fault

with the wireless relay 3 or a problem in the wireless communication environment.

[0071] As a result, suitable measures can be taken in terms of replacing the wireless relay 3 or improving the wireless environment (removing interference noise etc.).

[0072] According to this mode of embodiment, when the test mode has been completed, the portable terminal 2 is notified by means of the notification unit 142 of the control unit 14 that there is a high probability of a fault with the wireless relay 3 or a problem in the wireless communication environment (radio wave environment).

[0073] The portable terminal 2 is thus notified that there is a high probability of a fault with the wireless relay 3 or a problem in the wireless communication environment (radio wave environment), so the user is incited to take suitable measures in terms of replacing the wireless relay 3 or improving the wireless environment (removing interference noise etc.), and this helps in taking appropriate steps.

[0074] In addition, according to this mode of embodiment, the heat-cooking appliance 1 is adapted in such a way as to be operable from the portable terminal 2 using the access point mode B after completion of the test mode, and the heat-cooking appliance 1 also communicates wirelessly in the access point mode B after completion of the test mode.

[0075] As a result, the heat-cooking appliance 1 can be used in the normal manner after test mode processing has been completed, so it can also be used until the problem with the wireless relay 3 such as a router has been resolved, which provides good usability.

Other modes of embodiment

[0076]

(1) In the abovementioned mode of embodiment, an example was described in which serial communication is used for the internal communication, but the internal communication may be performed by means of parallel communication.

(2) In the abovementioned mode of embodiment, an example was described in which the heat-cooking appliance 1 is switched to the access point mode B, but it is equally possible to use a direct communication method employing a different protocol from that of the abovementioned mode of embodiment. For example, it is possible to use Wi-Fi Direct (registered trademark) or an ad hoc mode or the like as the direct communication method, for example.

(3) In the abovementioned mode of embodiment, an example was described in which an operational check of internal communication is performed in the test mode, but a check simply for establishing communication between the communication unit 11 and the portable terminal 2 may equally be performed.

(4) In the abovementioned mode of embodiment, an example was described in which the heat-cooking appliance 1 is operable from the portable terminal 2 in the access point mode B after completion of the test mode, but the heat-cooking appliance 1 may equally return to the infrastructure mode A after completion of the test mode.

(5) In the abovementioned mode of embodiment, an example was described in which the control unit 14 of the heat-cooking appliance 1 is provided with the notification unit 142, but the notification unit 142 may equally not be provided.

(6) In the abovementioned mode of embodiment, an example was described in which the processing content d1 of the test mode is stored in the memory unit 13 of the heat-cooking appliance 1, but the processing content d1 of the test mode may equally be stored in the portable terminal 2. In this case, the portable terminal 2 may equally acquire and store the processing content d1 of the test mode from an external server via the Internet, as required, or the processing content d1 of the test mode corresponding to one or more heat-cooking appliances 1 may equally be pre-stored before the test mode is executed. In such a case, the portable terminal 2 may instruct execution of the test mode to the heat-cooking appliance 1 and may also send the processing content d1 of the test mode.

(7) In the abovementioned mode of embodiment, an example was described in which what is known as a smartphone is used as the portable terminal 2, but any device may be used as the portable terminal 2 provided that it is an information terminal which can utilize a wireless LAN.

[0077] The present invention can be used as a heat-cooking system which can easily identify which of a wireless relay such as a wireless router, a heat-cooking appliance or a portable terminal a problem such as a fault has occurred in, when a defect arises in a communication function which affords communication between the heat-cooking appliance and the portable terminal via the wireless relay.

Key to Symbols

[0078]

- 1: Heat-cooking appliance
- 2: Portable terminal
- 3: Wireless relay
- 11: Communication unit
- 12: Operation display unit (display unit)
- 13: Memory unit
- 122: Display panel (display unit)

142: Notification unit

A: Infrastructure mode (indirect communication method)

B: Access point mode (direct communication method)

S: Heat-cooking system

d: Test execution information

dl: Processing content

Claims

1. Heat-cooking system provided with: a heat-cooking appliance for heating an article for cooking, and a portable terminal for wirelessly communicating by means of an indirect communication method which affords communication with the heat-cooking appliance via a wireless relay, wherein the heat-cooking appliance and/or the portable terminal is provided with a memory unit for storing:

processing content of a test mode for confirming operation of a communication function of the heat-cooking appliance;

wherein the heat-cooking appliance is provided with a memory unit for storing: test execution information including information for instructing execution of the test mode from the portable terminal;

the system is adapted in such a way as to enable setting of a state in which communication is performed by a direct communication method which affords direct communication between the heat-cooking appliance and the portable terminal, and in a state of communication by the direct communication method:

the portable terminal acquires the test execution information from the memory unit of the heat-cooking appliance,

the portable terminal is adapted in such a way as to be able to instruct execution of the test mode to the heat-cooking appliance by utilizing the acquired test execution information, and

the heat-cooking appliance executes the test mode of the processing content either received by the portable terminal that has sent the processing content to the heat-cooking appliance or stored in the memory unit when the test mode execution is instructed.

2. Heat-cooking system according to Claim 1, wherein the heat-cooking appliance is provided with:

- a communication unit for performing wireless

communication with the portable terminal and the wireless relay, and

- a display unit for displaying the operating state of the heat-cooking appliance, wherein the processing content includes processing for performing internal communication between the communication unit and the display unit inside the heat-cooking appliance, and for displaying the operating state on the display unit.

3. Heat-cooking system according to Claim 1 or 2, wherein the heat-cooking appliance is adapted to be operable from the portable terminal using the direct communication method after the test mode has been completed.

4. Heat-cooking system according to Claim 3, wherein the heat-cooking appliance is provided with a notification unit for notifying the portable terminal that there is a high probability of a problem in the wireless relay or in the wireless communication environment mediated by the wireless relay when the test mode has been completed in a regular manner.

5. Method for testing a heat-cooking appliance of a heat-cooking system provided with: the heat-cooking appliance for heating an article for cooking, and a portable terminal for wirelessly communicating by means of an indirect communication method which affords communication with the heat-cooking appliance via a wireless relay, wherein the heat-cooking appliance and/or the portable terminal has stored in a memory unit: processing content of a test mode for confirming operation of a communication function of the heat-cooking appliance; wherein the heat-cooking appliance has stored in a memory unit: test execution information including information for instructing execution of the test mode from the portable terminal; the system is adapted in such a way as to enable setting of a state in which communication is performed by a direct communication method which affords direct communication between the heat-cooking appliance and the portable terminal, and in a state of communication by the direct communication method the following steps are executed:

- the portable terminal acquires the test execution information from the memory unit of the heat-cooking appliance,

- the portable terminal instructs execution of the test mode to the heat-cooking appliance by utilizing the acquired test execution information,

- and the heat-cooking appliance executes the test mode of the processing content either received by the portable terminal that has sent the processing content to the heat-cooking appliance

ance or stored in the memory unit when the test mode execution is instructed.

6. Method according to Claim 5, wherein the portable terminal operates the heat-cooking appliance using the direct communication method after the test mode has been completed. 5
7. Method according to Claim 6, wherein the heat-cooking appliance notifies the portable terminal that there is a high probability of a problem in the wireless relay or in the wireless communication environment mediated by the wireless relay when the test mode has been completed in a regular manner. 10

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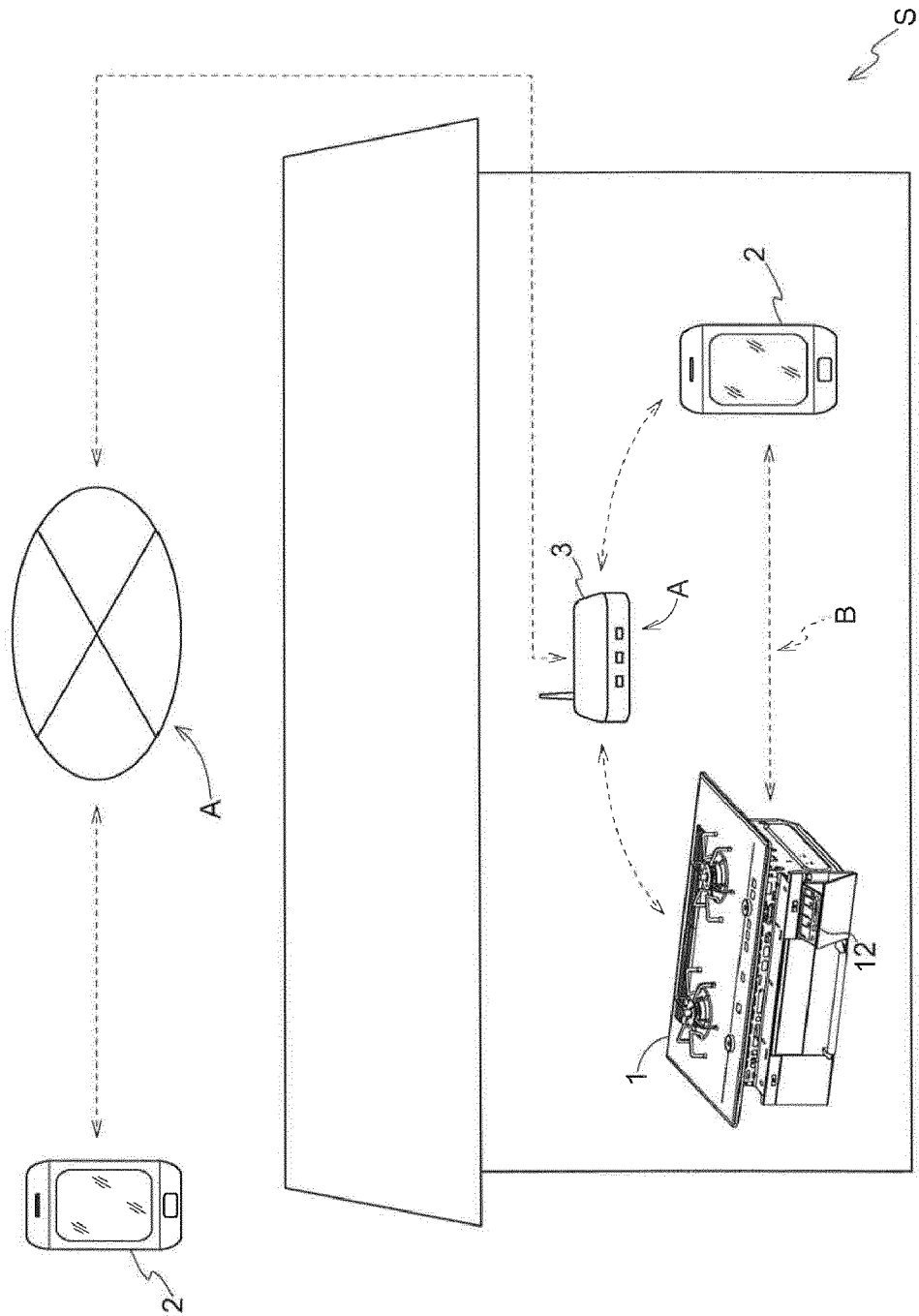
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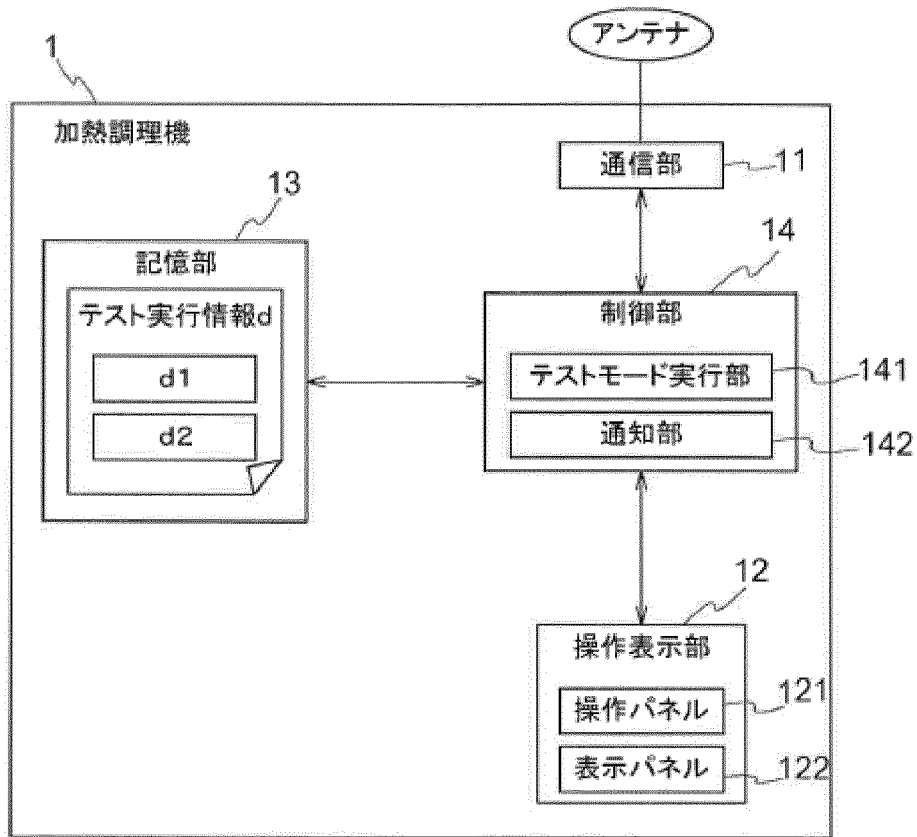
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[Fig. 1]

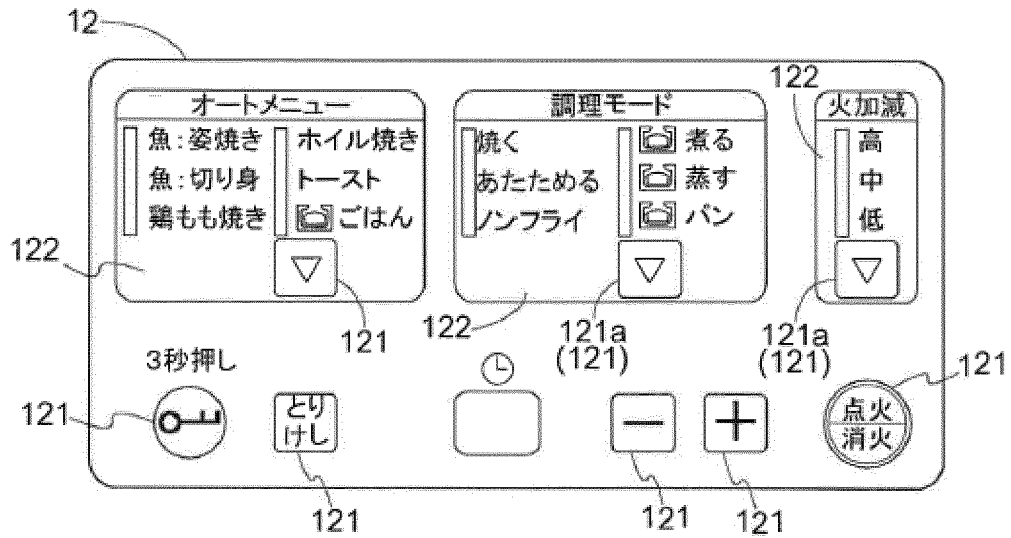


[Fig. 2]



- 1 Heat-cooking appliance
- 13 Storage unit
- d Test execution information
- アンテナ = Antenna
- 11 Communication unit
- 14 Control unit
- 141 Test mode execution unit
- 142 Notification unit
- 12 Operation display unit
- 121 Control panel
- 122 Display panel

[Fig. 3]



[top left box 122]

Auto menu

Fish: Grilled whole	Roast in foil
Fish: Fillet	Toast
Roast chicken thigh	Rice

[top middle box 122]

Cooking mode

Grill	Boil
Heat	Steam
Non-fry	Bread

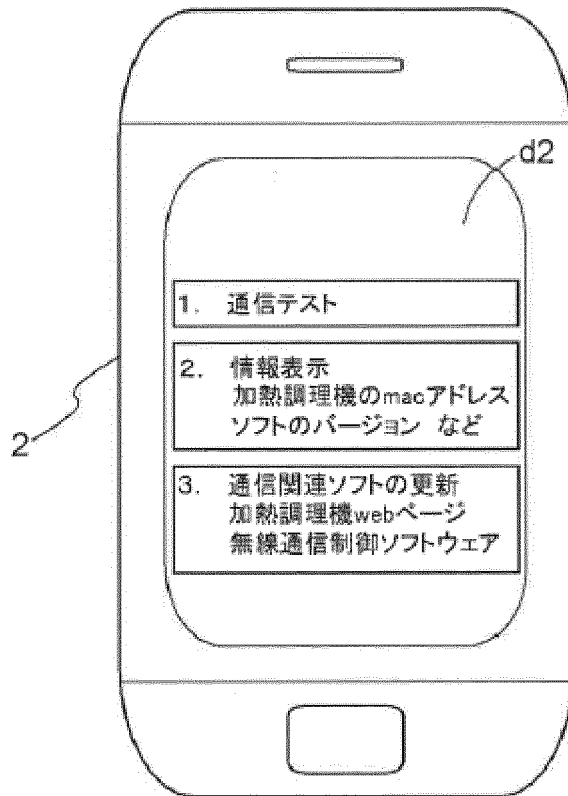
[top right box 122]

Heat level
High
Medium
Low

[bottom, left to right 121]

Push for three seconds
Stop
Ignition/off

[Fig. 4]



1. Communication test

2. Information display

mac address of heat-cooking appliance
Software version etc.

3. Update software associated with communication

Heat-cooking appliance webpage
Wireless communication control software



EUROPEAN SEARCH REPORT

Application Number
EP 15 18 0801

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The Hague		6 January 2016	Adant, Vincent
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