

server apparatus 300 acquires the provision location information included in the discarding notification message.

[0105] An operation example of the resource recovery system 1 according to the second embodiment will be described. FIG. 10 is a diagram illustrating an operation example of the resource recovery system 1 according to the second embodiment. In FIG. 10, dashed lines illustrate steps that are optional.

[0106] As illustrated in FIG. 10, in step S201, the writing apparatus 500 detects provision of the article (product 50) to the consumer.

[0107] In step S202, the writing apparatus 500 writes the provision time information to the electronic tag 52.

[0108] Subsequently, in step S203, the resource recovery apparatus 200 performs authentication processing on the consumer attempting to discard the article (e.g., the container and packaging 51 of the product 50). In a case that the consumer is successfully authenticated, the resource recovery apparatus 200 accepts discarding (input) of the article.

[0109] In step S204, the resource recovery apparatus 200 reads the product identifier and the provision time information from the electronic tag 52 attached to the waste.

[0110] In step S205, the resource recovery apparatus 200 transmits, to the server apparatus 300, the discarding notification message including the product identifier and the provision time information read in step S204. The discarding notification message may include discarding time information.

[0111] In step S206, the server apparatus 300 identifies the provision time information and the discarding time information based on the discarding notification message from the resource recovery apparatus 200. Here, the server apparatus 300 identifies the provision time information by acquiring the provision time information included in the discarding notification message.

[0112] In step S207, the server apparatus 300 associates the provision time information as well as the discarding time information identified in step S206 with the product identifier.

[0113] In step S208, the server apparatus 300 calculates the elapsed period based on the association in step S207.

[0114] In step S209, the server apparatus 300 transmits, to the communication apparatus 400, a set of the elapsed period information related to the elapsed period and the product identifier.

[0115] Variation of Second Embodiment

The elapsed period from the provision of the product to the consumer until discarding of the product may vary depending on the characteristics (e.g., lifestyle) of the consumer. In the present variation, by deriving such elapsed period information for each consumer, the package, the cold insulator, or the like can be optimized for each consumer.

[0116] The information stored and managed by the server apparatus 300 according to the present variation is the same as and/or similar to the information in the variation (see FIG. 6) of the first embodiment. Specifically, the writing apparatus 500 according to the present variation further writes the consumer identifier to the electronic tag 52 attached to the article (product 50). The resource recovery apparatus 200 reads the consumer identifier from the electronic tag 52 and transmits, to the server apparatus 300, the discarding notification message further including the consumer identifier. Thus, the server apparatus 300 manages the product identifier and the consumer identifier in association with each other.

[0117] FIG. 11 is a diagram illustrating a variation of operation of the resource recovery system 1 according to the second embodiment. Here, differences from operations of the resource recovery system 1 according to the second embodiment described above (see FIG. 10) will be described.

[0118] As illustrated in FIG. 11, in step S202a, the writing apparatus 500 writes the provision time information to the electronic tag 52 and also writes, to the electronic tag 52, the consumer identifier for identifying the consumer provided with the article (product 50). For example, in a case that electronic payment is used for payment for the product 50, the consumer identifier can be obtained from the information of the electronic payment.

[0119] In step S204a, the resource recovery apparatus 200 reads the product identifier, the consumer identifier, and the provision time information from the electronic tag 52 attached to the waste.

[0120] In step S205a, the resource recovery apparatus 200 transmits, to the server apparatus 300, the discarding notification message including the product identifier, the consumer identifier, and the provision time information read in step S204a⁵. The discarding notification message may include discarding time information.

[0121] In step S206a, the server apparatus 300 identifies the provision time information and the discarding time information based on the discarding notification message from the resource recovery apparatus 200. Here, the server apparatus 300 identifies the provision time information by acquiring the provision time information included in the discarding notification message.

[0122] In step S207a, the server apparatus 300 associates the provision time information as well as the discarding time information identified in step S206a with the product identifier and the consumer identifier.

[0123] In step S209a, the server apparatus 300 transmits a set of the product identifier, the consumer identifier, and the elapsed period information to the communication apparatus 400.

[0124] Outline of Third Embodiment

After purchasing a product at a store, the consumer consumes the product and discards the product packaging or container (hereinafter referred to as the "container and packaging") of the product. For example, in a case that the product 50 is a food or a beverage, then after

the server apparatus 300 may determine whether the consumer is legitimate and notify the resource recovery apparatus 200 of the result of the determination, and the controller 260 may control the opening and closing accordingly.

[0169] After switching the opener/closer 210 from the closed state to the open state, the controller 260 may switch the opener/closer 210 from the open state to the closed state when a closing condition is satisfied. The closing condition includes at least one selected from the group consisting of 1) condition that a certain time has elapsed since switching to the open state, 2) condition that the product identification unit 205 has newly read information from the electronic tag 52 of the waste, 3) condition that a certain time has elapsed since the product identification unit 205 has newly read the information from the electronic tag 52 of the waste, and 4) condition that the consumer identification unit 204 has performed the second authentication on the same consumer. The closing condition in 4) assumes that, for example, the consumer passes the IC card over the consumer identification unit 204 to switch the opener/closer 210 to the open state and then, after discarding of the waste, passes the IC card over the consumer identification unit 204 to switch the opener/closer 210 to the closed state.

[0170] The controller 260 acquires the consumer identifier output by the consumer identification unit 204 and the product identifier output by the product identification unit 205, generates a discarding notification message including the ~~product~~-consumer identifier acquired and the product identifier acquired, and transmits the discarding notification message to the server apparatus 300 via the communicator 240.

[0171] The controller 260 may further include, in the discarding notification message, the weight measurement information indicating the weight of the individual waste (i.e., the weight at the time of discarding of product 50). The controller 260 may include the clocking function and may generate discarding time information (time stamp) indicating the discarding time for the waste and associate the discarding time information with the product identifier.

[0172] The controller 260 may transmit the discarding notification message to the server apparatus 300 every time waste is newly discarded. The controller 260 may accumulate (buffer), over a predetermined time, information to be included in the discarding notification message and transmit, to the server apparatus 300, the discarding notification message including the accumulated information. For example, the condition for transmitting the discarding notification message may be that a transmission opportunity has arrived according to the periodic transmission period or that the buffer accumulation amount exceeds a threshold value. In a case that the transmission of the discarding notification message is suspended until the transmission condition is satisfied, the data communication amount and the power consumption of the resource recovery apparatus 200 can be suppressed.

[0173] When transmitting the discarding notification message to the server apparatus 300, the controller 260 may include, in the discarding notification message, the discarding location information indicating the installation location (i.e., discarding location) of the resource

[0210] Subsequently, in step S303, the resource recovery apparatus 200 identifies the consumer attempting to discard the container and packaging 51 of the product 50. In a case of successfully identifying the consumer, the resource recovery apparatus 200 accepts discarding (input) of the waste.

[0211] In step S304, the resource recovery apparatus 200 reads information from the electronic tag 52 attached to the waste. The information read from the electronic tag 52 includes the product identifier. The information read from the electronic tag 52 may include at least a part of information configuring the above-described product information.

[0212] In step S305, the resource recovery apparatus 200 transmits, to the server apparatus 300, the discarding notification message including the consumer identifier of the consumer identified in step S303 and the information (including the product identifier) read in step S304. The discarding notification message may include at least one selected from the group consisting of the discarding time information, the discarding location information, and the weight measurement information.

[0213] In step S306, the server apparatus 300 updates the consumption history information and the intake information based on the discarding notification message from resource recovery apparatus 200. Specifically, the server apparatus 300 acquires the consumer identifier and the product identifier included in the discarding notification message and updates the consumption history information by using the consumer identifier acquired and the product identifier acquired. The server apparatus 300 manages the sale time information, the sale location information, the discarding time information, the discarding location information, and the waste amount information in association with the product identifier. Based on the product information and the consumption history information, the server apparatus 300 manages the intake information indicating at least one selected from the group consisting of the nutrients, the calories, and the allergic substances taken in by the consumer. The server apparatus 300 may modify the intake information based on the waste amount information.

[0214] In step S307, the server apparatus 300 transmits the consumer identifier, the consumption history information and intake information managed by the server apparatus 300 to the communication apparatus 400.

[0215] As described above, according to the third embodiment, the resource recovery apparatus 200 can inform the server apparatus 300 which consumer has consumed which product, and the server apparatus 300 can understand and manage a history of the consumed product for each consumer. This allows, for example, a high value-added service such as assistance of healthcare for each consumer to be provided.

[0216] FIG. 18 is a diagram illustrating an operation example of the resource recovery system 1 in a case that the consumer has suffered health damage (e.g., food poisoning).

[0217] As illustrated in FIG. 18, in step S401, the server apparatus 300 receives, from the communication apparatus 400, information (health damage notification) indicating that two or more consumers have suffered health damage (e.g., food poisoning). The health damage notification includes the ~~product~~-consumer identifier of each of the two or more consumers.

[0218] In step S402, based on the consumption history information corresponding to the consumer identifier of each of the two or more consumers, the server apparatus 300 estimates, as the cause of the health damage, a product (product name) taken in by the two or more consumers in common. The server apparatus 300 may estimate a product 50 that caused the health damage taking into account the sale location information and/or the production location information included in the product information.

[0219] In step S403, the server apparatus 300 transmits, to the communication apparatus 400, the causal product information indicating the determination result (estimation result) of the product 50 that caused the health damage.

[0220] FIG. 19 is a diagram illustrating an operation example of the resource recovery system 1 in a case that a problem (e.g., foreign matter contamination) is discovered in a particular product.

[0221] As illustrated in FIG. 19, in step S501, the server apparatus 300 receives, from the communication apparatus 400, information (problem discovery notification) indicating that a problem (e.g., a foreign matter contamination) is discovered in a particular product. The problem discovery notification includes the product identifier of the particular product.

[0222] In step S502, based on the consumption history information managed by the server apparatus 300, the server apparatus 300 identifies consumers who have consumed (taken in) a related product that is of the same type as the type of the particular product (that has the same product name as the product name of the particular product) and that is related to the particular product.

[0223] In step S503, the server apparatus 300 transmits, to the communication apparatus 400, the related consumer information indicating the identified consumer.

[0224] Other Embodiments

A program may be provided to cause a computer to execute the processing operations according to the first to the third embodiments described above. The program may be recorded in a computer readable medium. Use of the computer readable medium enables the program to be installed on a computer. Here, the computer readable medium on which the program is recorded may be a non-transitory recording medium. The non-transitory recording medium is not particularly limited, but may be, for example, a recording medium such as a CD-ROM, a DVD-ROM, or the like.

[0225] The first to third embodiments have been described above in detail with reference to the drawings; however, specific configurations are not limited to those described above, and

CLAIMS

1. A resource recovery system for recovering discarded articles which can be recycled as resources, the resource recovery system comprising:
 - a resource recovery apparatus configured to recover an article discarded by a consumer; and
 - a server apparatus configured to communicate with the resource recovery apparatus, wherein
 - the server apparatus is configured to associate a discarding time with a provision time, based on a first message received from the resource recovery apparatus, the discarding time the article is discarded, the provision time the article is provided to the consumer, the first message including an article identifier to identify the article.
2. The resource recovery system according to claim 1, wherein
 - the server apparatus is further configured to manage a ~~period~~first information, the first information related to a period that elapses from the provision time to the discarding time ~~for the article~~.
3. The resource recovery system according to claim 2, wherein
 - the article is configured to include a container and packaging of a product,
 - the server apparatus is further configured to determine a sale time is the provision time, the sale time the product is sold, and
 - the server apparatus is configured to calculate the period, ~~from the sale time of the product to the discarding time of the container and packaging, by using a sale time when the product is sold as the provision time.~~
4. The resource recovery system according to claim 2 or 3, wherein
 - the server apparatus is further configured to transmit the ~~period~~first information to a communication apparatus of a business operator providing the article.
5. The resource recovery system according to any one of claims 1 to 4, wherein
 - the first message further includes discarding time information indicating the discarding time, and
 - the server apparatus is configured to identify the discarding time based on the discarding time information included in the first message.
6. The resource recovery system according to any one of claims 1 to 4, wherein

the resource recovery apparatus is configured to transmit the first message to the server apparatus when the article is discarded, and

the server apparatus is configured to determine a first reception time, which the first message is received from the resource recovery apparatus, is identify, as the discarding time, ~~a reception time the first message is received from the resource recovery apparatus.~~

7. The resource recovery system according to any one of claims 1 to 6, wherein the server apparatus is configured to

receive a second message including the article identifier from a terminal apparatus, the terminal apparatus installed at a provision location where the article is provided to the consumer, and

identify the provision time based on the second message.

8. The resource recovery system according to claim 7, wherein

the second message is further configured to include provision time information indicating the provision time, and

the server apparatus is configured to identify the provision time based on the provision time information included in the second message.

9. The resource recovery system according to claim 7, wherein

the terminal apparatus is configured to transmit the second message to the server apparatus when a business operator providing the article provides the article, and

the server apparatus is configured to determine a second reception time, which the second message is received from the terminal apparatus, is identify, as the provision time, ~~a reception time the second message is received from the terminal apparatus.~~

10. The resource recovery system according to any one of claims 1 to 6, further comprising

a writing apparatus configured to write provision time information to an electronic tag attached to the article, the provision time information indicating the provision time, wherein

the resource recovery apparatus is configured to

read both the article identifier and the provision time information from the electronic tag, and

transmit both the first message including the article identifier and the provision time information to the server apparatus, and

the server apparatus is configured to identify the provision time based on the provision time information included in the first message.

11. The resource recovery system according to claim 10, wherein
the writing apparatus is further configured to write provision location information to the electronic tag, the provision location information indicating a provision location where the article is provided to the consumer,
the resource recovery apparatus is further configured to
read the provision location information from the electronic tag and
transmit the first message to the server apparatus, the first message further including the provision location information, and
the server apparatus is configured to identify the provision location based on the provision location information included in the first message.
12. The resource recovery system according to any one of claim 2 or claims 3 to 11 depending on claim 2, wherein
the server apparatus is configured to
acquire a consumer identifier, the consumer identifier configured to identify the consumer corresponding to the article, and
associate the first ~~period~~ information with the consumer identifier.
13. The resource recovery system according to claim 12, wherein
the server apparatus is configured to acquire the consumer identifier from a terminal apparatus, the terminal apparatus installed at a provision location where the article is provided to the consumer.
14. The resource recovery system according to claim 12, wherein
the first message includes the consumer identifier, and
the server apparatus is configured to acquire the consumer identifier included in the first message.
15. The resource recovery system according to claim 14, further comprising
a writing apparatus configured to write the consumer identifier to an electronic tag attached to the article, wherein
the resource recovery apparatus is configured to
read the consumer identifier from the electronic tag, and
transmit the first message to the server apparatus, the first message including the consumer identifier.
16. The resource recovery system according to claim 14, wherein
the resource recovery apparatus is configured to

recognize the consumer by personal authentication, and
transmits the first message to the server apparatus, the first message including the consumer identifier of the recognized consumer.

17. A server apparatus in a resource recovery system for recovering discarded articles which can be recycled as resources, wherein

the server apparatus is configured to communicate with a resource recovery apparatus, the resource recovery apparatus configured to recover an article discarded by a consumer, and

the server apparatus further includes:

a communicator configured to receive a first message from the resource recovery apparatus, the first message including an article identifier configured to identify the discarded article; and

a processing unit configured to associate a discarding time with a provision time based on the first message, the discarding time the article is discarded, the provision time the article is provided to the consumer.

18. A method executed by a resource recovery system for recovering discarded articles which can be recycled as resources, the method comprising:

communicating with a resource recovery apparatus configured to recover an article discarded by a consumer;

receiving a first message from the resource recovery apparatus, the first message including an article identifier configured to identify the discarded article; and

associating a discarding time with a provision time based on the first message, the discarding time the article is discarded, the provision time the article is provided to the consumer.