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*Continued on last page***(54) Title of Invention: WIRELESS DISPLAY SYSTEM****(57) Abstract****Problem**

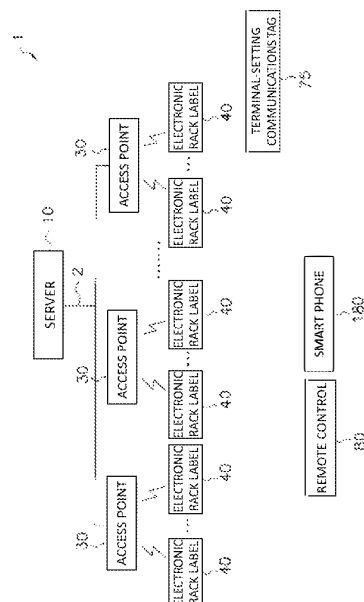
To provide a wireless display system in which notification of an instruction of a user or the like can be rapidly sent to a host server without the provision of a switch on a wireless display device.

Solution

A wireless display system 1 performs communication with a remote control 80 and comprises: a plurality of electronic rack labels 40 disposed corresponding to a plurality of products, respectively, and that displays product information related to the corresponding product; a server 10, which stores the product information; and an access point 30, which wirelessly transmits, to each of the electronic rack labels, the product information that is stored in the server. The wireless display device comprises: a first communications part, which performs near-field communication with the remote control and receives instruction information; a second communications part, which exchanges information with the server via the access point by wireless communication; and a switching part, which switches the operation state of the second communications part between a sleep state and an awake state, in which communication with the access point is possible. When the first communications part receives the instruction information, the switching part switches the operation state of the second communications part to the awake state, and the second communications part transmits, to the server, the instruction information received by the first communications part.

Selected Figure

FIG. 1



CLAIMS

1. A wireless display system that performs communication with a portable terminal, comprising:

a plurality of wireless display devices disposed corresponding to a plurality of items, respectively, and each having a display part that displays item information related to the corresponding item;

5 a server, which stores the item information related to the plurality of items; and

a communications apparatus, which wirelessly transmits, to each of the wireless display devices, the item information that is stored in the server and is related to the item corresponding to each wireless display device;

wherein:

10 the wireless display device comprises:

a first communications part, which performs near-field communication with the portable terminal and receives instruction information from the portable terminal;

a second communications part, which performs wireless communication with the communications apparatus and exchanges information with the server via the communications apparatus; and

15 a switching part, which switches the operation state of the second communications part between a sleep state, in which the second communications part cannot communicate with the communications apparatus, and an awake state, in which the second communications part can communicate with the communications apparatus; and

20 when the first communications part receives the instruction information, the switching part switches the operation state of the second communications part to the awake state, and the second communications part transmits, to the server via the communications apparatus, the instruction information received by the first communications part.

2. The wireless display system according to claim 1, wherein:

the portable terminal has an instruction-selection function; and

25 the first communications part receives the instruction information selected in the portable terminal.

3. The wireless display system according to claim 1 or 2, wherein:

the instruction information includes first instruction information, which instructs the switching of the operation state of the second communications part to the stopped state;

30 the switching part is configured so that the operation state of the second communications part is further switched to the stopped state based on the first instruction information received by the first communications part; and

when the first communications part receives the first instruction information, prior to the switching part switching the operation state of the second communications part to the stopped state, the second communications part transmits, to the server via the communications apparatus, the first instruction information received by the first communications part.

4. The wireless display system according to claim 3, wherein:

when the first instruction information is received, the server transmits the first display image to the second communications part via the communications apparatus;

40 after the second communications part has received the first display image, the switching part switches the operation state of the second communications part to the stopped state; and

when the second communications part receives the first display image, the display part displays the first display image.

5. The wireless display system according to claim 3, wherein:

45 the first communications part receives a first display image, which is transmitted together with the first instruction information by the portable terminal; and

when the first communications part receives the first display image, the display part displays the first display image.

6. The wireless display system according to any one of claims 1–5, wherein:

50 the instruction information includes second instruction information, which instructs the switching of the display language of the display part to a first language;

when the second instruction information is received from the second communications part via the communications apparatus, the server transmits, to the second communications part via the communications apparatus, a second display image in which the first language is used; and

when the second communications part receives the second display image, the display part displays the second display image.

7. The wireless display system according to any one of claims 1–6, further comprising a communications tag, which performs near-field communication with the portable terminal and changes a setting of the portable terminal.

8. The wireless display system according to any one of claims 1–7, wherein the first communications part transmits, to the portable terminal, information related to the state of the wireless display device.

DETAILED DESCRIPTION OF THE INVENTION

FIELD OF THE INVENTION

[0001]

The present invention relates to a wireless display system and more specifically relates to a wireless display system in which notification of an instruction of a user or the like is sent from a wireless display device to a host server.

BACKGROUND ART

[0002]

Conventionally, a wireless display system is known (e.g., Patent Document 1 (Japanese Laid-open Patent Publication 2010-243672)), in which a switch is provided on a wireless display device and notification of an instruction of a user or the like is sent from the wireless display device to a host server by manipulating a switch. By providing the switch on the wireless display device, a user or the like, who manipulates the wireless display device, can rapidly notify the server of the instruction.

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0003]

However, as in Patent Document 1 (Japanese Laid-open Patent Publication 2010-243672), in the situation in which a switch is provided on a wireless display device, there are problems in that the device structure tends to become complicated and the cost of the wireless display device becomes high. In addition, as in Patent Document 1 (Japanese Laid-open Patent Publication 2010-243672), in the situation in which the switch is provided on the wireless display device, because space to dispose the switch is needed, it is difficult to make the wireless display device small.

[0004]

An object of the present invention is to provide a wireless display system in which notification of an instruction of a user or the like is sent from a wireless display device to a host server, wherein it is possible to rapidly notify the server of the instruction without the provision of a switch on the wireless display device.

MEANS FOR SOLVING THE PROBLEMS

[0005]

A wireless display system according to a first viewpoint of the present invention performs communication with a portable terminal. The wireless display system comprises a plurality of wireless display devices, a server, and a communications apparatus. The plurality of wireless display devices is disposed corresponding to a plurality of items, respectively. Each of the plurality of wireless display devices has a display part that displays item information related to the corresponding item. The server stores the item information related to the plurality of items. The communications apparatus wirelessly transmits, to each of the wireless display devices, the item information that is stored in the server and is related to the item corresponding to that wireless display device. The wireless display device comprises a first communications part, a second communications part, and a switching part. The first communications part performs near-field communication with the portable terminal and receives instruction information from the portable terminal. The second communications part performs wireless communication with the communications apparatus and exchanges information with the server via the communications apparatus. The switching part switches the operation state of the second communications part between a sleep state and an awake state. In the sleep state, the second communications part cannot communicate with the communications apparatus. In the awake state, the second communications part can communicate with the communications apparatus. When the first communications part receives the instruction information, the switching part switches the operation state of the second communications part to the awake state, and the second communications part transmits, to the server via the

communications apparatus, the instruction information received by the first communications part.

[0006]

In the wireless display system according to the first viewpoint of the present invention, when the first communications part of the wireless display device that performs near-field communication with the portable terminal receives instruction information transmitted by the portable terminal, the received instruction information is transmitted from the wireless display device to the server. By being configured in this manner, notification of the instruction of the user or the like can be rapidly sent from the wireless display device to the server without the provision of a switch on the wireless display device.

[0007]

A wireless display system according to a second viewpoint of the present invention is the wireless display system according to the first viewpoint, wherein the portable terminal has an instruction-selection function. The first communications part receives the instruction information selected in the portable terminal.

[0008]

In the situation in which switches are provided on the wireless display device in order to notify the server of instructions, to rapidly notify the server of the multiple types of instructions, it is preferable to dispose switches, on the wireless display device, corresponding in number to the number of types of instructions. However, the greater the number of switches disposed on the wireless display device, the more difficult it becomes to make the wireless display device compact.

[0009]

In the wireless display system according to the second viewpoint of the present invention, because the portable terminal has the instruction-selection function, notification of multiple types of instructions of the user or the like can be rapidly sent from the wireless display device to the server without the size of the wireless display device becoming large.

[0010]

A wireless display system according to a third viewpoint of the present invention is the wireless display system according to the first viewpoint or the second viewpoint, wherein the instruction information includes first instruction information, which instructs the switching of the operation state of the second communications part to the stopped state. The switching part is configured so that the operation state of the second communications part is further switched to the stopped state based on the first instruction information received by the first communications part. When the first communications part receives the first instruction information, prior to the switching part switching the operation state of the second communications part to the stopped state, the second communications part transmits, to the server via the communications apparatus, the first instruction information received by the first communications part.

[0011]

In the wireless display system according to the third viewpoint of the present invention, in the situation in which the item corresponding to the wireless display device no longer exists, the communications function between the wireless display device and the server can be stopped without the provision of a switch on the wireless display device. In addition, it can be understood that, because the first instruction information is transmitted from the wireless display device to the server before the stopping of the communications function, the communications function of the wireless display device can be stopped on the server side.

[0012]

A wireless display system according to a fourth viewpoint of the present invention is the wireless display system according to the third viewpoint, wherein, when the first instruction information is received, the server transmits the first display image to the second communications part via the communications apparatus. After the second communications part has received the first display image, the switching part switches the operation state of the second communications part to the stopped state. When the second communications part receives the first display image, the display part displays the first display image.

[0013]

In the wireless display system according to the fourth viewpoint of the present invention, the operation state of the second communications part is switched to the stopped state after the second communications part has received the first display image to be displayed on the display part. Consequently, when the communications function of the second communications part is stopped, the worker or the like can be clearly informed that the first display image is displayed on the display part and that the second communications part of the wireless display device is in the state in which the communications function has been stopped.

[0014]

A wireless display system according to a fifth viewpoint of the present invention is the wireless display system according to the third viewpoint, wherein the first communications part receives a first display image, which is transmitted together with the first instruction information by the portable terminal. When the first communications part receives the first display image, the display part displays the first display image.

[0015]

In the wireless display system according to the fifth viewpoint of the present invention, the first communications part receives, from the portable terminal, first instruction information, which instructs the switching of the operation state of the second communications part to the stopped state, and a first display image to be displayed on the display part. Consequently, when the communications function of the second communications part is stopped, the worker or the like can be clearly informed that the first display image is displayed on the display part and that the second communications part of the wireless display device is in the state in which the communications function has been stopped.

[0016]

A wireless display system according to a sixth viewpoint of the present invention is the wireless display system according to any one of the first viewpoint to fifth viewpoint, wherein the instruction information includes second instruction information, which instructs the switching of the display language of the display part to a first language. When the second instruction information is received from the second communications part via the communications apparatus, the server transmits, to the second communications part via the communications apparatus, a second display image in which the first language is used. When the second communications part receives the second display image, the display part displays the second display image.

[0017]

In the wireless display system according to the sixth viewpoint of the present invention, information in the language desired by the carrier of the portable terminal can be displayed on the wireless display device. Consequently, even in the situation in which the wireless display device is used in an environment where a variety of languages can be used, the user of the portable terminal can easily ascertain the information displayed on the wireless display device, and therefore it is highly convenient.

[0018]

A wireless display system according to a seventh viewpoint of the present invention is the wireless display system according to any one of the first viewpoint to sixth viewpoint, further comprising a communications tag, which performs near-field communication with the portable terminal and changes a setting of the portable terminal.

[0019]

Conventionally, to change the settings of the portable terminal, troublesome operations are required on the portable terminal, such as the CPU directly overwriting ROM data.

[0020]

In the wireless display system according to the seventh viewpoint of the present invention, the settings of the portable terminal can be easily changed by near-field communication between the portable terminal and the terminal-setting communications tag.

[0021]

A wireless display system according to an eighth viewpoint of the present invention is the wireless display system according to any one of the first viewpoint to seventh viewpoint, wherein the first communications part transmits, to the portable terminal, information related to the state of the wireless display device.

[0022]

According to the wireless display system according to an eighth viewpoint of the present invention, because information (e.g., the remaining battery charge of the wireless display device or the like) related to the state of the wireless display device is transmitted to the portable terminal, the user or the like can easily confirm the state of the wireless display device using the portable terminal.

EFFECTS OF THE INVENTION

[0023]

According to the wireless display system according to the present invention, when a first communications part of a wireless display device, which performs near-field communication with a portable terminal, receives instruction information transmitted by the portable terminal, the received instruction information is transmitted from the wireless display device to a server. By being configured in this manner, notification of an instruction of a user or the like can be rapidly sent from the wireless display device to the server without the provision of a switch on the wireless display device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

FIG. 1 is an overall schematic diagram of a wireless display system according to one embodiment of the present invention.

FIG. 2 is a drawing that depicts a layout example of electronic rack labels of the wireless display system shown in FIG. 1.

FIG. 3 is a drawing that shows the external appearance of one of the electronic rack labels of the wireless display system shown in FIG. 1.

FIG. 4 is a drawing that shows the state in which the electronic rack label of the wireless display system shown in FIG. 1 is displaying an image of characters that read "Communications Function OFF."

FIG. 5 is a block diagram that shows a schematic configuration of the electronic rack label of the wireless display system shown in FIG. 1.

FIG. 6 is a block diagram that shows a schematic configuration of a server of the wireless display system shown in FIG. 1.

FIG. 7 is a schematic diagram of a remote control, which performs communication with the wireless display system shown in FIG. 1.

FIG. 8 is a flow chart that shows the operation of the wireless display system in the situation in which, in the wireless display system shown in FIG. 1, the electronic rack label receives a recording- and display-update instruction.

FIG. 9 is a flow chart that shows the operation of the wireless display system in the situation in which, in the wireless display system shown in FIG. 1, the electronic rack label receives a display-switch instruction for the electronic rack label.

FIG. 10 is a flow chart that shows the operation of the wireless display system in the situation in which, in the wireless display system shown in FIG. 1, the electronic rack label receives a communications-function-OFF instruction for a second communications part.

FIG. 11 is a flow chart that shows the operation of the wireless display system in the situation in which, in the wireless display system shown in FIG. 1, the electronic rack label receives a communications-function-ON instruction for the second communications part.

FIG. 12 is a flow chart that shows the operation of the wireless display system in the situation in which, in the wireless display system shown in FIG. 1, the electronic rack label receives a display-language switch instruction for the electronic rack label.

FIG. 13 is a flow chart that shows the operation of the wireless display system in the situation in which, in the wireless display system according to Modified Example B, the electronic rack label receives a communications-function-OFF instruction for the second communications part.

MODES FOR CARRYING OUT THE INVENTION

[0025]

Embodiments of the wireless display system according to the present invention will be explained below. It is noted that the embodiments below are specific examples of the present invention and do not limit the technical scope of the present invention. Various modifications are possible within a range that does not deviate from the gist of the present invention.

[0026]

(1) Overall Configuration

In the present embodiment, a wireless display system 1 is used in a store such as, for example, a supermarket or a convenience store.

[0027]

As shown in FIG. 1, the wireless display system 1 principally comprises a server 10, a plurality of electronic rack labels 40, 40, ..., a plurality of access points 30, 30, ..., and a terminal-setting communications tag 75. The number of the electronic rack labels 40, the number of the access points 30, and the number of the terminal-setting communications tags 75 of the wireless display system 1 are not limited to the numbers shown in FIG. 1.

[0028]

Each of the electronic rack labels 40 is one example of a wireless display device. Each of the electronic rack labels 40 is a portable apparatus. The electronic rack labels 40 are disposed corresponding to a plurality of products P carried by the store in which the wireless display system 1 is installed (refer to FIG. 2). Each of the products P is one example of an item. Each of the electronic rack labels 40 comprises a display part 41, which displays product information related to the corresponding product P (refer to FIG. 3). Product information is one example of item information. Product information related to each of the products P includes, for example, the product name of the product P, the retail price of the product P, the unit retail price (retail price by weight) of the product P, the barcode (identification information unique to the product P) of the product P, etc. (refer to FIG. 3). However, product information related to each of the products P is not necessarily limited to the information illustrated herein and may include other information in addition to such information or instead of a portion or all of such information.

[0029]

Each of the electronic rack labels 40 is driven by a battery 45 (refer to FIG. 5). When a second communications part 42, which performs communication with the corresponding access point 30 and is described below, is set to the normally communication-enabled state, the electric-power consumption of the electronic rack label 40 becomes large, and therefore it becomes necessary to replace the battery 45 frequently. Accordingly, as described below, the electronic rack label 40 is configured to switch the operation state of the second communications part 42 at a prescribed-time interval between a sleep state, in which the second communications part 42 cannot communicate with the access point 30, and an awake state, in which the second communications part 42 can communicate with the access point 30. Each of the electronic rack labels 40 repetitively cycles such that it sets the operation state of the second communications part 42 to a relatively long-term sleep state, switches to a relatively short-term awake state, and then once again returns to the sleep state. Owing to the electronic rack label 40 operating in this manner, consumption of the battery 45 curtailed.

[0030]

The server 10 is a common computer that manages information related to the plurality of products P carried by the store. The server 10 is disposed in, for example, the server room of the store in which the wireless display system 1 is

installed. Various information related to the products P is stored in the server 10. The server 10 stores various information related to the plurality of products P. In addition, information for associating each of the electronic rack labels 40 and the product P corresponding to that electronic rack label 40 is stored in the server 10. The server 10 exchanges information with the electronic rack labels 40 via the access points 30, which are connected by a network 2 (refer to FIG. 1), such as a LAN (local-area network) or the like. Information transmitted by the server 10 to the electronic rack labels 40 includes: storage- and/or display-change commands to the electronic rack labels 40; and the image-display command when the communications function is OFF. The storage- and/or display-change commands and the during-communications-function-OFF image-display command are described below. Information transmitted from the electronic rack labels 40 to the server 10 includes a response signal, which is described below, and instruction information, which is described below.

[0031]

Each of the access points 30 is a communications apparatus that performs radio-wave-type wireless communication. Each of the access points 30 transmits, to the corresponding electronic rack labels 40 using radio waves, information transmitted from the server 10. In addition, each of the access points 30 receives information transmitted by radio waves from the corresponding electronic rack labels 40 and transmits that received information to the server 10.

[0032]

The access points 30 are mounted spaced apart on, for example, the ceiling of the store. The installation locations and the installation spacing of the access points 30 are determined so that an electronic rack label 40 installed inside the store can communicate with one of the access points 30.

[0033]

To report to the each of the electronic rack labels 40 the presence or absence of information transmission, each of the access points 30 transmits at a prescribed-time interval a signal called a beacon timed to when the operation state of the second communications parts 42 of the electronic rack labels 40 becomes the awake state. In the situation in which information is to be transmitted to one of the electronic rack labels 40, the access point 30 transmits that information following a beacon, which reports to the electronic rack label 40 that information is to be transmitted. In addition, in the situation in which information is not to be transmitted to one of the electronic rack labels 40, the access point 30 transmits a beacon that reports to the electronic rack label 40 that information will not be transmitted. In the situation in which the electronic rack label 40 has received a beacon reporting that information will be transmitted, the electronic rack label 40 maintains the operation state of the second communications part 42 in the awake state without immediately returning to the sleep state for a prescribed interval.

[0034]

By configuring the electronic rack label 40 in this manner, consumption of the battery 45 is curtailed because the operation state of the second communications part 42 no longer switches to the awake state for an unnecessarily long interval.

[0035]

The wireless display system 1 is configured in a manner capable of communicating with a remote control 80 and a smart phone 180. The remote control 80 and the smart phone 180 each are one example of a portable terminal.

[0036]

The remote control 80 is device that is carried by a user or the like who performs work in the store.

[0037]

The remote control 80 comprises a CPU (not shown) and memory (not shown), such as RAM, ROM, flash memory, and the like. The remote control 80 comprises a communications part (not shown) that performs near-field communication (NFC: near-field communication) with a first communications part 50 (RF tag (radio-frequency tag)) of the electronic rack label 40, which is described below. That is, the remote control 80 is an RF-tag reader/writer that is capable of near-field communication with the first communications part 50 (RF tag (radio-frequency tag)) of the electronic rack label 40.

[0038]

The remote control 80 transmits instruction information to the electronic rack label 40 using near-field communication. The instruction information transmitted to the electronic rack label 40 by the remote control 80 includes a plurality of instructions. The instruction information transmitted to the electronic rack label 40 by the remote control 80 includes, for example, a storage- and/or display-update instruction for the electronic rack label 40, a display-switch instruction for the electronic rack label 40, a communications-function-OFF instruction for the second communications part 42 of the electronic rack label 40, and a communications-function-ON instruction for the second communications part 42. The details of each instruction are described below.

[0039]

As shown in FIG. 7, the remote control 80 comprises a plurality of (in the present embodiment, 8) buttons 81. Each piece of instruction information transmitted to the electronic rack label 40 is correlated with one of the buttons 81. After the button 81 corresponding to the instruction information that the user or the like wishes to transmit has been pressed, the user brings the remote control 80 close to the electronic rack label 40, and thereby the instruction information corresponding to the pressed button 81 is transmitted from the remote control 80 to the first communications part 50 of the electronic rack label 40. That is, the remote control 80 has an instruction-selection function (a function with which instruction information to be transmitted to the electronic rack label 40 can be selected).

[0040]

The terminal-setting communications tag 75 is an RF tag (radio-frequency tag). The terminal-setting communications tag 75 is disposed in, for example, the server room of the store in which the wireless display system 1 is installed. The terminal-setting communications tag 75 is used to change the settings of the remote control 80. Here, changing the settings of the remote control 80 does not mean merely resetting the settings of the remote control 80 but includes initializing the remote control 80 when it has not been set. The settings of the remote control 80 include, for example: assigning a function to each of the buttons 81 (e.g., what instruction information is transmitted from the remote control 80 when a certain button 81 is pressed); the setting of a signal-transmission time with respect to the electronic rack label 40; the setting of an authentication code; and the like.

[0041]

The terminal-setting communications tag 75 principally comprises an NFC chip (not shown) and a loop antenna (not shown) for communication. The remote control 80 is configured in a manner capable of communication with the terminal-setting communications tag 75. Information (setting values and the like) for setting the remote control 80 is written in advance by an RF-tag reader/writer, which is not shown, into memory (not shown) in the NFC chip of the terminal-setting communications tag 75.

[0042]

Changing the settings of the remote control 80 is performed, for example, as follows.

[0043]

When the settings of the remote control 80 are to be changed, a manipulation that switches the operation mode of the remote control 80 to a setting mode (e.g., a manipulation in which one of the buttons 81 is pressed) is performed by the user or the like on the remote control 80. Subsequently, when the remote control 80 is brought close to the terminal-setting communications tag 75 and near-field communication between the remote control 80 and the terminal-setting communications tag 75 is performed, information (setting values and the like) stored in the memory of the NFC chip of the terminal-setting communications tag 75 is transmitted to the remote control 80. The remote control 80 writes the received information to nonvolatile memory (e.g., EEPROM, flash memory, or the like). When the remote control 80 is used such that the operation mode is the normal mode (when instruction information is transmitted from the remote control 80 to the electronic rack label 40), the remote control 80 operates in accordance with the information (settings) stored in the nonvolatile memory.

[0044]

The smart phone 180 is a device that is carried by a customer or the like visiting the store. The smart phone 180 is a mobile phone that also has the functions of a computer. The smart phone 180 transmits instruction information to the electronic rack label 40 using near-field communication. The instruction information transmitted to the electronic rack label 40 by the smart phone 180 includes a plurality of instructions. The instruction information transmitted to the electronic rack label 40 by the smart phone 180 includes, for example, a display-language switch instruction for the electronic rack label 40 and a display-switch instruction for the electronic rack label 40. The details of each of the instructions are described below.

[0045]

The smart phone 180 comprises: a CPU (not shown); memory (not shown), such as RAM and ROM; etc. Application software for generating the instruction information to the electronic rack label 40, which is described below, is downloaded to the memory in the smart phone 180 in advance via, for example, a communications line, which is not shown. The smart phone 180 comprises a communications part (not shown) that performs near-field communication (NFC: near-field communication) with the first communications part 50 (RF tag (radio-frequency tag)) of the electronic rack label 40, which is described below. In other words, the smart phone 180 is an RF-tag reader/writer that is capable of near-field communication with the first communications part 50 (RF tag (radio-frequency tag)) of the electronic rack label 40. In addition, the smart phone 180 comprises a touch-panel-type display that serves as an information input-output part. The switching of the near-field-communication function ON and OFF, the operation for transmitting instruction information to the electronic rack label 40, and the like are performed using the touch-panel-type display of the smart phone

180. For example, after the user of the smart phone 180 performs the operation for transmitting certain instruction information using the touch-panel-type display, the user brings the smart phone 180 close to the electronic rack label 40, and thereby the instruction information intended by the user of the smart phone 180 is transmitted from the smart phone 180 to the first communications part 50 of the electronic rack label 40. That is, the smart phone 180 has an instruction-selection function (a function with which the instruction information to be transmitted to the electronic rack label 40 can be selected).

[0046]

In addition, the smart phone 180 is configured in a manner capable of receiving information stored in the electronic rack label 40. Of the information stored in the electronic rack label 40, what kinds of information can be received by the smart phone 180 is described below.

[0047]

(2) Detailed Configuration

The electronic rack labels 40 and the server 10 of the wireless display system 1 are explained in detail below.

[0048]

(2-1) Electronic Rack Label

The electronic rack labels 40 are disposed corresponding to the plurality of products P carried by the store in which the wireless display system 1 is installed (refer to FIG. 2). Each of the electronic rack labels 40 displays product information related to its corresponding product P (refer to FIG. 3).

[0049]

As shown in FIG. 5, the electronic rack label 40 principally comprises the display part 41, the first communications part 50, the second communications part 42, memory 60, a control part 44, and the battery 45.

[0050]

(2-1-1) Display Part

The display part 41 is a screen that displays product information related to the product P corresponding to the electronic rack label 40 that comprises that display part 41 (refer to FIG. 3). The display part 41 displays product information, which is stored in the memory 60, related to the product P. For example, electronic paper is used as the display part 41. That is, the display part 41 is a dot-matrix-type nonvolatile-display part, which is configured such that a plurality of pixels is arrayed in a matrix. The display part 41 is capable of maintaining the display content, even without being supplied with electric power.

[0051]

(2-1-2) First Communications Part

The first communications part 50 is a passive-type RF tag that receives the supply of electric power from the remote control 80 or the smart phone 180 by non-contact, electric-power transmission. The first communications part 50 performs near-field communication with the remote control 80 and the smart phone 180.

[0052]

The first communications part 50 is configured to receive instruction information from the remote control 80 and the smart phone 180. The first communications part 50 receives the instruction information that was selected in either the remote control 80 or the smart phone 180. The details of the instruction information are described below.

[0053]

In addition, the first communications part 50 is configured to transmit, to the smart phone 180, various information stored in the memory 60.

[0054]

As shown in FIG. 5, the first communications part 50 principally comprises an antenna 51 and an NFC chip (near-field communication chip) 52.

[0055]

The antenna 51 is a loop antenna (coil antenna) that is used in the transmission and reception of signals using radio waves and magnetic fields. The distance over which communication is possible between the first communications part 50 on one side and the remote control 80 and the smart phone 180 on the other side is approximately several centimeters to several tens of centimeters.

[0056]

The NFC chip 52 is an integrated circuit that performs control of the first communications part 50 in various ways. The NFC chip 52 comprises the memory 60, which stores information. The memory 60 is described below.

5 [0057]

When the NFC chip 52 receives instruction information from the remote control 80 or the smart phone 180 via the antenna 51, the NFC chip 52 stores the received instruction information in the memory 60. In addition, the NFC chip 52 outputs a signal that notifies the control part 44 that the instruction information has been received. It is noted that the operation of the wireless display system 1 in the situation in which the first communications part 50 has received a variety of instruction information is described below.

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[0058]

In addition, when near-field communication is performed between the smart phone 180 and the first communications part 50 in the state in which instruction information is not being transmitted from the smart phone 180, the NFC chip 52 reads out, from the memory 60, prescribed information related to the product P. That is, when the smart phone 180 is brought close to the electronic rack label 40 in the state in which the near-field-communication function is turned ON and an operation to transmit instruction information is not being performed, the NFC chip 52 reads out, from the memory 60, prescribed information related to the product P. Furthermore, the NFC chip 52 transmits, to the smart phone 180 via the antenna 51, prescribed information related to the product P.

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20 [0059]

It is noted that, the prescribed information related to the product P may be all or a portion of the information related to the product P stored in the memory 60. The details of the information related to the product P stored in the memory 60 are described below.

[0060]

It is noted that, here, the transmission, from the first communications part 50 to the smart phone 180, of the prescribed information related to the product P is not limited only to turning the near-field-communication function of the smart phone 180 ON and bringing the smart phone 180 close to the electronic rack label 40. It may be configured such that the smart phone 180 transmits, to the first communications part 50, a transmission-request instruction for prescribed information related to the product P (instruction information), and the NFC chip 52, in response to the transmission-request instruction, transmits, to the smart phone 180, the prescribed information related to the product P.

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[0061]

(2-1-3) Second Communications Part

The second communications part 42 performs wireless communication with the corresponding access point 30. The second communications part 42 performs radio-wave-type wireless communication with the corresponding access point 30. The second communications part 42 exchanges information with the server 10 via the corresponding access point 30.

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[0062]

For example, the second communications part 42 receives a storage- and/or display-change command transmitted from the server 10 via the corresponding access point 30. The storage-change command is a command that instructs the electronic rack label 40 to change (including adding and deleting) the storage content of the memory 60. The display-change command is a command that instructs the electronic rack label 40 to change (including deleting) the display content of the display part 41. There are situations in which the storage- and/or display-change command transmitted to the electronic rack label 40 includes information (including numerical data and image data) related to the product P. In addition, an apparatus ID (identification information that is unique to each electronic rack label 40) of the target electronic rack label 40 that is to perform the change command is affixed to the storage- and/or display-change command transmitted to the electronic rack label 40.

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[0063]

In addition, for example, the second communications part 42 receives a during-communications-function-OFF image-display command, which is transmitted from the server 10 via the corresponding access point 30. The during-communications-function-OFF image-display command is a command that instructs the display part 41 to display the characters "Communications Function OFF" (refer to FIG. 4). The storage- and/or display-change command transmitted to the electronic rack label 40 includes a first display image (image data of the characters "Communications Function OFF"). It is noted that, here, although the during-communications-function-OFF image-display command is a command that instructs the display part 41 to display the characters "Communications Function OFF," the image displayed on the display part 41 is not limited to the characters

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55

"Communications Function OFF." The during-communications-function-OFF image-display command may be a command that instructs the display part 41 to display characters other than "Communications Function OFF" or a symbol indicating that the communications function of the second communications part 42 is OFF.

[0064]

5 The second communications part 42 transmits various signals to the corresponding access point 30.

[0065]

The signal transmitted by the second communications part 42 to the corresponding access point 30 includes a response signal (ACK). The response signal is a signal transmitted from the second communications part 42 for notifying the server 10 that the electronic rack label 40 has received information (e.g., a storage-
10 and/or display-change command) transmitted in a manner addressed to that electronic rack label 40.

[0066]

In addition, when the first communications part 50 receives instruction information from the remote control 80 or the smart phone 180, the second communications part 42 transmits the received instruction information to the server 10 via the corresponding access point 30. It is noted that transmitting the received instruction information to the server 10 includes the situation in which the received instruction information is transmitted as is as well as the situation in which information (a signal) corresponding to the received instruction information is transmitted.

[0067]

(2-1-4) Memory

20 The memory 60 includes the NFC chip 52 of the first communications part 50. The memory 60 is connected to the second communications part 42 and the first communications part 50. It is noted that the second communications part 42 and the memory 60 being connected means that it is possible to write into the memory 60 the information received by the second communications part 42 and that it is possible to transmit from the second communications part 42 the information read out from the memory 60. In addition, the first
25 communications part 50 and the memory 60 being connected means that it is possible to write into the memory 60 the information received by the first communications part 50 and that it is possible to transmit from the first communications part 50 the information read out from the memory 60.

[0068]

30 The memory 60 stores information received by the second communications part 42 and related to the product P.

[0069]

The information related to the product P includes product information (the product name of the product P, the retail price of the product P, the unit retail price of the product P, the barcode of the product P, and the like) related to the product P displayed on the electronic rack label 40. The product information related to the
35 product P is information that is normally displayed on the display part 41. The product information related to the product P is stored, for example, as image data in the memory 60.

[0070]

In addition, in the situation in which the product P is a foodstuff, the information related to the product P may include information concerning allergic substances it contains, information related to halal (whether, based on Islamic law, it is permitted to consume), and the like. In addition, in the situation in which the retail price of the product P (e.g., the retail price in Japanese yen) is to be converted to another currency (e.g., the U.S. dollar), the various information related to the product P may include a rough price. In addition, in the situation in which the tax rate differs by product, the various information related to the product P may include
40 information about a bargain product that, while being a product of the same type as the product P has a lower tax rate based on its reduced tax rate classification. In addition, the various information related to the product P may include discount information in the situation in which that product P is purchased in bulk.

[0071]

In addition, the information related to the product P may include a URL with which information related to the above-mentioned product P can be acquired.

50 [0072]

In the situation in which the prescribed information about the product P is to be transmitted from the first communications part 50 to the smart phone 180, a portion or all of the information about the above-mentioned product P stored in the memory 60 is transmitted to the smart phone 180.

[0073]

55 It is noted that, in the situation in which the information transmitted from the electronic rack label 40 to

the smart phone 180 is a URL for accessing the information related to the product P, it is preferable that the information is displayed on the smart phone 180 in a language suited to the user of that smart phone 180, even without a special operation being performed on the smart phone 180. Specifically, the smart phone 180 is preferably configured such that, when the URL that has been transmitted from the electronic rack label 40 is accessed from the smart phone 180, content in accordance with the language (setting language) used on that smart phone 180 (content in that language) is automatically displayed.

[0074]

(2-1-5) Control Part

The control part 44 principally comprises: a CPU (not shown); memory (not shown), including RAM, ROM, and the like; etc. The control part 44 is electrically connected to the display part 41, the second communications part 42, the first communications part 50, the memory 60, and the battery 45 (refer to FIG. 5).

[0075]

A program, which is for execution by the CPU of the control part 44, apparatus IDs, which are identifiers unique to the electronic rack labels 40, and the like are stored in the memory of the control part 44.

[0076]

By executing the program stored in the memory of the control part 44, the control part 44 controls each configuration of the corresponding electronic rack label 40. Specifically, the control part 44 performs the following kinds of control.

[0077]

For example, when the second communications part 42 receives a storage- and/or display-change command from the server 10, the control part 44 determines whether that storage- and/or display-change command is addressed to itself (addressed to the electronic rack label 40 of that control part 44). Specifically, the control part 44 compares the apparatus ID affixed to the storage- and/or display-change command with the unique apparatus ID stored in the memory of the control part 44; in the situation in which these coincide, the control part 44 determines that the storage- and/or display-change command is addressed to itself. In the situation in which it has been determined that the storage- and/or display-change command is addressed to itself, the control part 44 stores in the memory 60 the information related to the product P included in the storage- and/or display-change command. In the situation in which the second communications part 42 has received a display-change command, the control part 44 controls the display part 41 so that the display of the display part 41 is changed to content in accordance with the display-change command. In addition, in the situation in which it has been determined that the storage- and/or display-change command is addressed to itself, the control part 44 controls the second communications part 42 such that the second communications part 42 transmits a response signal to the server 10.

[0078]

In addition, for example, when the second communications part 42 receives a during-communications-function-OFF image-display command from the server 10, the control part 44 determines whether that during-communications-function-OFF image-display command is addressed to itself (addressed to the electronic rack label 40 of that control part 44). Specifically, the control part 44 compares the apparatus ID affixed to the during-communications-function-OFF image-display command with the unique apparatus ID stored in the memory of the control part 44; in the situation in which these coincide, the control part 44 determines that the during-communications-function-OFF image-display command is addressed to itself. In the situation in which it has been determined that the during-communications-function-OFF image-display command is addressed to itself, the control part 44 stores in the memory 60 the first display image (image data of the characters "Communications Function OFF") contained in the during-communications-function-OFF image-display command. The control part 44 controls the display part 41 so that the first display image is displayed. In addition, in the situation in which it has been determined that the storage- and/or display-change command is addressed to itself, the control part 44 controls the second communications part 42 such that the second communications part 42 transmits a response signal to the server 10.

[0079]

In addition, for example, when the first communications part 50 receives instruction information from the remote control 80 or the smart phone 180, the control part 44 controls the second communications part 42 so that the received instruction information is transmitted to the server 10 via the corresponding access point 30. The instruction information received by the first communications part 50 from the remote control 80 includes a storage- and/or display-update instruction for the electronic rack label 40, a display-switch instruction for the electronic rack label 40, a communications-function-OFF instruction for the second communications part 42, and a communications-function-ON instruction for the second communications part 42. In addition, instruction information received by the first communications part 50 from the smart phone 180 includes a display-language switch instruction for the electronic rack label 40 and display-switch instruction for the electronic rack label 40. Specific details of the instruction information are explained below.

[0080]

The control part 44 comprises a switching part 44a, which serves as a functional part. The switching part 44a switches the operation state of the second communications part 42. This is specifically explained below.

[0081]

5 The second communications part 42 has three operation states: the sleep state, the awake state, and the stopped state. When the second communications part 42 is in the awake state, electric power is supplied from the battery 45 to the second communications part 42, and the second communications part 42 can communicate with the corresponding access point 30. When the second communications part 42 is in the sleep state or the stopped state, electric power is not supplied from the battery 45, and the second communications part 42 cannot communicate with the corresponding access point 30. By switching a switching device, which is not shown, to control the supply of electricity from the battery 45 to the second communications part, the switching part 44a switches the operation state of the second communications part 42 among the three states: the sleep state, the awake state, and the stopped state.

[0082]

15 It is noted that the sleep state and the stopped state differ in the following points. The operation state of the second communications part 42 when it is in the sleep state is automatically switched to the awake state by the switching part 44a after the elapse of a prescribed time. On the other hand, the operation state of the second communications part 42 when it is in the stopped state remains as is in the stopped state until a communications-function-ON instruction for the second communications part 42 is transmitted to the first communications part 50.

[0083]

20 Normally (at times when the communications function of the second communications part 42 is not OFF), the switching part 44a switches the operation state of the second communications part 42 between the sleep state and the awake state at a prescribed time interval. The switching part 44a switches the operation state of the second communications part 42 from the sleep state to the awake state for just 1 s, for example, once a minute. The switching part 44a normally performs this repetitively. However, in the situation in which the second communications part 42 has entered the awake state and the second communications part 42 has received a beacon notifying it to the effect that information to be transmitted from the access point 30 has been transmitted, the switching part 44a, for example, maintains the operation state of the second communications part 42 as is in the awake state for 30 s.

[0084]

30 In addition, when the first communications part 50 receives a communications-function-OFF instruction for the second communications part 42, the switching part 44a, based on the received communications-function-OFF instruction, switches the operation state of the second communications part 42 to the stopped state at a prescribed timing (details of the timing are described below).

[0085]

35 In addition, when the operation state of the second communications part 42 is in the stopped state and the first communications part 50 receives a communications-function-ON instruction for the second communications part 42, the switching part 44a, based on the received communications-function-ON instruction, switches the operation state of the second communications part 42 to the sleep state or the awake state. After the operation state of the second communications part 42 has been switched to the sleep state or the awake state, as mentioned above, the operation state of the second communications part 42 is switched from the sleep state to the awake state at the prescribed cycle.

40 [0086]

(2-1-6) Battery

45 The battery 45 is electrically connected to the display part 41, the second communications part 42, and the control part 44 of the electronic rack label 40. The battery 45 is configured to supply electric power to the display part 41, the second communications part 42, and the control part 44 of the electronic rack label 40. The first communications part 50 is configured to receive the supply of electric power from the remote control 80 or the smart phone 180 by non-contact, electric-power transmission, and electric power is not supplied to the first communications part 50 from the battery 45. The memory 60 is configured such that the supply of electric power is received from the battery 45 when data is to be written into the memory 60 by the second communications part 42 and is received by non-contact, electric-power transmission from the remote control 80 or the smart phone 180 when data is to be written into the memory 60 by the first communications part 50.

[0087]

(2-2) Server

The server 10 is a common computer that performs unified management of the information of the plurality of products P carried by the store. The server 10 exchanges information with the electronic rack labels 40 via the

access points 30. Information transmitted from the server 10 to the electronic rack labels 40 includes storage- and/or display-change commands, which include information related to the products P.

[0088]

5 The server 10 principally comprises a server-communications part 11, a server-display part 12, a server-input part 13, a server-storage part 14, and a server-control part 15 (refer to FIG. 6).

[0089]

(2-2-1) Server-Communications Part

10 The server-communications part 11 is a communications interface for enabling communication between the server 10 and the access points 30. In addition, the server 10 is configured, for example, in a manner capable of communication, via the server-communications part 11, with both a server (not shown) and a store controller (not shown) of a POS system installed in the store in which the wireless display system 1 is installed.

[0090]

15 The information transmitted from the server-communications part 11 to the access points 30 is transmitted to the electronic rack labels 40 via the access points 30. The information transmitted from the electronic rack labels 40 to the access points 30 is transmitted to the server-communications part 11 via the access points 30.

[0091]

20 The information transmitted from the server-communications part 11 to the electronic rack labels 40 includes storage- and/or display-change commands and image-display commands during communications-function OFF. The information transmitted from the electronic rack labels 40 to the server-communications part 11 includes response signals. In addition, the information transmitted from the electronic rack labels 40 to the server-communications part 11 includes instruction information (instruction information transmitted from the remote control 80 or the smart phone 180 to the electronic rack labels 40).

25 **[0092]**

(2-2-2) Server-Display Part

The server-display part 12 is a liquid-crystal display. The server-display part 12 is capable of displaying various information related to the wireless display system 1.

[0093]

30 (2-2-3) Server-Input Part

The server-input part 13 is a mouse and keyboard. The various commands and various information to the server 10 can be input via the server-input part 13.

[0094]

(2-2-4) Server-Storage Part

35 The server-storage part 14 comprises ROM, RAM, a hard disk, and the like. Various programs, which are executed by the server-control part 15 as described below, are stored in the server-storage part 14. In addition, various information is stored in the server-storage part 14. The information stored in the server-storage part 14 includes a product master table 14a and an electronic-rack-label master table 14b (refer to FIG. 5).

[0095]

40 (2-2-4-1) Product Master Table

The product master table 14a is a table of information related to the products P carried by the store or the like in which the wireless display system 1 is installed.

[0096]

45 The product master table 14a includes information related to the product P stored in the memory 60 of each of the electronic rack labels 40. In addition, the product master table 14a may contain information related to the product P other than the information stored in the memory 60 of each of the electronic rack labels 40. For example, the product master table 14a may contain inventory information of the product P or sales information of the product P that is not stored in the memory 60. In addition, for example, the product master table 14a may contain product information related to the product P in a language other than the language that is normally displayed and is not stored in the memory 60. For example, in the situation in which the product information related to the product P displayed on the display part 41 of the electronic rack label 40 is normally in the Japanese language, the product information related to the product P in a language other than the language normally displayed may be product information related to the product P in English, product information related

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to the product P in Chinese, product information related to the product P in Korean, product information related to the product P in Spanish, etc. It is noted that these languages are merely illustrative and are not limited thereto.

[0097]

5 It is noted that the product information related to the inventory information of the product P, the sales information of the product P, and the product information related to the product P in a language other than the language normally displayed are not stored in the memory 60 in the present embodiment; this is merely one working example, and such may be stored in the memory 60 in other embodiments.

[0098]

10 Information related to the product P by product ID (barcode information) of the product P is stored in the product master table 14a. The content of the product master table 14a is updated by the server-communications part 11 receiving information from an external device (e.g., the POS system, which is not shown) or by the server-input part 13 accepting the input of information.

[0099]

15 (2-2-4-2) Electronic-Rack-Label Master Table

The electronic-rack-label master table 14b is a table of information that associates the apparatus IDs for identifying the electronic rack labels 40 with the product IDs of the products P.

[0100]

20 By associating the apparatus IDs and the product IDs and storing such in the electronic-rack-label master table 14b, the electronic rack labels 40 and the products P corresponding to the electronic rack labels 40 are linked. In other words, associating the apparatus IDs and the product IDs and storing such in the electronic-rack-label master table 14b identifies, for a given electronic rack label 40, which product information related to the corresponding product P should be displayed. The apparatus IDs and the product IDs are associated by the user performing a linking operation using a handy terminal (not shown).

25 [0101]

In the linking operation, the user uses the handy terminal to perform the operation of reading the apparatus ID (e.g., the barcode) affixed to the electronic rack label 40 and the product ID (e.g., the barcode) affixed to the product P. The handy terminal transmits the read-in apparatus ID and product ID to the server 10 via a communications line, which is not shown. Furthermore, by associating the apparatus ID and the product ID and storing such in the electronic-rack-label master table 14b of the server-storage part 14, the electronic rack label 40 and the product P corresponding to that electronic rack label 40 are linked.

30 [0102]

(2-2-5) Server-Control Part

35 By executing the program stored in the server-storage part 14, the server-control part 15 controls each configuration of the server 10. Specifically, the server-control part 15 performs the following kind of control.

[0103]

40 For example, when the server-communications part 11 receives the apparatus ID of the electronic rack label and the product ID of the product P transmitted by the handy terminal (not shown) and are to be associated, the server-control part 15 associates that apparatus ID and that product ID and stores such in the electronic-rack-label master table 14b.

[0104]

45 In addition, for example, when starting the wireless display system 1 or when it is necessary to update the storage content and/or display content of the electronic rack label 40, the server-control part 15 generates a storage- and/or display-change command and controls the server-communications part 11 to transmit the storage- and/or display-change command to the electronic rack label 40 via the corresponding access point 30. The timing when it is necessary to change the storage content and/or display content of the electronic rack label 40 is, for example, when the content of the product master table 14a or the electronic-rack-label master table 14b has been updated.

[0105]

50 When the server-control part 15 stores information in the memory 60 and transmits a display-change command for the display part 41 with respect to the electronic rack label 40, the process below is performed.

[0106]

55 First, the server-control part 15 references the product master table 14a and generates image data (image data that includes the information to be displayed on the display part 41) to be transmitted to the electronic rack label 40 for the product P that requires a change in its display on the electronic rack label 40. In

addition, the server-control part 15 references the electronic-rack-label master table 14b and acquires, as the transmission-destination identifier, the apparatus ID of the electronic rack label 40 linked to the product ID of the product P that requires a change in its display on the electronic rack label 40.

[0107]

5 Next, the server-control part 15 generates a storage- and display-change command, which includes image data to be transmitted to the electronic rack label 40 and to which the acquired transmission-destination identifier (the apparatus ID of the electronic rack label 40 that is the transmission target) is affixed. Furthermore, the server-control part 15 controls the server-communications part 11 to transmit the generated storage- and display-change command to the access point 30. The access point 30 that received the storage- and display-change command transmits that storage- and display-change command to the electronic rack label 40.

[0108]

When transmitting to the electronic rack label 40 only a storage-change command for the memory 60, the server-control part 15 performs the process below.

[0109]

15 First, the server-control part 15 references the product master table 14a and reads out the information (information to be stored in the memory 60) to be transmitted to the electronic rack label 40 for the product P that requires a change in the storage content of the memory 60. In addition, the server-control part 15 references the electronic-rack-label master table 14b and acquires, as the transmission-destination identifier, the apparatus ID of the electronic rack label 40 linked to the product P that requires a change in the storage content of the electronic rack label 40.

[0110]

25 Next, the server-control part 15 generates a storage-change command, which includes the information to be transmitted to the electronic rack label 40 and to which the acquired transmission-destination identifier (the apparatus ID of the electronic rack label 40 that is the transmission target) is affixed. Furthermore, the server-control part 15 controls the server-communications part 11 to transmit the generated storage-change command to the access point 30. The access point 30 that received the storage-change command transmits that storage-change command to the electronic rack label 40.

[0111]

30 As described above, when the electronic rack label 40 receives from the server 10 information addressed to itself, the electronic rack label 40 transmits a response signal to the server-communications part 11 of the server 10 via the corresponding access point 30. When the server-communications part 11 receives a response signal after the transmission of a storage- and/or display-change command, the server-control part 15 determines that communication with the electronic rack label 40 was successful and terminates the information transmission process with respect to the electronic rack label 40. On the other hand, in the situation in which the server-communications part 11 has not received a response signal for some reason, the server-control part 15 retransmits the storage- and/or display-change command.

[0112]

In the situation in which the server-communications part 11 has received instruction information, the operation of the server-control part 15 is as described below.

40 [0113]

(3) Operation of Wireless Display System When Electronic Rack Label Has Received Instruction Information

The operation of the wireless display system 1 when the electronic rack label 40 has received instruction information from the remote control 80 or the smart phone 180 is explained below.

[0114]

45 (3-1) Situation in Which a Storage- and/or Display-Update Instruction for an Electronic Rack Label Is Received

The operation of the wireless display system 1 in the situation in which the electronic rack label 40 receives a storage- and/or display-update instruction for the electronic rack label 40 from the remote control 80 will now be explained. In the situation in which a worker or the like who works in the store wishes to rapidly change the storage and/or display of the electronic rack label 40, a storage- and/or display-update instruction for the electronic rack label 40 is transmitted to the electronic rack label 40 using the remote control 80. Here, the operation of the wireless display system 1 in the situation in which the electronic rack label 40 receives a storage- and display-update instruction for the electronic rack label 40 from the remote control 80 will now be explained, with reference to the flow chart in FIG. 8.

[0115]

55 First, in step S1, the button 81 of the remote control 80 corresponding to the storage- and display-update instruction is pressed by the user or the like, who carries the remote control 80, and the remote control 80 is brought close to the electronic rack label 40. As result, near-field communication is performed between the

remote control 80 and the first communications part 50 of the electronic rack label 40, and the storage- and display-update instruction transmitted from the remote control 80 is received by the first communications part 50. The storage- and display-update instruction transmitted from the remote control 80 is stored in the memory 60 of the electronic rack label 40.

5 [0116]

Next, in step S2, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state. The switching part 44a maintains the operation state of the second communications part 42 in the awake state for a prescribed interval (e.g., 30 s). In addition, the switching part 44a may instead maintain the operation state of the second communications part 42 in the awake state until the second communications part 42 receives a storage- and display-change command in step S7, which is described below.

[0117]

Next, in step S3, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 via the corresponding access point 30, the storage- and display-update instruction stored in the memory 60. The apparatus ID of the electronic rack label 40 that transmits the instruction information is affixed to the storage- and display-update instruction transmitted to the server 10 so that the transmission source can be identified.

[0118]

Next, in step S4, the server-communications part 11 of the server 10 receives the storage- and display-update instruction.

[0119]

Next, in step S5, the server-control part 15 of the server 10 generates a storage- and display-change command.

[0120]

First, the server-control part 15 references the electronic-rack-label master table 14b to identify the product ID of the product P that is linked to the apparatus ID of the electronic rack label 40 received by the server-communications part 11 in step S4. Next, the server-control part 15 references the product master table 14a and generates image data (image data of the product information related to the product P to be displayed on the display part 41) to be transmitted to the electronic rack label 40 for the product P of the identified product ID. Next, the server-control part 15 generates a storage- and display-change command, which includes the image data to be transmitted to the electronic rack label 40 and to which the apparatus ID of the electronic rack label 40 received by the server-communications part 11 in step S4 is affixed as the transmission-destination identifier (the apparatus ID of the electronic rack label 40 that is the transmission target).

[0121]

Next, in step S6, the server-control part 15 of the server 10 controls the server-communications part 11 so that the storage- and display-change command generated by the server-communications part 11 is transmitted to the electronic rack label 40 via the corresponding access point 30.

[0122]

Next, in step S7, the second communications part 42 of the electronic rack label 40 receives the storage- and display-change command. In the situation in which it has been determined that the received storage- and display-change command is addressed to itself, the control part 44 operates the second communications part 42 so that the second communications part 42 transmits a response signal to the server 10 via the corresponding access point 30. In addition, based on the information (product information related to the product P) included in the storage- and display-change command, the storage of the memory 60 is updated. Explanation regarding the process in the situation in which the received storage- and display-change command is not addressed to itself is omitted herein.

[0123]

Next, in step S8, the control part 44 controls the display part 41 so that the display of the display part 41 is updated based on the information (image data of the product information about the product P stored in the memory 60) included in the storage- and display-change command.

[0124]

It is noted that, here, it is possible to set to the awake state, at an arbitrary timing, only the second communications part 42 of the electronic rack label 40 for which it is required to update the storage content of the memory 60 and/or the display content of the display part 41. Consequently, the second communications part 42 does not have to be set to the awake state for a long time with respect to the electronic rack labels 40 other than those that are the target of the updating of the storage content of the memory 60 and/or the display content

of the display part 41. Consequently, wear of the battery 45 of the electronic rack label 40 can be curtailed.

[0125]

(3-2) Situation of Receiving a Display-Switch Instruction for an Electronic Rack Label

The operation of the wireless display system 1 in the situation in which the electronic rack label 40 receives a display-switch instruction for the electronic rack label 40 from the remote control 80 or the smart phone 180 will now be explained. A display-switch instruction for the electronic rack label 40 in which the remote control 80 is utilized is used in the situation in which the worker or the like who works in the store has displayed, on the display part 41 of the electronic rack label 40, an operation screen, e.g., the inventory quantity or the sales count of the product P—not the normal display of product information related to the product P (refer to FIG. 3). A display-switch instruction for the electronic rack label 40 in which the smart phone 180 is utilized is used in the situation in which the user or the like in the smart phone 180 wishes to display, on the display part 41 of the electronic rack label 40, other information about the product P (e.g., information related to allergic substances)—not the normal display of product information related to the product P (refer to FIG. 3).

[0126]

Other than the content that is to be displayed on the electronic rack label 40 being different, the display-switch instruction for the electronic rack label 40 using the remote control 80 and the display-switch instruction for the electronic rack label 40 using the smart phone 180 are the same. Here, the operation of the wireless display system 1 in the situation in which a display-switch instruction for the electronic rack label 40 is received from the remote control 80 will now be explained, with reference to the flow chart in FIG. 9.

[0127]

First, in step S11, the button 81 of the remote control 80 corresponding to the display-switch instruction is pressed by the user or the like, who carries the remote control 80 and brings the remote control 80 close to the electronic rack label 40. As a result, near-field communication is performed between the remote control 80 and the first communications part 50 of the electronic rack label 40, and the display-switch instruction transmitted from the remote control 80 is received by the first communications part 50. The display-switch instruction transmitted from the remote control 80 is stored in the memory 60 of the electronic rack label 40.

[0128]

Next, in step S12, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state. The switching part 44a maintains the operation state of the second communications part 42 in the awake state for a prescribed interval (e.g., 30 s). In addition, the switching part 44a may instead maintain the operation state of the second communications part 42 in the awake state until the second communications part receives a storage- and display-change command in step S17, which is described below.

[0129]

Next, in step S13, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 via the corresponding access point 30, the display-switch instruction stored in the memory 60. The apparatus ID of the electronic rack label 40 that transmits the instruction information is affixed to the display-switch instruction transmitted to the server 10 so that the transmission source can be identified.

[0130]

Next, in step S14, the server-communications part 11 of the server 10 receives the display-switch instruction.

[0131]

Next, in step S15, the server-control part 15 of the server 10 generates a storage- and display-change command.

[0132]

First, the server-control part 15 references the electronic-rack-label master table 14b to identify the product ID of the product P that is linked to the apparatus ID of the electronic rack label 40 received by the server-communications part 11 in step S14. Next, the server-control part 15 references the product master table 14a and generates image data (image data including the information, e.g., inventory quantity, sales quantity, or the like of the product P, related to the product P to be displayed on the display part 41) to be transmitted to the electronic rack label 40 for the product P of the identified product ID. Next, the server-control part 15 generates a storage- and display-change command, which includes the image data to be transmitted to the electronic rack label 40 and to which the apparatus ID of the electronic rack label 40 received by the server-communications part 11 in step S14 is affixed as the transmission-destination identifier (the apparatus ID of the electronic rack

label 40 that is the transmission target).

[0133]

The processes in step S16 and step S17 are the same as the processes in the above-mentioned step S6 and step S7, and therefore explanations thereof are omitted.

5

[0134]

Next, in step S18, the control part 44 controls the display part 41 so that the display of the display part 41 is updated based on the information (image data of the information related to the product P stored in the memory 60) included in the display-switch command.

[0135]

10

It is noted that, here, it is possible to set to the awake state, at an arbitrary timing, only the second communications part 42 of the electronic rack label 40 for which it is required to switch the display of the display part 41. Consequently, the second communications part 42 does not have to be set to the awake state for a long time with respect to the electronic rack labels 40 other than those that are the target of the switching of the display of the display part 41. Consequently, wear of the battery 45 of the electronic rack label 40 can be curtailed.

15

[0136]

(3-3) Situation of Receiving a Communications-Function-OFF Instruction for the Second Communications Part of the Electronic Rack Label

20

The operation of the wireless display system 1 in the situation in which the electronic rack label 40 receives from the remote control 80 a display communications-function-OFF instruction for the second communications part 42 of the electronic rack label 40 will now be explained. A display communications-function-OFF instruction for the second communications part 42 of the electronic rack label 40 utilizing the remote control 80 is used when moving the electronic rack label 40 that is being used in a certain store to another store or when the electronic rack label 40 is to be stored without being used in the server room of the store. The communications-function-OFF instruction is one example of first instruction information that instructs the switching of the operation state of the second communications part 42 to the stopped state. The operation of the wireless display system 1 in the situation in which a communications-function-OFF instruction for the second communications part 42 is received from the remote control 80 will now be explained, with reference to the flow chart in FIG. 10.

25

[0137]

30

First, in step S21, the button 81 of the remote control 80 corresponding to the communications-function-OFF instruction is pressed by the user or the like, who carries the remote control 80 and brings the remote control 80 close to the electronic rack label 40. As a result, near-field communication is performed between the remote control 80 and the first communications part 50 of the electronic rack label 40, and the communications-function-OFF instruction transmitted from the remote control 80 is received by the first communications part 50. The communications-function-OFF instruction transmitted from the remote control 80 is stored in the memory 60 of the electronic rack label 40.

35

[0138]

40

Next, in step S22, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state. The switching part 44a maintains the operation state of the second communications part 42 in the awake state for a prescribed interval (e.g., 30 s). In addition, the switching part 44a may instead maintain the operation state of the second communications part 42 in the awake state until the operation state of the second communications part is switched to the stopped state in step S30, which is described below.

[0139]

45

Next, in step S23, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 via the corresponding access point 30, the communications-function-OFF instruction stored in the memory 60. The apparatus ID of the electronic rack label 40 that transmits the instruction information is affixed to the communications-function-OFF instruction transmitted to the server 10 so that the transmission source can be identified.

[0140]

50

Next, in step S24, the server-communications part 11 of the server 10 receives the communications-function-OFF instruction.

[0141]

Next, in step S25, the server-control part 15 of the server 10 deletes from the electronic-rack-label master table 14b of the server-storage part 14 the information associated with the apparatus ID of the electronic rack label 40 affixed to the communications-function-OFF instruction received by the server-communications part 11 in step S24. In addition, the server-control part 15 of the server 10 may instead store in the electronic-rack-label master table 14b

of the server-storage part 14, as the apparatus ID of the electronic rack label 40 whose communications function is turned OFF, the apparatus ID of the electronic rack label 40 affixed to the communications-function-OFF instruction received by the server-communications part 11 in step S24.

[0142]

5 Next, in step S26, the server-control part 15 of the server 10 generates a during-communications-function-OFF image-display command.

[0143]

10 First, the server-control part 15 reads out the first display image (image data of characters that read "Communications Function OFF") stored in the server-storage part 14. Next, the server-control part 15 generates a during-communications-function-OFF image-display command that includes the first display image and to which the apparatus ID of the electronic rack label 40 affixed to the communications-function-OFF instruction received by the server-communications part 11 in step S24 is affixed as the transmission-destination identifier (the apparatus ID of the electronic rack label 40 that is the transmission target).

[0144]

15 Next, in step S27, the server-control part 15 of the server 10 controls the server-communications part 11 so that the during-communications-function-OFF image-display command generated by the server-communications part 11 is transmitted to the electronic rack label 40 via the corresponding access point 30.

[0145]

20 Next, in step S28, the second communications part 42 of the electronic rack label 40 receives the during-communications-function-OFF image-display command. In the situation in which it has been determined that the received during-communications-function-OFF image-display command is addressed to itself, the control part 44 operates the second communications part 42 so that the second communications part 42 transmits a response signal to the server 10 via the corresponding access point 30. In addition, the storage of the memory 60 is updated based on the information (the first display image) included in the during-communications-function-OFF image-display command. Here, explanation of the process in the situation in which the received during-communications-function-OFF image-display command is not addressed to itself is omitted.

[0146]

30 Next, in step S29, the control part 44 controls the display part 41 so that the information (the first display image that was stored in the memory 60) included in the during-communications-function-OFF image-display command is displayed on the display part 41 (refer to FIG. 4). That is, when the second communications part 42 receives the first display image (image data of characters that read "Communications Function OFF"), the display part 41 displays the first display image.

[0147]

35 Next, in step S30, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the stopped state.

[0148]

It is noted that, here, although step S30 is performed after step S29, it is not limited thereto. The order of step S29 and step S30 may be performed in reverse, or step S29 and step S30 may be performed in parallel.

[0149]

40 (3-4) Situation of Receiving a Communications-Function-ON Instruction for the Second Communications Part of the Electronic Rack Label

The operation of the wireless display system 1 in the situation in which the electronic rack label 40 receives from the remote control 80 a communications-function-ON instruction for the display on the second communications part 42 of the electronic rack label 40 will now be explained. A communications-function-ON instruction for the display on the second communications part 42 of the electronic rack label 40 utilizing the remote control 80 is used, for example, when introducing, to a store, a new electronic rack label 40 that has been transported such that the operation state of the second communications part 42 is in the stopped state. The communications-function-ON instruction instructs the switching of the operation state of the second communications part 42 from the stopped state to the sleep state or the awake state. The operation of the wireless display system 1 in the situation in which a communications-function-ON instruction for the second communications part 42 is received from the remote control 80 will now be explained, with reference to the flow chart in FIG. 11.

[0150]

55 First, in step S41, the button 81 of the remote control 80 corresponding to the communications-function-ON instruction is pressed by the user or the like, who carries the remote control 80 and brings the remote control 80 close to the electronic rack label 40. As a result, near-field communication is performed

between the remote control 80 and the first communications part 50 of the electronic rack label 40, and the communications-function-ON instruction transmitted from the remote control 80 is received by the first communications part 50.

[0151]

5 Next, in step S42, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state or the sleep state.

[0152]

10 It is noted that, in the situation in which a communications-function-ON instruction for the second communications part of the electronic rack label is received, the wireless display system 1 may operate as below instead of according to the flow chart in FIG. 11.

[0153]

15 In step S41, the communications-function-ON instruction transmitted from the remote control 80 is stored in the memory 60 of the electronic rack label 40. In step S42, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state. Subsequently, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 via the access point 30, the communications-function-ON instruction stored in the memory 60. The apparatus ID of the electronic rack label 40 that transmits the instruction information is affixed to the communications-function-ON instruction transmitted to the server 10 so that the transmission source can be identified. Next, the server-communications part 11 of the server 10 receives the communications-function-ON instruction. Next, the server-control part 15 of the server 10 stores in the electronic-rack-label master table 14b, as the apparatus ID of the electronic rack label 40 whose communications function is turned ON, the apparatus ID of the electronic rack label 40 affixed to the communications-function-ON instruction received by the server-communications part 11.

[0154]

25 In either situation, when the electronic rack label 40 is to be used in correspondence with the product P, the user performs the linking operation of linking the electronic rack label 40 with the product P using the handy terminal (not shown). Explanation regarding the linking operation is omitted.

[0155]

(3-5) Situation of Receiving a Display-Language Switch Instruction for the Electronic Rack Label

30 The operation of the wireless display system 1 in the situation in which the electronic rack label 40 receives from the smart phone 180 a display-language switch instruction for the electronic rack label 40 will now be explained. Switching back the display language is one example of second instruction information, which instructs the switching of the display language of the display part 41. The display-language switch instruction for the electronic rack label 40 in which the smart phone 180 is utilized is used in the situation in which the user or the like of the smart phone 180 wishes to display a language on the electronic rack label 40 that is the language normally used by them. The operation of the wireless display system 1 in the situation in which a display-language switch instruction for the electronic rack label 40 is received from the smart phone 180 will now be explained, with reference to the flow chart in FIG. 12.

[0156]

40 First, in step S51, the user or the like of the smart phone 180 performs on the smart phone 180 a manipulation for transmitting the display-language switch instruction and brings the smart phone 180 close to the electronic rack label 40. As a result, near-field communication between the smart phone 180 and the first communications part 50 of the electronic rack label 40 is performed, and the display-language switch instruction transmitted from the smart phone 180 is received by the first communications part 50. Information related to a first language is included as information in the display-language switch instruction. The first language is, for example, a language that is normally used by the smart phone 180 or a language selected by the user of the smart phone 180. The display-language switch instruction transmitted from the smart phone 180 is stored in the memory 60 of the electronic rack label 40.

[0157]

50 Next, in step S52, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state. The switching part 44a maintains the operation state of the second communications part 42 in the awake state for a prescribed interval (e.g., 30 s). In addition, the switching part 44a may instead maintain the operation state of the second communications part 42 in the awake state until the second communications part receives a storage- and display-change command in step S57, which is described below.

[0158]

Next, in step S53, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 via the access point 30, the display-language switch instruction stored in the memory 60. The apparatus ID of the electronic rack label 40 that transmits the instruction information is affixed to the display-language switch instruction transmitted to the server 10 so that the transmission source can be identified.

[0159]

Next, in step S54, the server-communications part 11 of the server 10 receives the display-language switch instruction.

[0160]

Next, in step S55, the server-control part 15 of the server 10 generates a storage- and display-change command.

[0161]

First, the server-control part 15 references the electronic-rack-label master table 14b to identify the product ID of the product P linked to the apparatus ID of the electronic rack label 40 received by the server-communications part 11 in the step S54. Next, with regard to the product P of the identified product ID, the server-control part 15 references the product master table 14a to generate a second display image (image data of product information related to the product P in which the first language is used) to be transmitted to the electronic rack label 40 based on information related to the first language included in the display-language switch instruction. Next, the server-control part 15 generates a storage- and display-change command, which includes the image data to be transmitted to the electronic rack label 40 and to which is affixed, as the transmission-destination identifier (the apparatus ID of the electronic rack label 40 that is the transmission target), the apparatus ID of the electronic rack label 40 received by the server-communications part 11 in step S54.

[0162]

Next, in step S56, the server-control part 15 of the server 10 controls the server-communications part 11 so that the storage- and display-change command generated by the server-communications part 11 is transmitted to the electronic rack label 40 via the corresponding access point 30.

[0163]

Next, in step S57, the second communications part 42 of the electronic rack label 40 receives the storage- and display-change command. In the situation in which it has been determined that the received storage- and display-change command is addressed to itself, the control part 44 controls the second communications part 42 so that the second communications part 42 transmits a response signal to the server 10 via the corresponding access point 30. In addition, the storage of the memory 60 is updated based on the information (second display image) included in the storage- and display-change command. Explanation of the process in the situation in which the received storage- and display-change command is not addressed to itself is omitted herein.

[0164]

Next, in step S58, the control part 44 controls the display part 41 so that the display of the display part 41 is updated based on the information (the second display image (image data of the product information about the product P in the first language) stored in the memory 60) included in the storage- and display-change command. That is, when the second communications part 42 receives the second display image (image data of the product information related to the product P in which the first language is used), the display part 41 displays the second display image.

[0165]

(4) Features

(4-1)

The wireless display system 1 according to the present embodiment performs communication with the remote control 80 and the smart phone 180, each of which serves as an example of the portable terminal. The wireless display system comprises the plurality of electronic rack labels 40, the server 10, and the access points 30. Each of the electronic rack labels 40 is one example of the wireless display device. Each of the access points 30 is one example of the communications apparatus. The plurality of electronic rack labels 40 is disposed corresponding to the plurality of products P. Each of the electronic rack labels 40 comprises the display part 41, which displays product information related to the corresponding product P. The server 10 stores the product information related to the plurality of products P. Each of the access points 30 wirelessly transmits, to each of the electronic rack labels 40, product information that is stored in the server 10 and that is related to the product P corresponding to that electronic rack label 40. Each of the electronic rack labels 40 comprises the first communications part 50, the second communications part 42, and the switching part 44a. The first communications part 50 performs near-field communication with the remote control 80 and the smart phone 180

and receives instruction information from the remote control 80 and the smart phone 180. The second communications part 42 performs wireless communication with the corresponding access point 30 and exchanges information with the server 10 via the corresponding access point 30. The switching part 44a switches the operation state of the second communications part 42 between the sleep state and the awake state. In the sleep state, the second communications part 42 cannot communicate with the corresponding access point 30. In the awake state, the second communications part 42 is capable of communication with the corresponding access point 30. When the first communications part 50 receives instruction information, the switching part 44a switches the operation state of the second communications part 42 to the awake state, and the second communications part 42 transmits, to the server 10 via the access point 30, the instruction information received by the first communications part 50.

[0166]

Here, when the first communications part 50 of the electronic rack label 40 that performs near-field communication with the remote control 80 and the smart phone 180 receives instruction information transmitted by the remote control 80 and the smart phone 180, the received instruction information is transmitted from the electronic rack label 40 to the server 10. By being configured in this manner, notification of the instruction of the user or the like can be rapidly sent from the electronic rack label 40 to the server 10 without the provision of a switch on the electronic rack label 40.

[0167]

(4-2)

With regard to the wireless display system 1 according to the present embodiment, the remote control 80 and the smart phone 180 each have an instruction-selection function. The first communications part 50 receives the instruction information selected in the remote control 80 and the smart phone 180.

[0168]

In the situation in which switches are provided on the electronic rack label in order to notify the server of instructions, to rapidly notify the server of the multiple types of instructions, it is preferable to dispose switches, on the electronic rack label, corresponding in number to the number of types of instructions. However, the greater the number of switches disposed on the electronic rack label, the more difficult it becomes to make the electronic rack label compact.

[0169]

Here, because the remote control 80 and the smart phone 180 each have the instruction-selection function, notification of multiple types of instructions of the user or the like can be rapidly sent from the electronic rack label 40 to the server 10 without the size of the electronic rack label 40 becoming large.

[0170]

(4-3)

In the wireless display system 1 according to the present embodiment, the instruction information includes the communications-function-OFF instruction, which instructs the switching of the operation state of the second communications part 42 to the stopped state. The communications-function-OFF instruction is one example of first instruction information. The switching part 44a is configured so that the operation state of the second communications part 42 is further switched to the stopped state based on the communications-function-OFF instruction received by the first communications part 50. When the first communications part 50 receives a communications-function-OFF instruction, prior to the switching part 44a switching the operation state of the second communications part 42 to the stopped state, the second communications part 42 transmits, to the server 10 via the access point 30, the communications-function-OFF instruction received by the first communications part 50.

[0171]

Here, in the situation in which the product P corresponding to the electronic rack label 40 no longer exists, the communications function between the electronic rack label 40 and the server 10 can be stopped without the provision of a switch on the electronic rack label 40. In addition, it can be understood that, because the communications-function-OFF instruction is transmitted from the electronic rack label 40 to the server 10 before the stopping of the communications function, the communications function of the electronic rack label 40 can be stopped on the server 10 side.

[0172]

(4-4)

In the wireless display system 1 according to the present embodiment, when a communications-function-OFF instruction is received, the server 10 transmits, to the second communications part 42 via the corresponding access point 30, a first display image (image data of characters that read "Communications Function OFF"). After the second communications part 42 has received the first display image, the switching part 44a switches the operation state of the second communications part 42 to the stopped state. When the second communications part 42 receives

the first display image, the display part 41 displays the first display image.

[0173]

Here, the operation state of the second communications part 42 is switched to the stopped state after the second communications part 42 has received the first display image to be displayed on the display part 41.

5 Consequently, when the communications function of the second communications part 42 is stopped, the worker or the like can be clearly informed that the first display image is displayed on the display part 41 and that the second communications part 42 of the electronic rack label 40 is in the state in which the communications function has been stopped.

[0174]

10 (4-5)

In the wireless display system 1 according to the present embodiment, the instruction information includes the display-language switch instruction, which instructs the switching of the display language of the display part 41 to the first language. The first language is, for example, the language normally used by the smart phone 180 or a language selected by the user of the smart phone 180. The display-language switch instruction is one example of second instruction information. When a display-language switch instruction is received from the second communications part 42 via the corresponding access point 30, the server 10 transmits, to the second communications part 42 via the corresponding access point 30, the second display image in which the first language is used (image data of product information related to the product P in which the first language is used). When the second communications part 42 receives the second display image, the display part 41 displays the second display image.

[0175]

Here, information in the language desired by the carrier of the smart phone 180 can be displayed on the electronic rack label 40. Consequently, even in the situation in which the electronic rack label 40 is used in an environment where a variety of languages can be used, the user of the smart phone 180 can easily ascertain the information displayed on the electronic rack label 40, and therefore it is highly convenient.

[0176]

(4-6)

In the wireless display system 1 according to the present embodiment, the terminal-setting communications tag 75, which performs near-field communication with the remote control 80 and changes the settings of the remote control 80, is further provided.

[0177]

Conventionally, to change the settings of the remote control 80, it is necessary to perform troublesome operations on the remote control 80, such as the CPU directly overwriting ROM data.

[0178]

35 Here, the settings of the remote control 80 can be easily changed by near-field communication between the remote control 80 and the terminal-setting communications tag 75.

[0179]

(5) Modified Examples

40 Modified examples of the above-mentioned embodiment will be explained below. It is noted that multiple modified examples may be combined within a scope that is not contradictory.

[0180]

(5-1) Modified Example A

45 In the above-mentioned embodiment, a system was described as one example of the wireless display system according to the present invention in which the electronic rack labels are used as wireless display devices; however, the wireless display system according to the present invention is not limited to an electronic rack label system installed in a store or the like.

[0181]

50 For example, the wireless display system may be used in a hospital. Specifically, in hospitals, there are situations where management is performed in which drugs (injection drugs, oral medicines, and the like) are prepared, at a dispensary or the like, for each patient, and the drugs in those containers are conveyed to hospital rooms or the like. The wireless display system may comprise wireless display devices (wireless display devices having a configuration the same as the electronic rack labels 40 according to the above-mentioned embodiment) that are mounted respectively on the plurality of containers (one example of an item).

[0182]

55 In addition, for example, the wireless display system may be used in a warehouse or the like. Specifically, in a warehouse, in the situation in which items to be transported are put in containers according to

transport destination, the wireless display system may comprise wireless display devices (wireless display devices having a configuration the same as that of the electronic rack labels 40 according to the above-mentioned embodiment), which are mounted respectively on the plurality of containers (one example of an item).

[0183]

5 (5-2) Modified Example B

In the wireless display system 1 according to the above-mentioned embodiment, after receiving a communications-function-OFF instruction from the remote control 80, the electronic rack label 40 receives the first display image (image data of characters that read "Communications Function OFF") from the server 10 but is not limited thereto.

10 [0184]

For example, as shown in the flow chart in FIG. 13, the wireless display system 1 may be one that operates. It is noted that, in the wireless display system according to Modified Example B, the first display image (image data of characters that read "Communications Function OFF") is stored in the remote control 80.

[0185]

15 In step S121, the user or the like who carries the remote control 80 presses the button 81 of the remote control 80 corresponding to the transmission of a communications-function-OFF instruction and then brings the remote control 80 close to the electronic rack label 40. As a result, near-field communication is performed between the remote control 80 and the first communications part 50 of the electronic rack label 40, and the first communications part 50 receives the communications-function-OFF instruction transmitted from the remote control 20 80. In addition, both the communications-function-OFF instruction and the first display image (image data of characters that read "Communications Function OFF") are transmitted from the remote control 80, and the first communications part 50 receives the first display image as well. The communications-function-OFF instruction and the first display image transmitted from the remote control 80 are stored in the memory 60 of the electronic rack label 40.

25 [0186]

Next, in step S122, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the awake state.

[0187]

30 Next, in step S123, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 via the access point 30, the communications-function-OFF instruction stored in the memory 60. The apparatus ID of the electronic rack label 40 is affixed to the communications-function-OFF instruction transmitted to the server 10 so that the transmission source can be identified.

[0188]

35 Next, in step S124, the server-communications part 11 of the server 10 receives the communications-function-OFF instruction.

[0189]

40 Next, in step S125, the server-control part 15 of the server 10 deletes, from the electronic-rack-label master table 14b of the server-storage part 14, the information associated with the apparatus ID of the electronic rack label 40 affixed to the communications-function-OFF instruction received in step S124. In addition, the server-control part 15 of the server 10 may instead store, in the electronic-rack-label master table 14b of the server-storage part 14 and as the apparatus ID of the electronic rack label 40 whose communications function is turned OFF, the apparatus ID of the electronic rack label 40 affixed to the communications-function-OFF instruction received in step S124.

[0190]

45 Next, in step S129, the control part 44 controls the display part 41 so that the first display image (image data of characters that read "Communications Function OFF") that has been stored in the memory 60 and that was transmitted from the remote control 80 is displayed on the display part 41 (refer to FIG. 4). That is, when the first communications part 50 receives the first display image (image data of characters that read "Communications Function OFF"), the display part 41 displays the first display image.

50 [0191]

Next, in step S130, the switching part 44a of the electronic rack label 40 switches the operation state of the second communications part 42 to the stopped state.

[0192]

55 It is noted that, here, although it is described that step S129 is performed after step S122 to step S125, such is not limited thereto; for example, step S122 to step S125 and step S129 may be performed in parallel.

[0193]

In addition, here, although step S130 is performed after step S129, such is not limited thereto; the order of

step S129 and step S130 may be reversed, or step S129 and step S130 may be performed in parallel.

[0194]

By being configured as in Modified Example B, when the communications function of the second communications part 42 is stopped, the first display image is displayed on the display part 41, and the worker or the like can be clearly informed that the second communications part 42 of the electronic rack label 40 is in the state in which the communications function has been stopped.

[0195]

(5-3) Modified Example C

In the wireless display system 1 according to the above-mentioned embodiment, the user or the like uses the remote control 80, but such is not limited thereto. The user or the like may use a general-purpose portable terminal, such as a smart phone, a tablet terminal, or the like, on which application software for exhibiting the same functions as the remote control 80 has been installed.

[0196]

(5-4) Modified Example D

In the wireless display system 1 according to the above-mentioned embodiment, the smartphone 180 alone transmits the display-language switch instruction, but such is not limited thereto. The display-language switch instruction may be transmittable from the remote control 80 as well.

[0197]

(5-5) Modified Example E

In the wireless display system 1 according to the above-mentioned embodiment, when the smart phone 180 transmits the display-language switch instruction for the electronic rack label 40, the second display image (image data of product information related to the product P in which the first language is used) is displayed on the display part 41 of the electronic rack label 40, but such is not limited thereto.

[0198]

For example, in step S58 in the flow chart in FIG. 12, instead of controlling the display part 41 so that the second display image is displayed on the display part 41, the control part 44 may control the first communications part 50 so that the second display image stored in the memory 60 is transmitted to the smart phone 180 by near-field communication.

[0199]

(5-6) Modified Example F

In the wireless display system 1 according to the above-mentioned embodiment, when the smart phone 180 transmits the display-switch instruction for the electronic rack label 40, the information displayed on the display part 41 of the electronic rack label 40 is switched to the instructed information (e.g., information about allergic substances contained in the product P), but such is not limited thereto. For example, instead of switching the display of the display part 41, the control part 44 may control the first communications part 50 so that the information stored in the memory 60 is transmitted to the smart phone 180 by near-field communication. Furthermore, it may be configured so that the instructed information is displayed on the smart phone 180 instead of the electronic rack label 40.

[0200]

(5-7) Modified Example G

The remote control 80, which performs communication with the wireless display system 1 according to the above-mentioned embodiment, does not comprise a display part but may be one that comprises a display part.

[0201]

Furthermore, in the above-mentioned embodiment, when the remote control 80 transmits a display-switch instruction for the electronic rack label 40, the information displayed on the display part 41 of the electronic rack label 40 is switched to the instructed information (e.g., inventory information about the product P, and the like), but such is not limited thereto.

[0202]

For example, in step S18 in the flow chart in FIG. 9, instead of switching the display of the display part 41, the control part 44 may control the first communications part 50 so that the information stored in the memory 60 is transmitted to the remote control 80 by near-field communication. Furthermore, the instructed information may be configured so that it is displayed on the remote control 80 instead of on the electronic rack label 40.

[0203]

(5-8) Modified Example H

Although the remote control 80, which performs communication with the wireless display system 1 according to the above-mentioned embodiment, does not comprise a display part, it may be one that comprises a display part.

[0204]

Furthermore, the wireless display system 1 may be configured so that, when the first communications part 50 of the electronic rack label 40 performs near-field communication with the remote control 80, the first communications part 50 transmits to the remote control 80 information related to the state of the electronic rack label 40. Information related to the state of the electronic rack label 40 is, for example, information related to the remaining battery charge of the battery 45. Furthermore, it may be configured so that the information related to the state of the electronic rack label 40 is displayed on the remote control 80.

[0205]

By being configured as in Modified Example G, the user or the like can easily confirm the state of the electronic rack label 40 using the remote control 80.

[0206]

(5-9) Modified Example I

The remote control 80 may be configured so that it has a function that changes settings of the electronic rack label 40. For example, a setting-change function for the electronic rack label 40 may be assigned to one of the buttons 81 of the remote control 80. When the user or the like presses that button 81 and brings the remote control 80 close to the electronic rack label 40, near-field communication between the remote control 80 and the first communications part 50 of the electronic rack label 40 is performed, and the first communications part 50 receives a setting-change instruction that is transmitted from the remote control 80. The setting-change instruction received by the first communications part 50 is stored in the memory 60 and used as the setting of the electronic rack label 40.

[0207]

(5-10) Modified Example J

According to the above-mentioned embodiment, by transmitting a display-language switch instruction from the smart phone 180 to the electronic rack label 40, the display language of the electronic rack label 40 is changed; however, for example, the wireless display system may instead be configured as below.

[0208]

The wireless display system comprises an operation panel, which has a language-selection key and is disposed in the vicinity of the display racks of the products P inside the store. The operation panel is configured in a manner capable of communication with the server via a communications line, which is not shown. Furthermore, a walk-in customer or the like selects a language by manipulating the language-selection key on the operation panel, and the server controls the electronic rack labels so that the display language of the electronic rack label is switched to the selected language. For example, the server transmits, to the electronic rack label, image data of product information in the selected language in accordance with the manipulation of the operation panel.

[0209]

In addition, in another embodiment, the wireless display system comprises a camera, which is disposed in the vicinity of the display racks of the products P inside the store. The camera is configured in a manner capable of communication with the server via a communications line, which is not shown. The server comprises a display-language inference part, which infers the appropriate display language based on an image of the walk-in customer taken by the camera. The server controls the electronic rack label so as to switch the display language of the electronic rack label based on the inference result. For example, the server transmits to the electronic rack label the image data of the product information in the appropriately inferred language based on the inference result of the display-language inference part.

INDUSTRIAL FIELD OF APPLICATION

[0210]

The present invention is broadly applicable to wireless display systems in which notification of the instruction of a user or the like is sent from the wireless display device to the host server, and therefore is useful.

EXPLANATION OF THE REFERENCE NUMBERS

[0211]

1 Wireless display system
 10 Server
 30 Access point (communications apparatus)
 40 Electronic rack label (wireless display device)
 41 Display part
 42 Second communications part
 44a Switching part
 50 First communications part
 80 Remote control (portable terminal)
 75 Terminal-setting communications tag (communications tag)
 90 Smart phone (portable terminal)
 P Product

PRIOR ART LITERATURE

15 Patent Documents

[0212]

Patent Document 1

Japanese Laid-open Patent Publication 2010-243672

FIG. 1

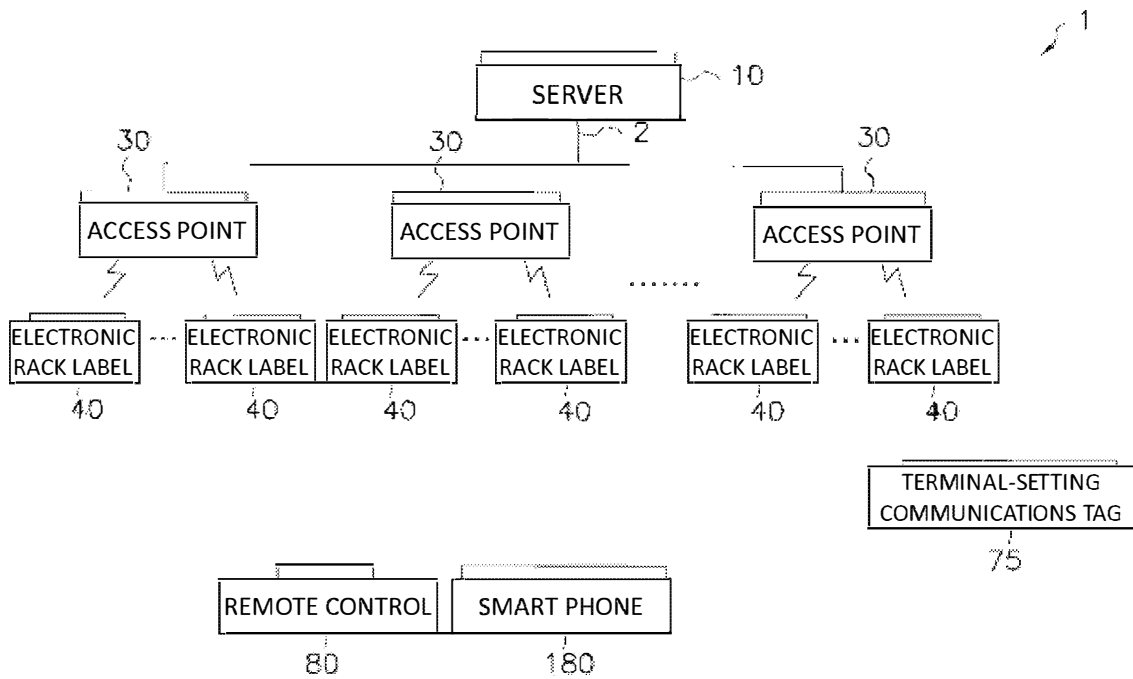


FIG. 2

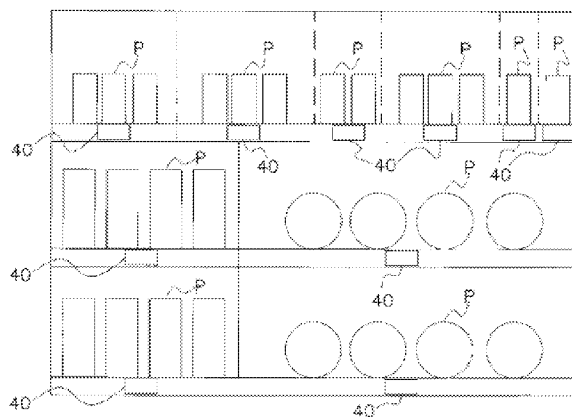


FIG. 3

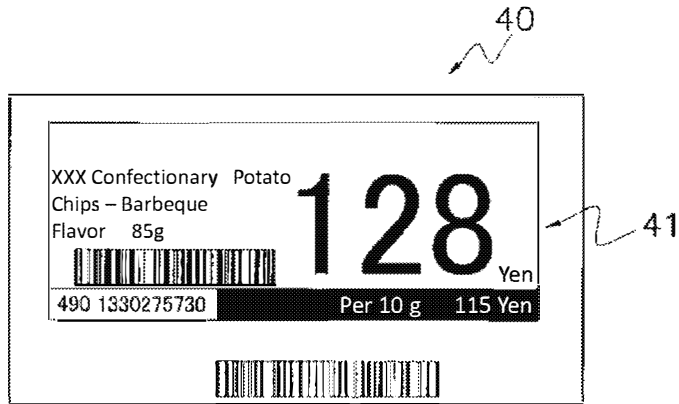


FIG. 4

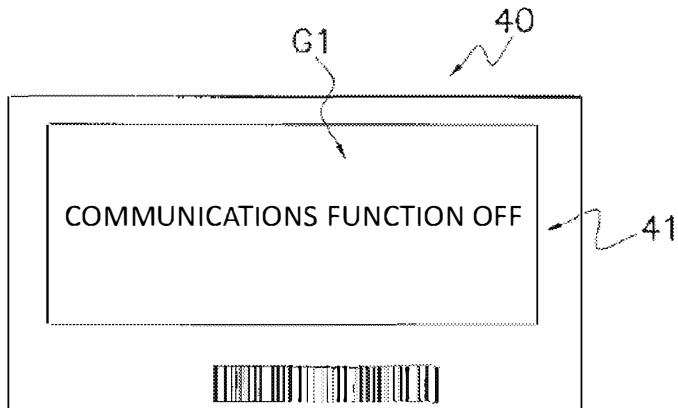


FIG. 5

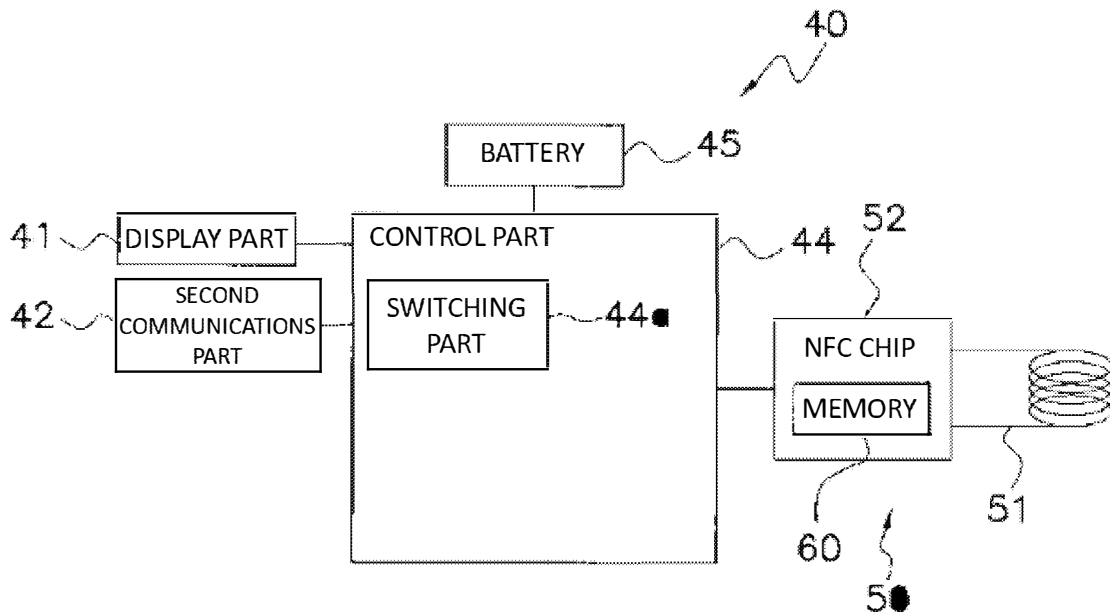


FIG. 6

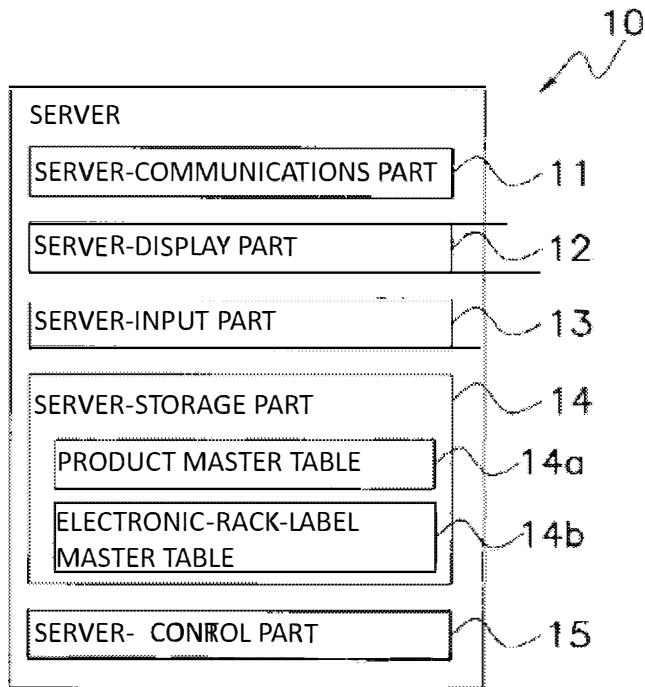


FIG. 7

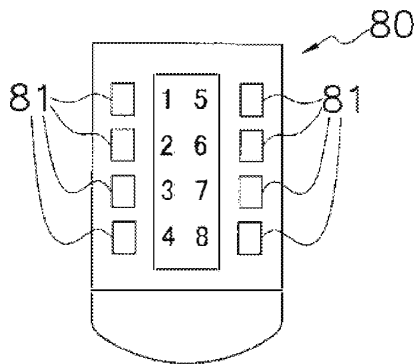


FIG. 8

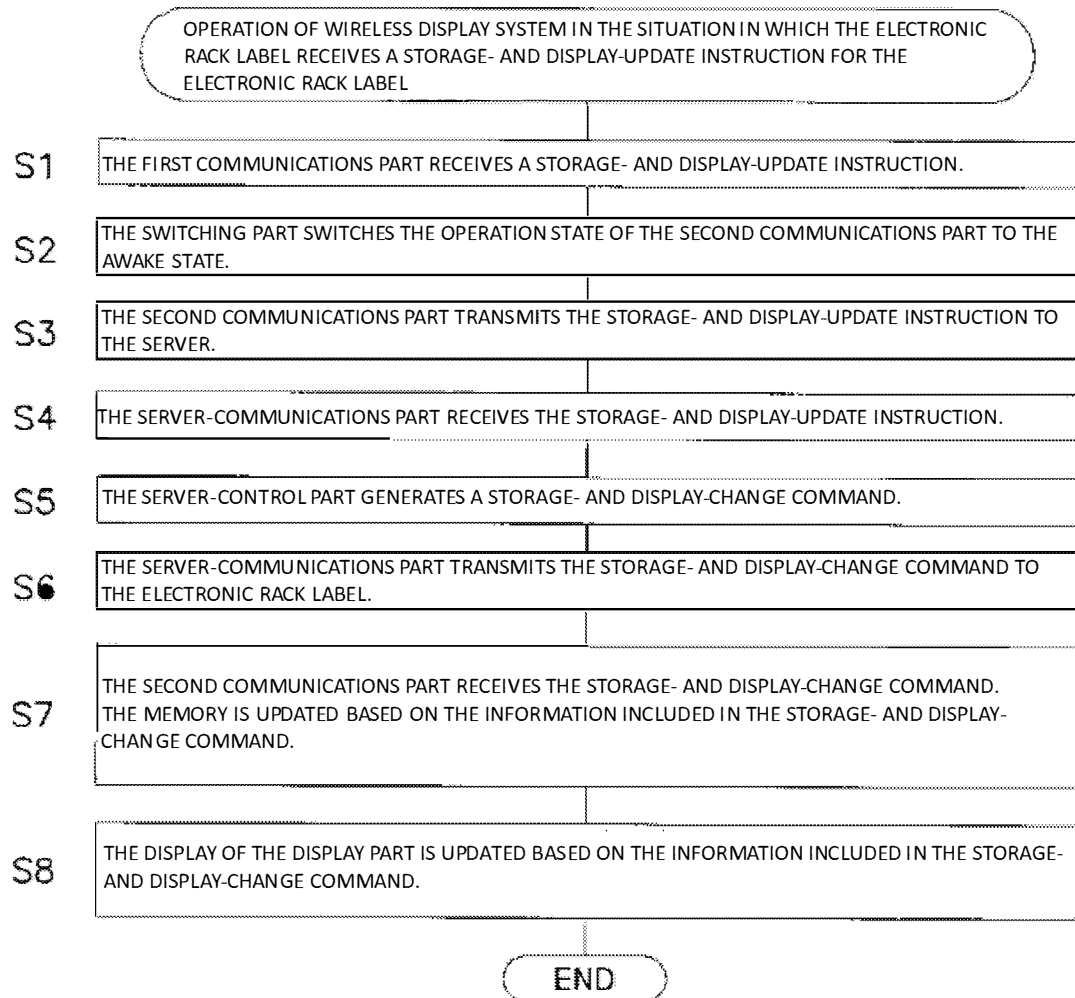


FIG. 9

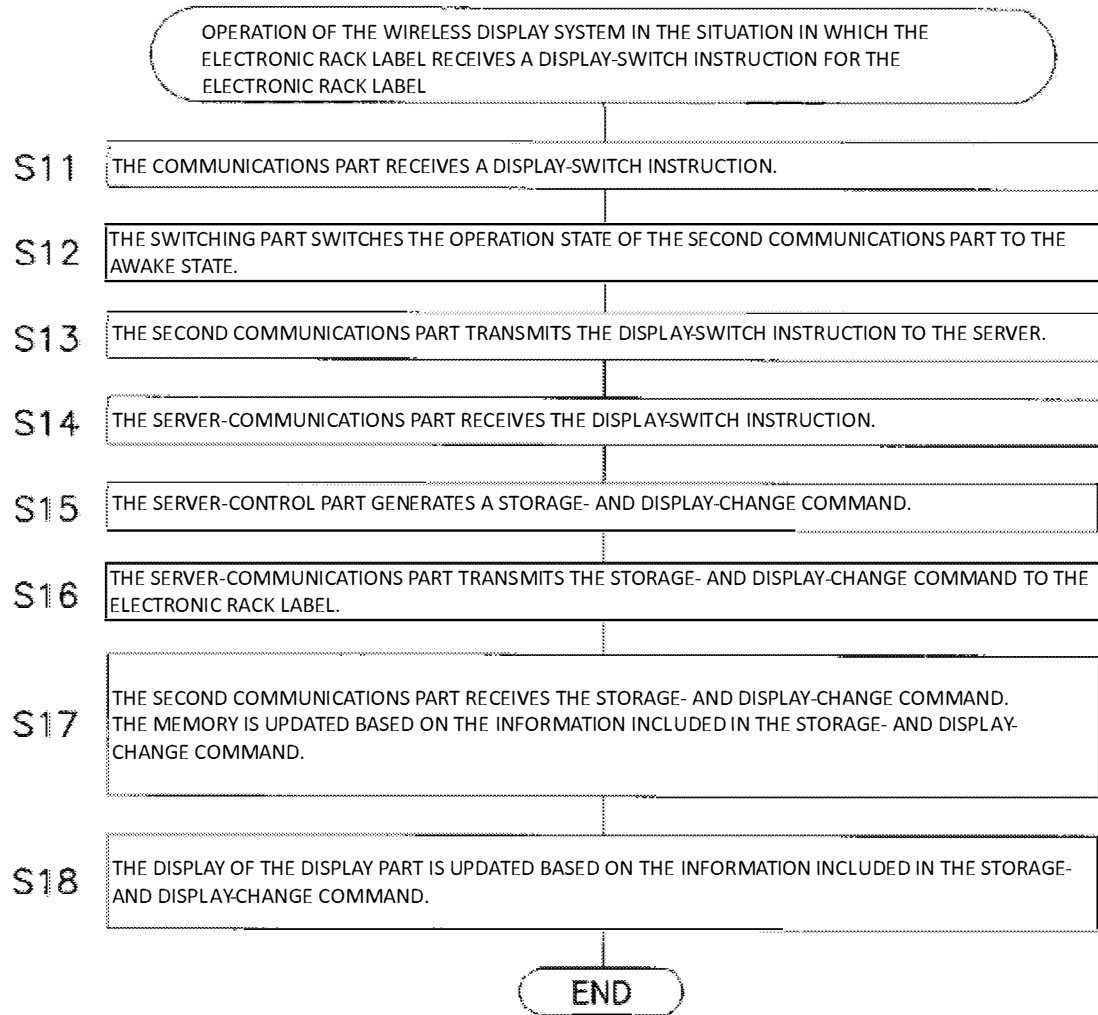


FIG. 10

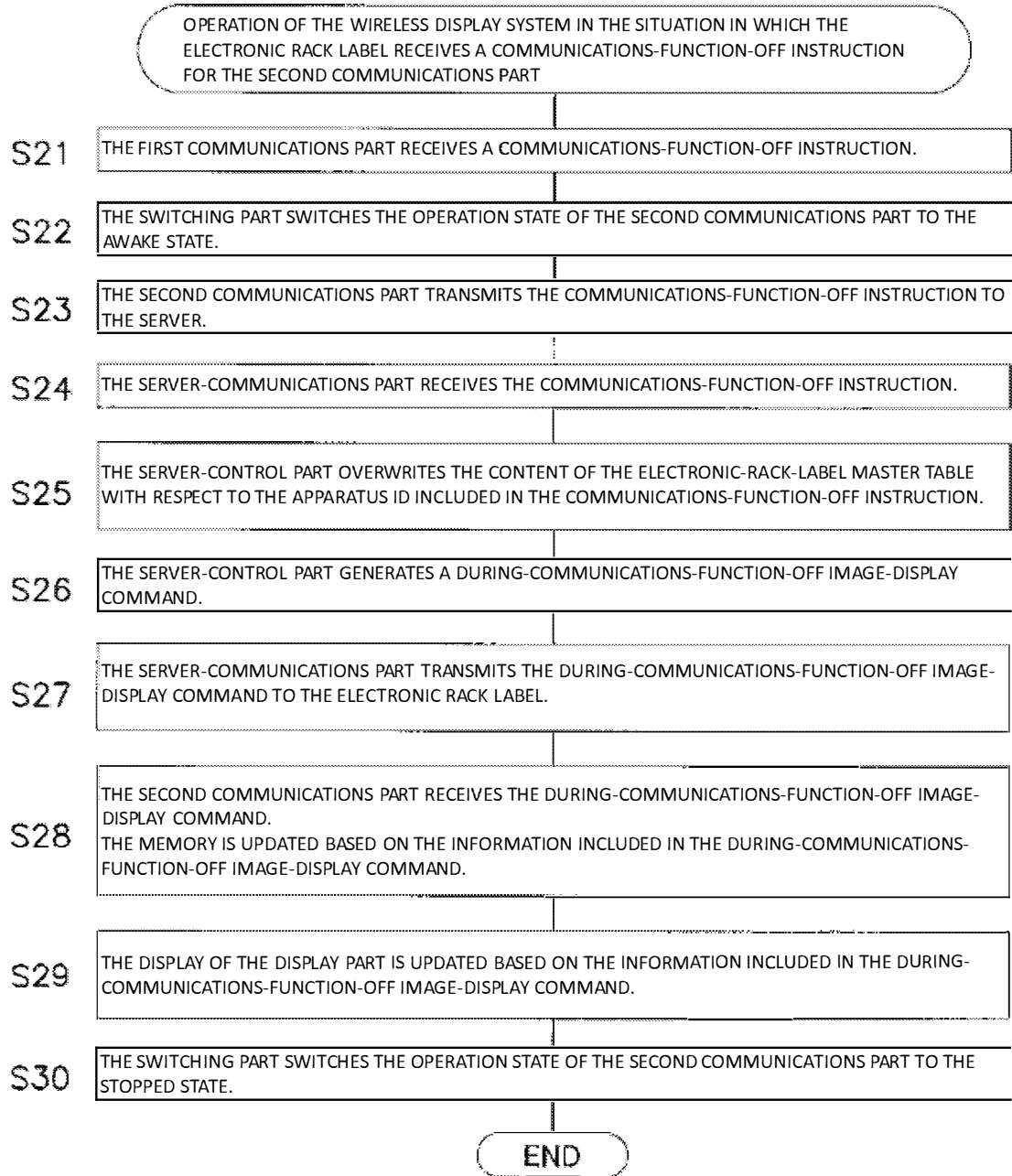


FIG. 11

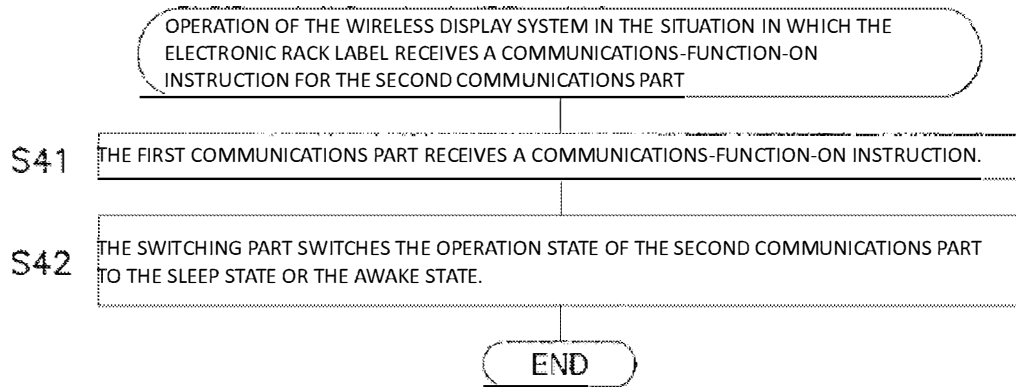


FIG. 12

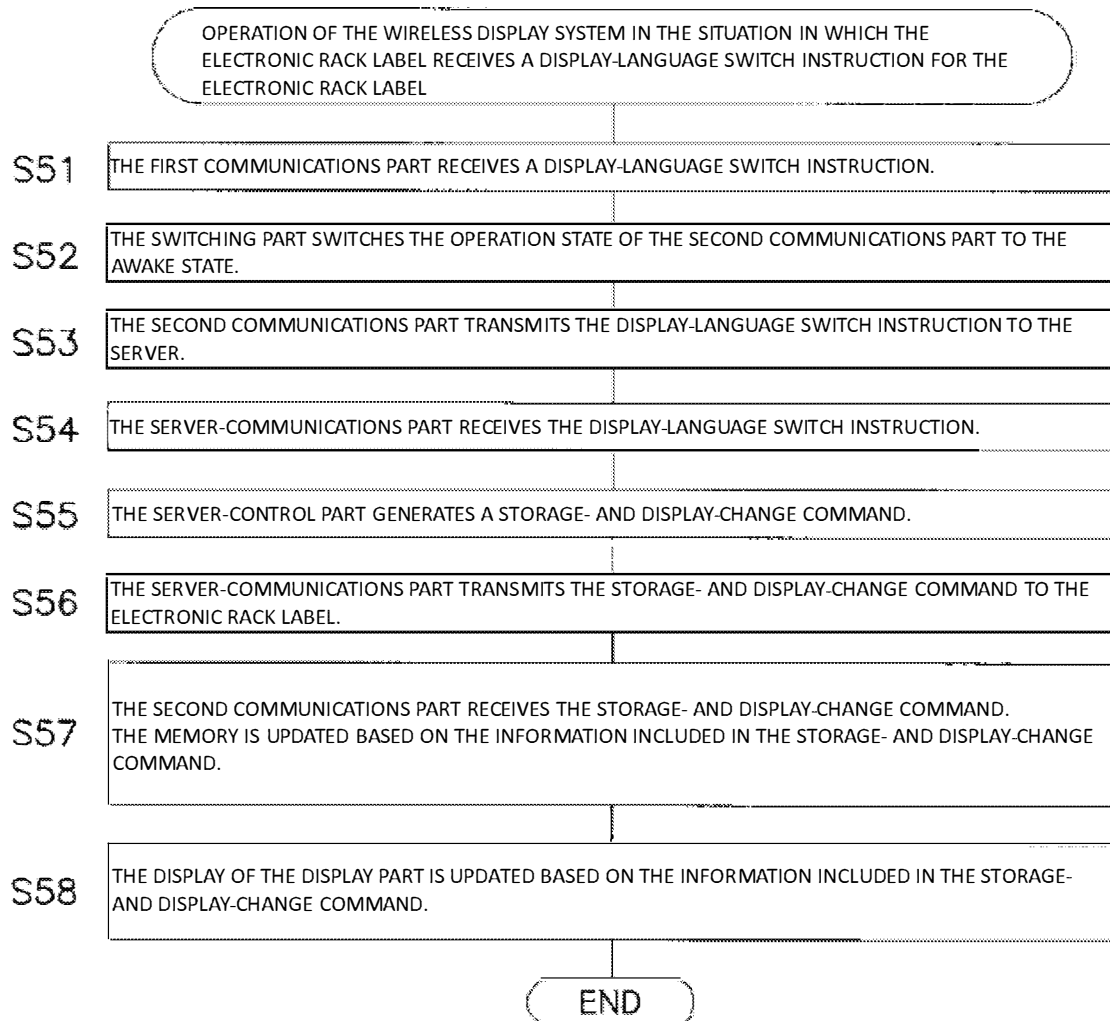
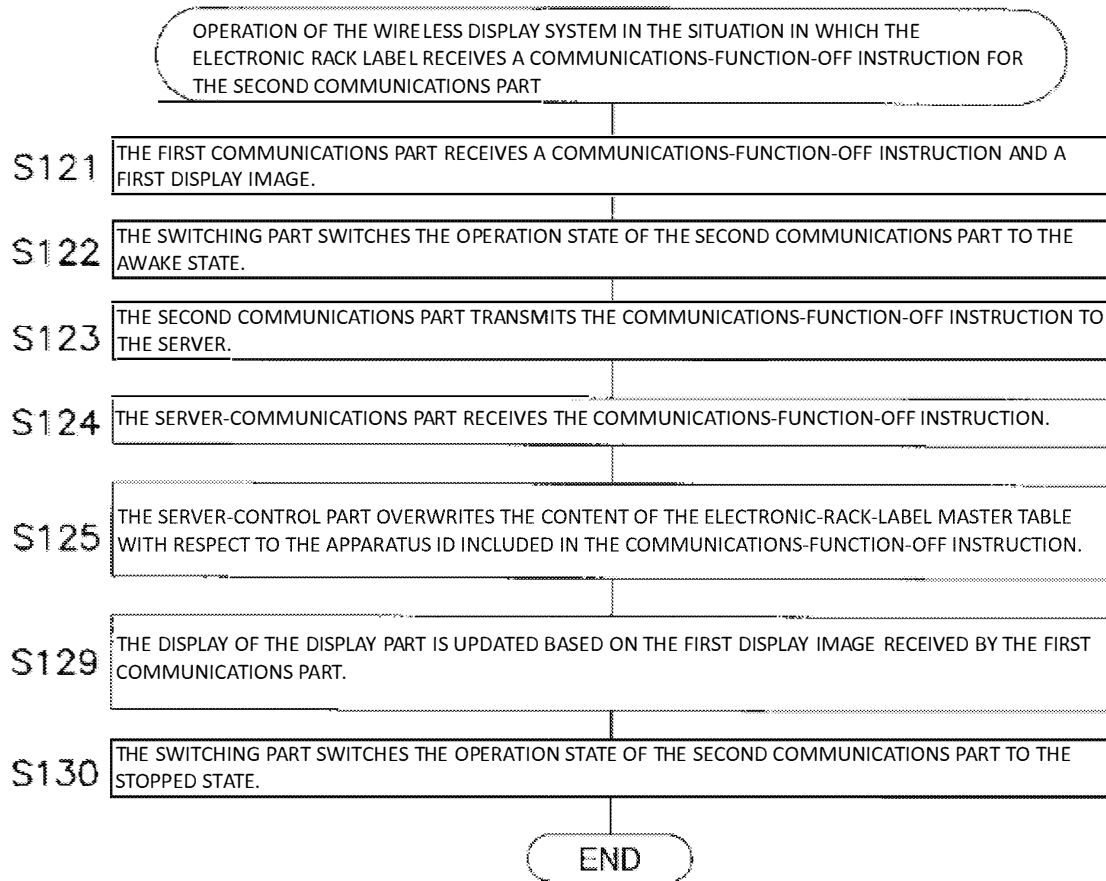


FIG. 13



Continuation of front page

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CERTIFICATION OF TRANSLATION

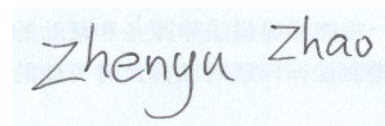
Original text full file name: JP2017-126872A

Translation full file name: JP2017-126872A-English

This is to certify that the attached documents in English language with the above title/s are a true and accurate translation and has the same meaning as the text of the original document/s of the Japanese language to the best of my knowledge and belief.

I am a Japanese to English translator; I am competent to perform Japanese to English translations.

I declare under the penalty of perjury under the laws of the United States that the foregoing is true and correct; and further declare that I am aware that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 1001 of Title 18 of the United States Code.

A handwritten signature in black ink on a light blue background. The signature reads "Zhenyu Zhao" in a cursive, slightly slanted script.

Name: Zhenyu Zhao

Date: February 20, 2025