

DESCRIPTION

VENDING MACHINE, VENDING MACHINE SYSTEM, AND SETTLEMENT
METHOD IN VENDING MACHINE SYSTEM

Field

5 [0001] The present invention relates to a vending
machine, a vending machine system, and a settlement method
in the vending machine system that can prevent multiple
settlement made with other settlement means when settlement
is made by accessing a settlement server using bar code
10 information.

Background

[0002] Recent vending machines can make settlement using
not only cash but also electronic money. Especially,
settlement is completed by holding a prepaid electronic
15 money card including an RFID tag over an RFID reader-writer
provided to the vending machine (refer to Patent Literature
1).

Citation List

Patent Literature

20 [0003] Patent Literature 1: Japanese Patent Application
Laid-open No. 2017-151674

Summary

Technical Problem

[0004] In recent years, portable terminals such as
25 smartphones are widely used, thereby making it possible to
access a settlement server using bar code information such
as two-dimensional bar code information to make settlement
for general product purchase.

[0005] When the settlement for product purchase from the
30 vending machine can be made using the bar code information,
the vending machine needs to only display the bar code
information, for example. As a result, the vending machine
has a simple structure.

[0006] When the vending machine has other settlement means using cash and electronic money cards, settlement can be made by other settlement means during the settlement by a settlement server using the bar code information. As a
5 result, multiple settlement is made for the same product in some cases.

[0007] The invention is made in view of the problems described above, and aims to provide a vending machine, a vending machine system, and a settlement method in the
10 vending machine system that can prevent multiple settlement with other settlement means when settlement is made by accessing a settlement server using bar code information.
Solution to Problem

[0008] To solve the problem and achieve the object, a
15 vending machine that is able to perform settlement processing of a product using a settlement server based on bar code information read by a portable terminal according to the present invention includes: a product selection
button configured to select a product to be sold; a
20 settlement server selection unit configured to receive selection of using the settlement server for settlement of a product selected by the product selection button; a display unit configured to display the bar code information including a price of the product selected by the product
25 selection button and location information about the settlement server making settlement of the product; and a sale control unit configured to: acquire the bar code information from the settlement server and display the bar code information on the display unit when the product is
30 selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit; and perform conveyance processing of the product selected by the product selection button when

receiving, from the settlement server, settlement completion information indicating that the settlement of the product by the portable terminal having read the bar code information is made, wherein the sale control unit is
5 configured to prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is
10 selected by the settlement server selection unit.

[0009] Moreover, a vending machine that is able to perform settlement processing of a product using a settlement server by reading bar code information displayed by a portable terminal according to the present invention
15 includes: a product selection button configured to select a product to be sold; a settlement server selection unit configured to receive selection of using the settlement server for settlement of a product selected by the product selection button; a reading unit configured to read the bar
20 code information including user identification information from the portable terminal; and a sale control unit configured to: perform settlement processing of the product with the settlement server based on the bar code information read by the reading unit when the product is
25 selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit; and perform conveyance processing of the product selected by the product selection button when the settlement processing is completed, wherein the sale
30 control unit is configured to prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by

the product selection button and the settlement by the settlement server is selected by the settlement server selection unit.

[0010] Moreover, in the vending machine according to the present invention, the sale control unit is configured to acquire the settlement completion information by periodically querying to the settlement server whether the settlement of the product by the portable terminal is made, after displaying the bar code information on the display unit.

[0011] Moreover, in the vending machine according to the present invention, the settlement server selection unit is configured to receive, from the portable terminal, the selection of using the settlement server for settlement of a product selected by the product selection button or a virtual product selection button of the portable terminal, the virtual product selection button corresponding to the product selection button.

[0012] Moreover, in the vending machine according to the present invention, the settlement server selection unit is configured to receive the selection of a single settlement server out of a plurality of settlement servers.

[0013] Moreover, a vending machine system according to the present invention includes a vending machine that is able to perform settlement processing of a product based on bar code information read by a portable terminal, and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, wherein the vending machine includes: a product selection button configured to select a product to be sold; a settlement server selection unit configured to receive selection of using the settlement server for settlement of

a product selected by the product selection button; a display unit configured to display the bar code information including a price of the product selected by the product selection button and location information about the settlement server making settlement of the product; and a sale control unit configured to: acquire the bar code information from the settlement server and display the bar code information on the display unit when the product is selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit; perform conveyance processing of the product selected by the product selection button when receiving, from the settlement server, settlement completion information indicating that the settlement of the product by the portable terminal having read the bar code information is made; and prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit, and the portable terminal is configured to read the bar code information displayed on the display unit and make settlement of the product by accessing to the settlement server indicated by the bar code information.

[0014] Moreover, a vending machine system according to the present invention includes a vending machine that is able to perform settlement processing of a product by reading bar code information displayed by a portable terminal, and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, wherein the vending machine includes: a

product selection button configured to select a product to be sold; a settlement server selection unit configured to receive selection of using the settlement server for settlement of a product selected by the product selection button; a reading unit configured to read the bar code information including user identification information from the portable terminal; and a sale control unit configured to: perform settlement processing of the product with the settlement server based on the bar code information read by the reading unit when the product is selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit; perform conveyance processing of the product selected by the product selection button when the settlement processing is completed; and prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit, and the portable terminal is configured to display the bar code information including the user identification information.

[0015] Moreover, a settlement method in a vending machine system that includes a vending machine that is able to perform settlement processing of a product based on bar code information read by a portable terminal and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, the settlement method being executed by the vending machine, according to the present invention includes: acquiring the bar code information from the settlement server and display

the bar code information on a display unit when a product is selected by a product selection button selecting a product to be sold and settlement by the settlement server is selected by a settlement server selection unit that
5 receives selection of using the settlement server for settlement of the product selected by the product selection button; and performing conveyance processing of the product selected by the product selection button when receiving, from the settlement server, settlement completion
10 information indicating that settlement of the product by the portable terminal having read the bar code information is made while prohibiting reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the
15 settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit.

[0016] Moreover, a settlement method in a vending
20 machine system that includes a vending machine that is able to perform settlement processing of a product by reading bar code information displayed by a portable terminal and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine
25 and the settlement server being connectable to a network, the settlement method being executed by the vending machine, according to the present invention includes: reading the bar code information including user identification
information from the portable terminal when a product is
30 selected by a product selection button selecting a product to be sold and settlement by the settlement server is selected by a settlement server selection unit that receives selection of using the settlement server for

settlement of the product selected by the product selection button; performing settlement processing of the product with the settlement server based on the read bar code information; and performing conveyance processing of the product selected by the product selection button when the settlement processing is completed while prohibiting reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit.

Advantageous Effects of Invention

[0017] When a product is selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit in the settlement made by accessing the settlement server using the bar code information, the invention performs processing that prohibits reception of settlement processing by the reception units for other settlement processing until the settlement server ends the settlement processing, thereby making it possible to prevent multiple settlement made with the reception units for other settlement processing.

Brief Description of Drawings

[0018] FIG. 1 is a block diagram illustrating a structure of a vending machine system in a first embodiment of the invention.

FIG. 2 is a block diagram illustrating a structure of a vending machine illustrated in FIG. 1.

FIG. 3 is a block diagram illustrating a structure of a portable terminal illustrated in FIG. 1.

FIG. 4 is a sequence diagram illustrating a sale control processing procedure based on reading two-

dimensional bar code information by the portable terminal.

FIG. 5 is a diagram illustrating an exemplary display of a settlement server selection unit.

FIG. 6 is a sequence diagram illustrating a sale
5 control processing procedure in a second embodiment based on reading the two-dimensional bar code information by the portable terminal.

FIG. 7 is a block diagram illustrating a structure of the vending machine in a third embodiment.

10 FIG. 8 is a sequence diagram illustrating a sale control processing procedure in the third embodiment based on reading the two-dimensional bar code information by the portable terminal.

FIG. 9 is a block diagram illustrating a structure of
15 the vending machine in a fourth embodiment.

FIG. 10 is a sequence diagram illustrating a sale control processing procedure based on reading the two-dimensional bar code information of the portable terminal by the vending machine.

20 Description of Embodiments

[0019] The following describes embodiments of the invention with reference to the accompanying drawings.

[0020] First embodiment

Structure of vending machine

25 FIG. 1 is a block diagram illustrating a structure of a vending machine system 1 in a first embodiment of the invention. FIG. 2 is a block diagram illustrating a structure of a vending machine 2 illustrated in FIG. 1. FIG. 3 is a block diagram illustrating a structure of a
30 portable terminal 3 illustrated in FIG. 1.

[0021] As illustrated in FIG. 1, in the vending machine system 1, the vending machine 2, the portable terminal 3, and settlement servers A, B, and C are connected to a

network N. The vending machine 2 is a vending machine that sells products such as canned beverages, bottled beverages, and PET-bottled beverages. The vending machine 2 is not limited to such a vending machine. The vending machine 2
5 can be a cup serving vending machine that pours a beverage into a cup or a vending machine that sells goods, for example.

[0022] The settlement servers A, B, and C each make settlement in accordance with settlement request from the
10 portable terminal 3. The portable terminal 3 reads two-dimensional bar code information including product data displayed by the vending machine 2 and location information about the settlement server that makes settlement of a product, and transmits, to the settlement server A, B, or C,
15 information in which user identification information is added to the read information. In FIG. 1, each of the settlement servers A, B, and C is directly connected to the network N. The connection is not limited to that in FIG. 1. An intermediate server may be installed between the network
20 N and the respective settlement servers A, B, and C, and the network N and the respective settlement servers A, B, and C may be connected via the intermediate server. In this case, the vending machine 2 and the portable terminal 3 can access the respective settlement servers A, B, and C
25 via the intermediate server by only finding the URL of the intermediate server although the URLs of the respective settlement servers A, B, and C are not found. The installation of the intermediate server is helpful when the respective settlement servers A, B, and C mutually
30 cooperate.

[0023] The user identification information is ID information such as a number for use permission preliminarily notified in accordance with registration

request to the settlement servers A, B, and C when a product is purchased using the settlement servers A, B, and C. In addition to the ID information, a password may be included in the user identification information.

5 [0024] Structure of vending machine

As illustrated in FIG. 2, in the vending machine 2, a main body control unit 11, a product selection button group 14, a display operation unit 15, a display unit 16, an external communication processing unit 17, a non-contact
10 card reader-writer 21, a contact card reader-writer 22, a coin mechanism 23, and bill validation data 24 are connected to a main controller 10.

[0025] To the main body control unit 11, a cooling-heating device 12 and a conveyance device 13 are connected.
15 The cooling-heating device 12 manages a set condition of a product storage in the vending machine 2. The cooling-heating device 12 cools the inside of the product storage for which cooling is set by the main controller 10 and heats the inside of the product storage for which heating
20 is set by the main controller 10, under the control of the main body control unit 11.

[0026] The conveyance device 13 manages vent solenoids and sold-out switches that are provided for respective racks. The main body control unit 11 controls the
25 conveyance device 13 in accordance with a conveyance command transmitted from the main controller 10 such that the conveyance device 13 conveys a product from a rack. When conveying all of the products housed in the rack, the conveyance device 13 outputs a sold-out signal to the main
30 body control unit 11.

[0027] The product selection button group 14 has a plurality of product selection buttons 14a for selecting products. The product selection buttons 14a are arranged

near product samples, for example. Each of the product selection buttons 14a can be displayed by LED display. When product selection is performed, the product selection button 14a is lighted and displayed. When product
5 settlement ends, the product selection button 14a is lighted off. When cash settlement is performed, the product selection buttons 14a corresponding to products that can be purchased by the amount of thrown-in money are lighted.

10 [0028] The display operation unit 15, which is a touch panel, for example, is capable of displaying and performing selection operation. The display operation unit 15 can display a settlement server selection unit 15a that allows performing the selection operation. The settlement server
15 selection unit 15a displays the settlement servers A, B, and C to which the vending machine 2 can be connected. When any of the settlement servers A, B, and C is selected, it is selected that settlement using the two-dimensional bar code information is made to the selected settlement
20 server A, B, or C. When the multiple settlement servers A, B, and C are not selectable, but only a single settlement server is selectable, the settlement server selection unit 15a displays only the selectable settlement server.

[0029] The display unit 16, which is a liquid crystal
25 panel, for example, displays various types of information such as on sale, change shortage, in preparation, in communication, bill suspend, amount of thrown-in money, and information in various settings. When settlement using the two-dimensional bar code information is made with the
30 selected settlement server A, B, or C, the display unit 16 displays this two-dimensional bar code information 16a. The two-dimensional bar code information 16a includes the product data including the price of a product and the

location information (URL) of the selected settlement server A, B, or C. The portable terminal 3 reads the two-dimensional bar code information 16a, adds the user identification information (including the URL), and
5 accesses the selected settlement server A, B, or C to make settlement of the product. The settlement server includes one that performs settlement processing in settlement systems such as "WeChat Pay", "Alipay", "LINE PAY", and "Rakuten Pay".

10 [0030] All of display operation system such as the product selection button group 14, the display operation unit 15, the display unit 16, and product samples may be replaced with a display operation unit such as a large screen touch panel.

15 [0031] The non-contact card reader-writer 21, which is an RFID card reader-writer, for example, reads information in a prepaid card to make settlement. The contact card reader-writer 22, which is a magnetic card read-writer, for example, reads information in a prepaid card to make
20 settlement in the same manner as the non-contact card reader-writer 21. The coin mechanism 23, which is a coin processing device, identifies coin and reads an amount of thrown-in money, and discharges change. The bill validation data 24, which is a bill processing device,
25 identifies bill and reads an amount of thrown-in money, and discharges change. The coin mechanism 23 and the bill validation data 24 are used for cash settlement. The non-contact card reader-writer 21, the contact card reader-writer 22, the coin mechanism 23, and the bill validation
30 data 24 are reception units for other settlement processing other than the settlement processing by the settlement servers A, B, and C using the two-dimensional bar code information. The processing reception units for other

settlement processing make settlement in the vending machine.

[0032] The external communication processing unit 17 performs processing for communication connection with the settlement servers A, B, and C via the network N.

Particularly, the external communication processing unit 17 accesses the selected settlement server A, B, or C, acquires the location information about the selected settlement server A, B, or C that makes the settlement of a selected product, and performs polling that periodically confirms whether the settlement of the selected product is successful, under a control unit of the main controller 10.

[0033] The main controller 10 has this control unit 10a, a sale control unit 10b, and a display control unit 10c.

The control unit 10a collectively manages the main body control unit 11, the product selection button group 14, the display operation unit 15, the display unit 16, the non-contact card reader-writer 21, the contact card reader-writer 22, the coin mechanism 23, the bill validation data 24, the external communication processing unit 17, and the like. The control unit 10a performs control on the basis of various types of setting data stored in a storage unit, which is not illustrated.

[0034] The sale control unit 10b performs product sale control on sale of products in the main body of the vending machine 2. The display control unit 10c performs display control of the product selection button group 14, the display operation unit 15, and the display unit 16 on the basis of instructions by the sale control unit 10b. When a product is selected by the product selection button 14a and the settlement by any of the settlement servers A, B, and C is selected by the settlement server selection unit 15a, the sale control unit 10b acquires the two-dimensional bar

code information including the location information about the selected settlement server A, B, or C from the selected settlement server A, B, or C, displays the two-dimensional bar code information on the display unit 16. When

5 receiving, from the selected settlement server A, B, or C, settlement completion information indicating that settlement of the product by the portable terminal 3 having read the two-dimensional bar code information 16a displayed on the display unit 16 is made, the sale control unit 10b
10 performs conveyance processing of the product selected by the product selection button 14a. When the settlement by the selected settlement server A, B, or C is selected by the settlement server selection unit 15a, the sale control unit 10b prohibits reception of settlement processing by
15 the reception units for other settlement processing until the selected settlement server A, B, or C ends the settlement processing. The sale control unit 10b also performs the product sale control of the reception units for other settlement processing.

20 [0035] Structure of portable terminal

As illustrated in FIG. 3, in the portable terminal 3, a display operation unit 32, an imaging unit 33, an external communication processing unit 34, and a short-range wireless communication processing unit 35 are
25 connected to a control unit 30. The display operation unit 32, which is a touch panel, for example, displays and operates various types of information. The imaging unit 33, which is a camera, can read the two-dimensional bar code information 16a displayed on the display unit 16 of the
30 vending machine 2. The external communication processing unit 34, which is connectable to the network N, can be connected to the settlement servers A, B, and C via the network N. The short-range wireless communication

processing unit 35 performs processing of short-range wireless communication such as Wi-Fi (registered trademark), for example.

[0036] The control unit 30 controls the display operation unit 32, the imaging unit 33, the external communication processing unit 34, and the short-range wireless communication processing unit 35. The control unit 30 has a settlement control unit 31. The settlement control unit 31 adds the user identification information to the read two-dimensional bar code information to control settlement processing of the selected settlement server A, B, or C. The settlement control unit 31 is set preliminarily as a settlement control application, for example.

[0037] Sale control processing based on reading two-dimensional bar code information by portable terminal

FIG. 4 is a sequence diagram illustrating a sale control processing procedure based on reading the two-dimensional bar code information by the portable terminal 3. As illustrated in FIG. 4, the product selection button 14a is selected (step S101), and then the sale control unit 10b lights the selected product selection button 14a (step S102). The settlement server selection unit 15a displays the settlement servers A, B, and C (step S103). As illustrated in FIG. 5, the settlement server selection unit 15a displays the settlement servers A, B, and C to which the vending machine 2 can be connected in regions EA, EB, and EC, respectively. One of the settlement servers A, B, and C, e.g., the settlement server A, is selected (step S104), and then the sale control unit 10b transmits the product data about the selected product to the external communication processing unit 17 (step S105).

[0038] When receiving the product data from the sale

control unit 10b, the external communication processing unit 17 makes a settlement server mode request (step S106), and receives a settlement server mode response from the sale control unit 10b (step S107). The settlement server mode response is a mode in which the sale control based on reading the two-dimensional bar code information by the portable terminal 3 is performed.

[0039] When receiving the settlement server mode request (step S106), i.e., the product selection button 14a is selected and the settlement server A is selected by the settlement server selection unit 15a, the sale control unit 10b prohibits settlement by the reception units for other settlement processing (step S108). The sale control unit 10b displays "in communication" on the display unit 16 (step S109). The display of "in communication" means that no settlement by the reception units for other settlement processing is received.

[0040] When receiving the settlement server mode response from the sale control unit 10b (step S107), the external communication processing unit 17 starts communication with the selected settlement server A (step S110). The external communication processing unit 17 transmits the received product data to the settlement server A (step S111) to order the product to the settlement server A.

[0041] When receiving the product data, the settlement server A transmits the two-dimensional bar code information to the external communication processing unit 17 (step S112). The two-dimensional bar code information includes the location information about the settlement server A besides the product data including a product code, a price, and the like. The sale control unit 10b produces a two-dimensional bar code on the basis of the two-dimensional

bar code information received by the external communication processing unit 17 and displays the produced two-dimensional bar code on the display unit 16 as the two-dimensional bar code information 16a (step S113).

5 [0042] When the two-dimensional bar code information 16a is displayed on the display unit 16, the portable terminal 3 images the two-dimensional bar code information 16a by the imaging unit 33 to read the two-dimensional bar code information 16a (step S114). The settlement control unit
10 31 of the portable terminal 3 adds the user identification information to the read two-dimensional bar code information 16a and makes a settlement request to the settlement server A indicated by the two-dimensional bar code information 16a (step S115).

15 [0043] When receiving the settlement request from the portable terminal 3, the settlement server A compares the settlement request content with the order content. If the settlement is successful (step S116), the settlement server A transmits a settlement success notification to the
20 portable terminal 3 (step S117).

[0044] After receiving the two-dimensional bar code information from the settlement server A, the external communication processing unit 17 performs polling that periodically makes a settlement confirmation whether the
25 settlement by the settlement server A is successful (step S118). The external communication processing unit 17 determines whether the settlement confirmation is made by the polling (step S119). If the settlement confirmation is not made (No at step S119), the external communication
30 processing unit 17 further determines whether a certain time has elapsed (step S120). If the certain time has not elapsed (No at step S120), the process returns to step S118, at which the polling for the settlement confirmation

continues. If the certain time has elapsed (Yes at step S120), the external communication processing unit 17 cuts the communication (step S122).

[0045] If the settlement confirmation is made (Yes at
5 step S119), the external communication processing unit 17 notifies the sale control unit 10b of a settlement confirmation notification (step S121) and cuts the communication (step S122).

[0046] When receiving the settlement confirmation
10 notification from the external communication processing unit 17 (step S121), the sale control unit 10b causes the settled product to be conveyed (step S123), and causes the product selection button 14a to be lighted off (step S124). The sale control unit 10b cancels the prohibition of
15 reception of the settlement by the reception units for other settlement processing (step S125).

[0047] Either the product selection by the product
selection button 14a or the selection of the settlement by
the settlement server A, the selection being received by
20 the settlement server selection unit 15a, may be performed first.

[0048] In the first embodiment, when the sale control
processing based on reading the two-dimensional bar code
information by the portable terminal 3 is performed, it is
25 prohibited that the non-contact card reader-writer 21, the contact card reader-writer 22, the coin mechanism 23, and the bill validation data 24 receive settlement. As a result, multiple settlement can be prevented when the external settlement server A, B, or C is used. The
30 electronic money settlement by the non-contact card reader-writer 21 or the contact card reader-writer 22 and the cash settlement by the coin mechanism 23 and the bill validation data 24 are jointly subjected to settlement processing in

the same vending machine 2 in some cases.

[0049] In the first embodiment, the vending machine 2 displays only the two-dimensional bar code information for reading of the two-dimensional bar code information by the portable terminal 3, thereby having a simple structure. This makes it easy to add, to the vending machine 2, the sale control processing based on reading the two-dimensional bar code information by the portable terminal 3.

[0050] In the first embodiment, a result of the settlement with the settlement server A by the portable terminal 3 is checked by the polling. As a result, each vending machine 2 does not need to acquire the IP address. From this point view, the vending machine 2 has a simple structure.

[0051] Second embodiment

In the first embodiment, a result of the settlement with the settlement server A by the portable terminal 3 is checked by the polling. In a second embodiment, the portable terminal 3 receives the settlement result from the settlement server A without polling.

[0052] FIG. 6 is a sequence diagram illustrating a sale control processing procedure in the second embodiment based on reading the two-dimensional bar code information by the portable terminal 3. As described above, in the second embodiment, the polling for settlement confirmation in the first embodiment (step S118) is not performed. When the settlement between the portable terminal 3 and the settlement server A is successful (step S116), the settlement server A transmits the settlement success notification to the portable terminal 3 and to the external communication processing unit 17 of the vending machine 2 (step S117). Other processing procedure in the second embodiment is the same as that in the first embodiment.

[0053] The second embodiment can prevent the multiple settlement in the same manner as the first embodiment although the vending machine 2 needs to acquire the IP address when the settlement server A transmits the settlement success notification to the vending machine 2, and can easily add, to the vending machine 2, the sale control processing based on reading the two-dimensional bar code information by the portable terminal 3.

[0054] Third embodiment

FIG. 7 is a block diagram illustrating a structure of the vending machine 2 in a third embodiment. As illustrated in FIG. 7, in the third embodiment, a short-range wireless communication processing unit 18 is added to the vending machine 2 in the first embodiment. The short-range wireless communication processing unit 18 processes a short-range wireless communication such as Wi-Fi (registered trademark), for example, in the same manner as the short-range wireless communication processing unit 35 of the portable terminal 3. Other structure is the same as that in the first embodiment.

[0055] FIG. 8 is a sequence diagram illustrating a sale control processing procedure in the third embodiment based on reading the two-dimensional bar code information by the portable terminal 3. In the third embodiment, the short-range wireless communication processing unit 35 and the short-range wireless communication processing unit 18 are connected to communicate with each other. As a result, the sale control unit 10b transmits the contents of the product selection button group 14 and the display operation unit 15 of the vending machine 2 to the portable terminal 3. This results in ones corresponding to the contents of the product selection button group 14 and the display operation unit 15 being virtually displayed on the portable terminal

3. In this state, the virtual product selection button 14a is selected (step S201), which corresponds to step S101, and a virtual settlement server is selected (step S202), which corresponds to step S104, on the portable terminal 3 side. Other structure is the same as that in the first embodiment.

[0056] Even in an application example where the product selection button 14a is selected and the settlement server is selected on the portable terminal 3 as described in the third embodiment, the third embodiment can also prevent the multiple settlement and easily add, to the vending machine 2, the sale control processing based on reading the two-dimensional bar code information by the portable terminal 3, in the same manner as the first embodiment.

[0057] The vending machine 2 in the application example described in the third embodiment performs the settlement processing procedure in the same manner as the first and the second embodiments, thereby reducing changes in the vending machine 2. The first embodiment and the third embodiment can be used together.

[0058] Fourth embodiment

FIG. 9 is a block diagram illustrating a structure of the vending machine 2 in a fourth embodiment. As illustrated in FIG. 9, in the fourth embodiment, the vending machine 2 is newly provided with a two-dimensional bar code reading unit 19 and the two-dimensional bar code reading unit 19 reads the two-dimensional bar code information displayed on the portable terminal 3 instead of reading the two-dimensional bar code information 16a displayed on the display unit 16 by the portable terminal 3. The two-dimensional bar code reading unit 19 is an imaging unit such as a camera, for example. Other structure is the same as that in the first embodiment.

[0059] FIG. 10 is a sequence diagram illustrating a sale control processing procedure based on reading the two-dimensional bar code information of the portable terminal 3 by the vending machine 2. In FIG. 10, step S301 to S311 are the same as steps S101 to S111 in the first embodiment. In the state where "in communication" is displayed (step S309), the portable terminal 3 causes the display operation unit 32 to display the two-dimensional bar code information including the user identification information (step S312). When the displayed two-dimensional bar code information is held up over the two-dimensional bar code reading unit 19, the sale control unit 10b causes the two-dimensional bar code reading unit 19 to read the two-dimensional bar code information (step S313). The sale control unit 10b transmits the read two-dimensional bar code information to the external communication processing unit 17. The external communication processing unit 17 transmits the received two-dimensional bar code information to the settlement server A (step S314) and makes a settlement request to the settlement server A.

[0060] The settlement server A compares the settlement request content with the order content to perform the settlement processing. If the settlement is successful (step S316), the settlement server A transmits the settlement success notification to the external communication processing unit 17 (step S317). The processing after step S317 (steps S319 to S325) is the same as that from step S119 to step S125 in the first and the second embodiments.

[0061] An IP address may be set to the vending machine 2 and the settlement server A may transmit the settlement success notification to the IP address in the same manner as the second embodiment. The vending machine 2 may

perform the polling for settlement confirmation in the same manner as the first embodiment.

[0062] In the fourth embodiment, when the sale control processing based on reading the two-dimensional bar code information of the portable terminal 3 by the vending machine 2 is performed, it is prohibited that the non-contact card reader-writer 21, the contact card reader-writer 22, the coin mechanism 23, and the bill validation data 24 receive the settlement. As a result, the fourth embodiment can prevent the multiple settlement when the external settlement server A, B, or C is used.

[0063] In the fourth embodiment, the vending machine 2 needs to be provided with only the two-dimensional bar code reading unit 19 that allows the vending machine 2 to read the two-dimensional bar code information of the portable terminal 3. This makes it possible for the vending machine 2 to have a simple structure.

[0064] In the first to the fourth embodiments, the two-dimensional bar code information such as the QR code (registered trademark) is described as an example of the bar code information. The bar code information is not limited to the two-dimensional bar code information. For example, the bar code information may be first-dimensional bar code information or other code information as long as they can be displayed and are readable.

[0065] In the first to the fourth embodiments, the vending machine that sales products such as canned beverages, bottled beverages, and PET-bottled beverages is described as an example of the vending machine. The vending machine is not limited to that described above. For example, the vending machine includes an automatic machine such as a ticket machine handling variable securities such as tickets as selling products as long as

it satisfies the following requirements: it includes at least a settlement processing means that performs settlement processing of a product using the settlement servers A, B, and C based on reading the bar code

5 information by the portable terminal 3 or reading the bar code information displayed on the portable terminal 3, and one or more reception units for other settlement processing such as the non-contact card reader-writer 21, the contact card reader-writer 22, the coin mechanism 23, the bill
10 validation data 24, and a credit card reader-writer.

[0066] The respective structures illustrated in the respective embodiments are functionally conceptual and need not be physically structured as illustrated. The forms of distribution and integration of the respective devices and
15 the respective constituting elements are not limited to those illustrated. The whole or a part of the forms can be structured by being functionally or physically distributed or integrated on the basis of any unit in accordance with the various usage conditions.

20 Reference Signs List

[0067] 1 vending machine system
2 vending machine
3 portable terminal
10 main controller
25 10a, 30 control unit
10b sale control unit
10c display control unit
11 main body control unit
12 cooling-heating device
30 13 conveyance device
14 product selection button group
14a product selection button
15, 32 display operation unit

15a settlement server selection unit
 16 display unit
 16a two-dimensional bar code information
 17, 34 external communication processing unit
 5 18, 35 short-range wireless communication processing
 unit
 19 two-dimensional bar code reading unit
 21 non-contact card reader-writer
 22 contact card reader-writer
 10 23 coin mechanism
 24 bill validation data
 31 settlement control unit
 33 imaging unit
 A, B, C settlement server
 15 EA, EB, EC region
 N network

CLAIMS

1. A vending machine that is able to perform settlement processing of a product using a settlement server based on bar code information read by a portable terminal, the
5 vending machine comprising:

a product selection button configured to select a product to be sold;

a settlement server selection unit configured to receive selection of using the settlement server for
10 settlement of a product selected by the product selection button;

a display unit configured to display the bar code information including a price of the product selected by the product selection button and location information about
15 the settlement server making settlement of the product; and

a sale control unit configured to:

acquire the bar code information from the settlement server and display the bar code information on the display unit when the product is selected by the
20 product selection button and settlement by the settlement server is selected by the settlement server selection unit; and

perform conveyance processing of the product selected by the product selection button when receiving,
25 from the settlement server, settlement completion information indicating that the settlement of the product by the portable terminal having read the bar code information is made, wherein

the sale control unit is configured to prohibit
30 reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the

settlement server is selected by the settlement server selection unit.

2. A vending machine that is able to perform settlement processing of a product using a settlement server by reading bar code information displayed by a portable terminal, the vending machine comprising:

a product selection button configured to select a product to be sold;

10 a settlement server selection unit configured to receive selection of using the settlement server for settlement of a product selected by the product selection button;

a reading unit configured to read the bar code information including user identification information from the portable terminal; and

a sale control unit configured to:

perform settlement processing of the product with the settlement server based on the bar code information read by the reading unit when the product is selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit; and

perform conveyance processing of the product selected by the product selection button when the settlement processing is completed, wherein

the sale control unit is configured to prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit.

3. The vending machine according to claim 1, wherein the sale control unit is configured to acquire the settlement completion information by periodically querying to the settlement server whether the settlement of the product by the portable terminal is made, after displaying the bar code information on the display unit.

4. The vending machine according to any one of claims 1 to 3, wherein the settlement server selection unit is configured to receive, from the portable terminal, the selection of using the settlement server for settlement of a product selected by the product selection button or a virtual product selection button of the portable terminal, the virtual product selection button corresponding to the product selection button.

5. The vending machine according to any one of claims 1 to 4, wherein the settlement server selection unit is configured to receive the selection of a single settlement server out of a plurality of settlement servers.

6. A vending machine system comprising a vending machine that is able to perform settlement processing of a product based on bar code information read by a portable terminal, and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, wherein

the vending machine includes:

a product selection button configured to select a product to be sold;

a settlement server selection unit configured to

receive selection of using the settlement server for settlement of a product selected by the product selection button;

5 a display unit configured to display the bar code information including a price of the product selected by the product selection button and location information about the settlement server making settlement of the product; and

a sale control unit configured to:

10 acquire the bar code information from the settlement server and display the bar code information on the display unit when the product is selected by the product selection button and settlement by the settlement server is selected by the settlement server selection unit;

15 perform conveyance processing of the product selected by the product selection button when receiving, from the settlement server, settlement completion information indicating that the settlement of the product by the portable terminal having read the bar code information is made; and

20 prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit, and

25 the portable terminal is configured to read the bar code information displayed on the display unit and make settlement of the product by accessing to the settlement server indicated by the bar code information.

30

7. A vending machine system comprising a vending machine that is able to perform settlement processing of a product by reading bar code information displayed by a portable

terminal, and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, wherein

5 the vending machine includes:

 a product selection button configured to select a product to be sold;

 a settlement server selection unit configured to receive selection of using the settlement server for
10 settlement of a product selected by the product selection button;

 a reading unit configured to read the bar code information including user identification information from the portable terminal; and

15 a sale control unit configured to:

 perform settlement processing of the product with the settlement server based on the bar code information read by the reading unit when the product is selected by the product selection button and settlement by
20 the settlement server is selected by the settlement server selection unit;

 perform conveyance processing of the product selected by the product selection button when the settlement processing is completed; and

25 prohibit reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is
30 selected by the settlement server selection unit, and

 the portable terminal is configured to display the bar code information including the user identification information.

8. A settlement method in a vending machine system that includes a vending machine that is able to perform settlement processing of a product based on bar code information read by a portable terminal and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, the settlement method being executed by the vending machine and comprising:

acquiring the bar code information from the settlement server and display the bar code information on a display unit when a product is selected by a product selection button selecting a product to be sold and settlement by the settlement server is selected by a settlement server selection unit that receives selection of using the settlement server for settlement of the product selected by the product selection button; and

performing conveyance processing of the product selected by the product selection button when receiving, from the settlement server, settlement completion information indicating that settlement of the product by the portable terminal having read the bar code information is made while prohibiting reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit.

9. A settlement method in a vending machine system that includes a vending machine that is able to perform

settlement processing of a product by reading bar code information displayed by a portable terminal and a settlement server that performs settlement processing of the product with the portable terminal, the vending machine and the settlement server being connectable to a network, the settlement method being executed by the vending machine and comprising:

reading the bar code information including user identification information from the portable terminal when a product is selected by a product selection button selecting a product to be sold and settlement by the settlement server is selected by a settlement server selection unit that receives selection of using the settlement server for settlement of the product selected by the product selection button;

performing settlement processing of the product with the settlement server based on the read bar code information; and

performing conveyance processing of the product selected by the product selection button when the settlement processing is completed while prohibiting reception of settlement processing by a reception unit for other settlement processing until the settlement processing by the settlement server ends when the product is selected by the product selection button and the settlement by the settlement server is selected by the settlement server selection unit.