

DELIVERY MANAGEMENT SYSTEM AND DELIVERY MANAGEMENT METHOD

Technical Field

【0001】

The present invention relates to a delivery management system, and its method.

Background Art

【0002】

It is known that portable gas fuel such as LP gas or the like is filled into a gas container such as a gas container or the like and supplied to a user. Especially, in the region where city gas is not widely spread such as Southeast Asia countries, LP gas is essential for a user to live, and it is a valuable heat source.

【0003】

In these region, LP gas is used for cooking in homes and restaurants or the like, and is essential fuel for life. Therefore, various system has been presented that gas containers filled with LP gas are delivered to each home and restaurant or the like before LP gas is runs out

【0004】

In Patent Literature 1, the technology is disclosed that creates a delivery list with a delivery date as the next day based on predicted remaining amount data after α days (for example, after two days) from an expected delivery date, not based on the predicted remaining amount data after a day from the expected delivery date. As a result, while the delivery date gets earlier $\alpha-1$ days, last-minute adjustments to the delivery list is no longer

be necessary.

【0005】

On the other hand, when delivery timing is moved forward to avoid running out of gas, delivery frequency increases. Hence, from a deliverer's point of view, increasing the delivery frequency makes it more likely that the gas container with a large remaining amount is collected, and delivery costs become more expensive as the delivery frequency increases and delivery cycles shorten. Furthermore, from a user's point of view, there is a case where he/she is reluctant to replace a gas container that still have remaining. Hence, in Patent Literature 2, the technology is disclosed that predicts a date when gas runs out, calculates the expected delivery date, and creates the delivery list based on this to improve delivery efficiency without running out of gas. All of above prior art install a gas meter at a user base and assume that a meter reader will read the gas meter.

【0006】

However, because the gas meter is relatively expensive, most of the gas container that is used in countries where city gas is not widely spread such as Southeast Asia or the like does not have the gas meter attached. Hence in these countries, at the time gas ran out, a user had requested delivery of the gas container filled with gas by the phone or the like. Because LP gas is necessary for life, this kind of request after running out of gas are highly urgent. If delivery is delayed, there is a risk of users leaking to other providers.

【0007】

Furthermore, for example, in a region where city gas is not widely spread such as Vietnam or the like, the gas container is often installed indoors, and in the case it is necessary to enter a house to replace the gas container. Because user's presence or

agreement is necessary to enter the house, it is necessary to determine a date of the gas container replacement (delivery date) by prior arrangement with the user.

【0008】

Therefore, in Patent Literature 3, in a user facility, gas pressure or the weight of the gas container in use is measured, its measurement data is automatically transmitted to management system on a regular basis or under the predetermined conditions, a predicted exchange date when the gas container is replaced is calculated from gas consumption and the remaining amount of gas, and the expected delivery date is set based on the predicted exchange date.

Citation List

Patent Literature

【0009】

Patent Literature 1: JP No.5756157

Patent Literature 2: JP No.5802225

Patent Literature 3: WO2020/115850

Summary of Invention

Technical Problem

【0010】

The Patent Literature 3 has made it possible to obtain gas consumption and the remaining amount of gas at a user base, and to make efficient delivery of the gas container that the gas meter is not attached. On the other hand, in conventional technology, the user base eligible for delivery is extracted according to the remaining amount of gas fuel, regarding contracted user as the population.

【0011】

Hence, a large of the user base may be set as a delivery destination that should be visited in a given day, which strain the work time of a deliverer. Alternatively, two user bases may be set as the delivery destination that are very far apart, which increases travel cost

【0012】

In addition, from another perspective, a system is required to be able to rush to the user base efficiently when emergency is occurred there. A deliverer must locate in near the eligible user base, because emergency such as gas leak or the like is occurred suddenly, not to mention making delivery more efficient to make time for the deliverer to work. Hence, geographical bias in the user base set as the delivery destination will take time to rush to the eligible user base.

【0013】

In view of the above circumstances, it is an object of the present invention to provide a novel technique for enabling to control a delivery area and delivery quantity, and for delivering gas fuel efficiently.

Solution to Problem

【0014】

In order to achieve above object, the present invention is a delivery management system managing delivery of a gas container to a user who uses portable gas fuel enclosed in the gas container,

the delivery management system

stores the user and a delivery completion date in database correspondingly to register delivery of a gas container to a user facility,

obtains usage amount or the amount of after use of a gas container used in the user facility,

calculates refund amount to the user based on the usage or the amount of after use.

【0015】

The present invention is a delivery management method managing delivery of a gas container to a user who uses portable gas fuel enclosed in the gas container,

the delivery management system executes:

a step for storing the user and a delivery completion date in database correspondingly to register delivery of a gas container to a user facility;

a step for obtaining usage amount or the amount of after use of a gas container used in the user facility;

a step for calculating refund amount to the user based on the usage or the amount of after use.

【0016】

With such a configuration, according to the remaining amount of gas fuel in the gas container to be collected, refund amount to a user can be calculated, and user's resistance to having his/her gas container replaced can be relived despite the remaining amount. In addition, conventionally, although delivery is necessary to be made when the gas container is empty or almost empty, with such a configuration, restrictions is removed of timing of replacement due to remaining amount of a gas container. Hence, the flexibility in scheduling deliveries increases, and more efficient delivery plans can be created. In addition, for example, regional bias in the delivery destination could be eliminated, thereby enhancing the quality of emergency response. Furthermore, the frequency of high-cost transportation route is reduced, and financial or human cost are lowered. Hence,

the environment that does not cause users to run out of gas is provided, and through improvement of safety and grasping gas usage of a gas provider, a novel technique can be provided for delivering gas fuel efficiently.

【0017】

In a preferred mode of the present invention, the delivery management system comprising:

a measurement apparatus for measuring the usage amount or the amount of after use; an information processing apparatus; and a deliverer terminal apparatus used by a deliverer,

wherein measurement apparatus identification information is stored in the database in association with user identification information,

the measurement apparatus or the deliverer terminal apparatus transmits deliverer identification information of a deliverer replacing the gas container, and the measurement apparatus identification information to the information processing apparatus in association,

the information processing apparatus stores the delivery completion date for an eligible user facility in the database in association with the user based on received the measurement apparatus identification information and the deliverer identification information.

【0018】

With such a configuration, it is possible to manage a deliverer who made delivery and history of his/her work

【0019】

In a preferred mode of the present invention, the measurement apparatus is a weight measurement apparatus capable of measuring weight as the amount of after use,

the delivery management system obtains the weight of a gas container used at a user facility, and calculates the refund amount based on the weight, and the weight of the gas container alone or the weight of gas filled in the gas container.

【0020】

In a preferred mode of the present invention, the measurement apparatus is a flow rate measurement apparatus capable of measuring flow rate as the usage amount,

the delivery management system obtains flow rate of a gas container used in a gas container at a user facility, and calculates the refund amount based on the flow rate. The flow rate measurement apparatus shown here may be an apparatus measuring pressure measurement data, and at this time, the information processing apparatus or the flow rate measurement apparatus may calculate flow rate based on the pressure measurement data using formulas.

【0021】

With such a configuration, it is possible to calculate refund amount with a weight sensor, a flow rate sensor, or a pressure sensor.

【0022】

In a preferred mode of the present invention, the delivery management system located at a user base, and comprising a gas leak sensor capable of communicating with the information processing apparatus,

wherein the database stores user information including the location of a user facility, and corresponded to the user identification information,

the deliverer terminal apparatus transmits its own location to the information processing apparatus,

the gas leak sensor reports to the information processing apparatus when detecting an abnormality,

the information processing apparatus receiving the report determines a deliverer to rush to a site based on the location of the deliverer terminal apparatus.

【0023】

In a preferred mode of the present invention, the delivery management system comprising an operator terminal apparatus capable of communicating with the information processing apparatus,

wherein the database stores a telephone number of the deliverer terminal apparatus as deliverer contact information,

the information processing apparatus transmits user identification information or the location of the user facility where a gas leak sensor that has reported are located, and a telephone number or deliverer identification information of the deliverer to request to the operator terminal apparatus when determining the deliverer to request.

【0024】

In a preferred mode of the present invention, the database stores a destination for information transmission to the deliverer terminal apparatus as deliverer contact information,

the information processing apparatus transmits user identification information or the location of the user facility where a gas leak sensor that has reported are located to the destination when determining the deliverer to request.

【0025】

In a preferred mode of the present invention, the user is stored in database in association with a deliverer who made a contract for delivery of the gas container,

the information processing apparatus determines the deliverer to request out of deliverers including a deliverer those who are not in a contractual relationship with a user of an express destination.

【0026】

With such a configuration, it is possible to carry out one-site rush in case of emergency efficiently.

【0027】

In a preferred mode of the present invention, the database stores a destination or a telephone number for information transmission to the user terminal apparatus as user contact information,

the information processing apparatus receiving the report transmits the user contact information to an operator terminal apparatus or reports to the user terminal apparatus using the user contact information.

【0028】

With such a configuration, it is possible to carry out notification of a user in case of emergency efficiently.

【0029】

In a preferred mode of the present invention, the information processing apparatus is configured to be able to communicate with a user terminal apparatus,

sets an appropriate user to delivery candidate list based on past delivery completion date stored in association with the user,

presents multiple candidate dates and times to the user terminal apparatus of a user set to the delivery candidate, and receives a desired delivery date from the user terminal apparatus,

adds the user to a delivery schedule list for delivery on the desired delivery date.

【0030】

With such a configuration, it is possible to obtain user's agreement and presence efficiently when the gas container is replaced.

【0031】

In a preferred mode of the present invention, in the database, delivery areas are set in association with each user,

the information apparatus presents multiple dates and time frames as the multiple candidate dates to a user terminal apparatus of the user added to the delivery candidate list,

receives a combination of the date and the time frame as the desired delivery from the user terminal apparatus date,

adds the user to a delivery schedule list based on the delivery area corresponded to a user and received the desired delivery date.

【0032】

With such a configuration, it is possible to add a user to a list according to an area, and to make delivery efficient.

【0033】

In a preferred mode of the present invention, receives a measurement result of the gas container from the measurement apparatus,

deletes the user from the delivery candidate list who has a predetermined remaining amount of gas in the gas container out of the users added to the delivery candidate list.

【0034】

With such a configuration, it is possible to reduce the frequency of being added to a list, and to reduce the number of deliveries of a deliverer in the medium to long term.

Advantageous Effects of Invention

【0035】

The present invention can provide a novel technique for enabling to control the delivery area and the delivery quantity, and for delivering gas fuel efficiently.

Brief Description of Drawings

【0036】

Fig. 1 is a block diagram illustrating a configuration of the system according to one embodiment.

Fig. 2 is a hardware configuration diagram of the system according to one embodiment.

Fig. 3 is a summary diagram of the user facility according to one embodiment.

Fig. 4 is a block diagram of the weight measurement apparatus according to one embodiment.

Fig. 5 is a summary diagram of the user facility according to one embodiment.

Fig. 6 is a block diagram of the weight measurement apparatus according to one embodiment.

Fig. 7 is a flowchart for replacing the gas container according to a one embodiment.

Fig. 8 is a flowchart showing a method for making the delivery list according to a one

embodiment.

Fig. 9 is a flowchart showing a method for making the delivery list according to a one embodiment.

Fig. 10 is a data configuration diagram on the delivery candidate list, and the delivery list according to one embodiment.

Fig. 11 is a processing flowchart for creating emergency information according to one embodiment.

Fig. 12 is a flowchart for asking a deliverer to rush to a site according to one embodiment.

Fig. 13 is an example of a screen in the operator apparatus according to one embodiment.

Description of Embodiments

【0037】

Hereinafter, with reference to the accompanying drawings, the delivery management system will be described for providing continuous portable gas fuel (hereinafter, called “LP gas”) such as LP gas or the like to the user facility using LP gas. A preferable mode is described in drawings. However, the present invention can be implemented in many different embodiments and is not limited to the embodiment described herein.

【0038】

For example, in the present embodiment, a configuration, an operation, or the like of the delivery management system will be described, but similar operational effects can be obtained by a method to be executed, an apparatus, a computer program, or the like. In the present embodiment, the program may be provided as a computer-readable non-

transitory recording medium or may be provided in a downloadable manner from an external server, and may be started in an external computer to achieve its functions at a client terminal (so-called server/client type).

【0039】

In addition, in the present embodiment, “unit” can include, for example, a combination of hardware source implemented by a circuit in the broad sense, and software information processing that can be specifically achieved by these hardware resources. In the present embodiment “information” is represented by, for example, physical value of signal value representing voltage and current, high or low signal value as a binary bit set consisting of 0 or 1, or quantum superposition (so-called qubit), and communication and calculation can be performed on the circuit in a broad sense.

【0040】

The circuit in broad sense is a circuit that is achieved by combining circuit, circuitry, processor, and memory, or the like as appropriate. Namely, the circuit in broad sense includes CPU (Central Processing Unit), GPU (Graphics Processing Unit), LSI (Large Scale Integration), ASIC (Application Specific Integrated Circuit), FPGA (Field-Programmable Gate Array), or the like.

【0041】

<A System configuration>

Fig. 1 is a block diagram illustrating a configuration of a system according to one embodiment. As illustrated Fig. 1, the delivery management system includes multiple user bases 1, a management system 2, multiple delivery bases 3, and a network NW.

【0042】

The user base 1 is a facility of a user (consumer) using LP gas as fuel, and is a house, a shop, or the like. The user base 1 includes a measurement apparatus 11 and a communication device 12. A user belonging to each user base uses a user terminal apparatus 10. The measurement apparatus 11 connects with the network NW via the communication device 12 such as Wi-fi Router or the like. The user terminal apparatus 10 connects with the network NW via the communication device 12 or a mobile network, and is callable via a public telephone network. The user is treated as a single user at each user base 1, even if the user is a group or organization. Note that, in some case, repeaters may be set between the measurement apparatus 11 and the communication device 12. The measurement apparatus 11 transmits measurement data to the communication device 12, and the communication device 12 transmits the measurement data to the management system 2 via the network NW. In addition, the measurement apparatus 11 transmits the measurement data to the user terminal apparatus 10, and may transmit it to the network NW and management system 2 directly via the user terminal apparatus 10.

【0043】

The management system 2 arranges for delivery of the gas container filled with LP gas to provide continuous LP gas or the like. The management system 2 includes an information processing apparatus 20, and one or more operator terminal apparatuses 200 connected with the information processing apparatus 20.

【0044】

The delivery base 3 is a base for delivering the gas container to the user base 1 based on an instruction from the management system 2. One or more deliverers belonging to each delivery base 3 use each deliverer terminal apparatus 30. Herein, the delivery base 3a and delivery base 3b, for example, are bases that different organization operates, and

make delivery of the gas container to the user base 1 with which each delivery base has contracted. In an illustrative example, a deliverer using the deliverer terminal apparatus 3a1, a deliverer using the deliverer terminal apparatus 3a2, ..., and a deliverer using the deliverer terminal apparatus 3an belong to the delivery base 3a. The deliverer terminal apparatus 30 is an apparatus carried by each deliverer, and connects with the network NW via the mobile network or a communication device which is not shown, or the like.

【0045】

Note that, in the present embodiment, the delivery management system 0 centrally manages the delivery base 3 operated by different organization, but this may be directed to a single organization. In addition, each delivery base 3 may include an information processing apparatus connected with the management system 2 via the network NW. At this time, for example, the information processing apparatus obtains an instruction from the management system 2, or the delivery list and delivery route information of each delivery area apparently, and may be configured to allow these to be assignable to the deliverer terminal apparatus 30 of a deliverer belonging to the delivery base 3. The delivery base 3 may also be a base where a person providing LP gas or the like has organized, or be a delegated delivery company.

【0046】

The network NW includes, for example, the internet, LAN (Local Area Network), and the public telephone network, but there are no restrictions on a type of communication protocol, moreover, the type or size of the network. In addition, the network NW shall be a concept including a radio communication station and a relay station.

【0047】

The information processing apparatus 20 operates as a server, and the user terminal apparatus 10 and the deliverer terminal apparatus 30 are cellular telephone, a smart phone, or the like operated by a user and a deliverer. The information processing apparatus 20 and the user terminal apparatus 10, and the information processing apparatus 20 and the deliverer terminal apparatus 30 are configured to be communicable via the network NW. A computer for general server or a personal computer or the like can be used as the information processing apparatus 20. In addition, the information processing apparatus 20 can be configured with multiple computers

【0048】

<Hardware configuration>

Fig. 2 (a) is a diagram showing an example of hardware configuration of the information processing apparatus 20. The information processing apparatus 20 includes a communication unit 21, a memory unit 22 and a control unit 23 as hardware configuration.

【0049】

The communication unit 21 executes communication process with the network NW, performs necessary input to operate information processing apparatus 20, and output according to operation results.

【0050】

The memory unit 22 is the HDD, ROM, RAM, or the like, and stores the delivery management program for the present invention and data or the like used when the control unit 23 executes processing based on the program.

【0051】

The control unit 23 includes one or more processors such as CPU or the like, and

controls the entire operation process by executing the delivery management program for the present invention, OS, and other applications. The below functional configuration is achieved by the control unit 23 executing a process based on the delivery management program stored in the memory unit 22.

【0052】

The user terminal apparatus 10, the deliverer terminal apparatus 30, and the operator terminal apparatus 200 are collectively called a terminal apparatus 90. As shown in Fig. 2 (b), the terminal apparatus 90 includes a communication unit 91, a memory unit 92, a control unit 93, an input unit 94, and an output unit 95 as hardware configuration.

【0053】

The communication unit 91 of the terminal apparatus 90 controls communication with a network. The memory unit 92 of the terminal apparatus 90 is HDD, ROM, RAM, or the like, and stores data or the like used when the control unit 93 executes a process based on the program. The control unit 93 includes one or more processors such as CPU or the like, and controls the entire operation process of the terminal apparatus 90. The input unit 94 of the terminal apparatus 90 is a touch panel, a mouse, and a keyboard, enters an operation request by a user into the control unit 93. The output unit 95 of the terminal apparatus 90 is a display or the like, and displays a process result of the control unit 93 or the like.

【0054】

<Functional configuration>

As shown in Fig 2 (a), the information processing apparatus 20 includes a reception unit 231, a delivery management unit 232, a prediction unit 233, a remaining amount management unit 234, a refund processing unit 235, an emergency response request unit

236, and a database as functional configuration. This is specifically achieved by hardware (the control unit or the like) of an information processing by software.

【0055】

<User base>

An example of the user facility located at the user base 1 is illustrated using Fig. 3-6.

【0056】

<Weight measurement apparatus 11a>

Fig. 3 is shown to explain about the user facility that measures weight. At the user facility shown in Fig. 3, LP gas consumption at the user base 1 is measured with a weight scale (a weight measurement unit 112) equipped with the measurement apparatus 11 (a weight measurement apparatus 11a). The user facility has the gas container GB on the weight measurement apparatus 11a that measures weight and can transmit the weight as the measurement data. The illustrative example shows an example where a single gas container is installed, but two or more gas containers may be configured to be installed. In that case, it is can also be configured to measure the total weight of multiple tanks collectively, and to transmit the total weight data, but in order to accurately manage the remaining amount of gas, it is desirable to be configured that the weight of gas container is measured one by one, and each measurement data of the gas container is transmitted. The weight measurement apparatus 11a furthermore includes a gas leak sensor 14, and is configured to be communicable with the communication device 12 connected with the network NW. LP gas is supplied to consumption equipment such as a gas stove or the like via a regulator 15 and a gas cutoff device 13

【0057】

Fig. 4 is a functional diagram of the weight measurement apparatus 11a. The weight measurement unit 112 measures the weight of the gas container GB and passes the measurement data to the control unit 110. The control unit 110 transmits the measurement data to the management system 2 via the communication unit 111. At this time, the control unit 110 transmits the type of measurement data, measurement date and time, and measurement apparatus identification information registered in memory which is not shown, to the management system 2 in association with the measurement data. The measurement apparatus identification information is information used to identify the user base 1. It may be configured to store user identification information in memory of the measurement apparatus 11, instead of the measurement apparatus identification information, and to transmit it to the management system 2 in association with the measurement data. Note that, this identification information is configured to be displayed by a character string or a code at the exterior of the measurement apparatus 11, and to be providable to a deliverer.

【0058】

LP gas supplied from the gas container GB is supplied to the consumption device via a gas pressure regulator (the regulator 15). Because gas pressure in the gas container is high, normally, gas pressure is reduced to a predetermined pressure with the regulator 15. There is a case where a gas pressure measurement device 16 is installed in the interior of the regulator 15 or on the supply route. The gas pressure measurement device 16 measures gas pressure of the gas container 14a. The gas pressure measurement device 16 passes the measurement data of gas pressure to the control unit 110, and the control unit 110 transmits the measurement data to the management system 2 via the communication unit 111. At this time, as with the transmission of the measurement data, information for

identifying a user is added.

【0059】

If the gas leak sensor 14 detects gas leak, it transmits a request to drive the gas cutoff device 13 to the control unit 110, and the control unit 110 drives the gas cutoff device 13 to cut off the gas. Note that, in the illustrative example, the gas leak sensor 14 is connected with the control unit 110, but informs a gas cutoff control unit which is not shown, and the gas cutoff control unit may be configured to drive the gas cutoff device 13. Note that, the gas leak sensor 14 may be embedded in the communication device 12. Moreover, if the gas leak sensor 14 detects gas leak, the control unit 110 or the gas cutoff control unit may be configured to inform the management system 2. In addition, the control unit 110 or the gas cutoff control unit which is not shown, receives a cutoff request signal from the management system 2, and may drive the gas cutoff device 13. The cutoff request signal may also be transmitted in the case where an unusual signal is received from the weight measurement apparatus 11a or the gas pressure measurement device 16, and gas leaking is determined.

【0060】

Transmitting timing for the measurement data can be define by a combination of conditions, such as when weight (remaining amount) falls below predetermined value, or when predetermined time has passed, or the like. The transmitting timing for the measurement data can be controlled by the control unit 110 and the control program. The measurement data is controlled to be transmitted when the above predetermined conditions are met. In addition, the control unit 110 receives a request from the management system 2, and is configured to be able to transmit current measurement data.

【0061】

In addition, the measurement apparatus 11 may transmit a switching signal to the management system 2 when the measurement data falls below a predetermined threshold that shows remaining amount of the gas container GB is low. Herein, it is preferable that in the case of a single of gas container GB at the user facility, the threshold is set so that there is a little room in the remaining amount of gas (for example, the remaining amount of gas for about 6 days calculated from the average consumption), in the case of two or more gas containers at the user facility, the value of measurement data that the remaining amount of gas of the other gas container GB is considered to be zero is set as threshold. The threshold may be previously set for each measurement apparatus 11, and be transmitted to the measurement apparatus 11 based on gas container data when the gas container was installed.

【0062】

<Flow rate measurement apparatus 11b>

Next, the user facility that measures flow rate and transmits the measurement data are described. The user facility shown in Fig. 5 measures LP gas consumption at the user base 1 with a current meter (a flow rate measurement unit 113) equipped with a flow rate measurement apparatus 11b. LP gas is supplied to the consumption equipment such as the gas stove or the like via the flow rate measurement apparatus 11b, the gas pressure measurement device 16, the regulator 15, and the gas cutoff device 13. In addition, at the user base 1, the gas leak sensor 14 is installed. In addition, the flow rate measurement apparatus 11b is configured to be communicable with the communication device 12 connected with the network NW. The flow rate measurement apparatus 11b may calculate a gas flow rate by calculation, instead of the flow rate measurement unit 16. This calculation may be performed in the control unit 110 of the flow rate measurement

apparatus 11b, in the information processing apparatus 20, or in other processing apparatuses consisting the management system 2.

【0063】

Fig. 6 is a functional block diagram of the flow rate measurement apparatus 11b. The flow rate measurement unit 113 measures the gas flow rate and registers a measurement result in memory which is not shown. Then, the flow rate measurement unit 113 passes the total flow rate to the control unit 110 as the measurement data. The control unit 110 transmits the measurement data to the management system 2 via the communication unit 111. At this time, the control unit 110 corresponds information for identifying a user registered in the memory, which is not shown, and measurement date and time to the measurement data, and transmits the measurement data to the management system 2. Transmitting timing for the measurement data can be defined by a combination of the conditions, such as when the total flow rate (consumption) reaches above predetermined value, or when predetermined time has passed, or the like.

【0064】

As with the user facility shown in Fig. 3 and 4, there is a case where the gas pressure measurement device 16 is installed in the interior of the regulator 15 or on the supply route. The gas pressure measurement device 16 passes the measurement data of gas pressure to the control unit 110, and the control unit 110 transmits the measurement data to the management system 2 via the communication unit 111. At this time, as with the transmission of the measurement data, the information for identifying a user is added.

【0065】

The user facility shown in Fig. 5 includes two gas containers as the gas container GB.

In this case, it is preferable to regard the gas pressure regulator (the regulator 15) as an automatic switching regulator. The automatic switching regulator includes a function that adjusts gas pressure, and automatically switches to the other gas container when the gas container becomes empty. When two gas containers are used one by one and one becomes empty, a manual or automatic switching regulator (the regulator 15) switches to the other gas container.

【0066】

In the user base 1 with two gas container GB shown in Fig. 4, emergency level of replacing the gas container is low because LP gas does not run out before the next gas container becomes empty, even though a single gas container becomes empty. Therefore, in the case that two or more gas containers are set, efficient delivery is possible by simultaneously delivering the gas container when the gas container are empty at other nearby user bases 1, even though one becomes empty. This kind of delivery is possible by managing delivery route management and out-of-gas management in combination.

【0067】

Fig. 7 – 13 are shown to explain about delivery management method using the delivery management system and the processing details by each function configuration element.

【0068】

<Database>

The database includes user information, measurement information, gas container information, delivery base information, deliverer information, deliverer location information, a delivery candidate list, and the delivery list. In the present embodiment, the case is illustrated in which the memory unit 22 functions as the database, but some or

all of information stored in the database may be stored in one or more other storage devices.

【0069】

The user information includes a user name, user contact information (a telephone number and a destination for information transmission), an address of user base 1, the measurement apparatus identification information, location information of the address, delivery base identification information of the delivery base 3 with contractual relationship, and is corresponded with the user identification information that uniquely identifies a user. Herein, the destination for information transmission is, for example, a user's email address, a telephone number for SMS transmission, ID for push notification, ID or the like for transmitting the message from messaging platform (for example, SNS message function or laptop and mobile messaging applications) via API (Application Programming Interface), or the like.

【0070】

The reception unit 231 receives information via the communication unit 21, and stores it in the database. Hereafter, intervention of the reception unit 231 will be omitted to the extent that is not unclear, and the explanation will be given on the assumption that “the information processing apparatus 20” receives and stores in the database.

【0071】

<A reception of measurement data>

The information processing apparatus 20 receives the measurement data from the user base 1, and stores in database as the measurement information. At this time, the

information processing apparatus 20 stores reception date and time in association with the measurement data.

【0072】

The measurement information includes the measurement apparatus identification information of the measurement apparatus that transmits the measurement data, a measurement type that shows the type of measurement data (weight, gas pressure, flow rate), measurement date and time, and date and time received by the management system 2, and is corresponded with a user.

【0073】

<A replacement of the gas container GB>

Fig. 7 is a flowchart for replacing a gas container. A deliverer goes to the user base 1 to replace the gas container GB. The measurement apparatus 11 or the deliverer terminal apparatus 3 transmits deliverer identification information of a deliverer replacing the gas container GB and the measurement apparatus identification information to the information processing apparatus 20 correspondingly, and the replacement of the gas container GB is registered in the information processing apparatus 20.

【0074】

In the present embodiment, a deliverer going to the user base 1, at step S701, displays a gas container replacement screen using the deliverer terminal apparatus 30, and enters the measurement apparatus identification information on the gas container replacement screen. Then, at step S702, the deliverer terminal apparatus 30 transmits the deliverer identification information and the measurement apparatus identification information to the information processing apparatus 20 correspondingly as a request to start an exchange.

In addition, at this time, the gas container type of replaced gas container GB is registered.

【0075】

The measurement apparatus identification information, in the present embodiment, is displayed at the exterior of the measurement apparatus 11 as 2-dimension code, and a deliverer executes the code reading means that can be activated on the gas container replacement screen, reads the measurement apparatus identification information from 2-dimension code, and enters it into the gas container replacement screen.

【0076】

Herein, in the present embodiment, the deliverer terminal apparatus 30 obtains the measurement apparatus identification information from code, but, for example, the measurement apparatus 11 may pass the measurement apparatus identification information to the deliverer terminal apparatus 30, communicating the deliverer terminal apparatus 30 by Bluetooth (registered trademark) or NFC (Near Field Communication) or the like. In addition, the request to start an exchange is transmitted from the deliverer terminal apparatus 30, but may be transmitted from the measurement apparatus 11. By any of the above method, by passing the deliverer identification information from the deliverer terminal apparatus 30 to the measurement apparatus, the request to start an exchange may be transmitted from the measurement apparatus 11 to the management system (the information processing apparatus 20).

【0077】

The information processing apparatus 20 receiving the request to start an exchange, at step S703, requests transmission of measurement data to the measurement apparatus 11. Herein, if the measurement apparatus 11 is the weight measurement apparatus 11a, the

information processing apparatus 20 requests transmission of current weight of the gas container as the measurement data as the amount after use. if the measurement apparatus 11 is the flow rate measurement apparatus 11b, the information processing apparatus 20 requests transmission of the total flow rate so far as the measurement data as usage amount.

【0078】

At step S704, the measurement apparatus 11 obtains the measurement data, and at step S705, transmits the measurement data to the information processing apparatus 20. At step S706, the information processing apparatus 20 stores the received measurement data. At step S707, the information processing apparatus 20 notifies a completion of the measurement data acquisition to the deliverer terminal apparatus 20 that has transmitted the request to start an exchange. Note that, at this time, the information processing apparatus 20 may notify the deliverer terminal apparatus 30 of the possibilities of measurement errors, irregularities, or malfunctions or the like, if the weight has increased or the flow rate has decreased compared to the measurement data that has been obtained so far.

【0079】

At step S708, a deliverer replaces a used gas container GB that was installed with a new gas container GB. Then, the deliverer transmits the deliverer identification information and the measurement information identification information to the information processing apparatus 20 correspondingly as a request for replacement. Note that, as with the request to start exchange, the request for replacement may also be transmitted from the measurement apparatus 11.

【0080】

Herein, if the measurement apparatus 11 is the weight measurement apparatus 11a, go to step S701, the information processing apparatus 20 requests transmission of the measurement data about the new gas container GB that was replaced. At step S711, the weight measurement apparatus 11a measures weight as initial amount, and at step S712, transmits the measurement data to the information processing apparatus 20. At step S713, the information processing apparatus 20 registers the gas container data in the database regarding the received measurement data as initial amount of the gas container GB after replacement.

【0081】

Herein, if the measurement apparatus 11 is the flow rate measurement apparatus 11b, go to step S714, the information processing apparatus 20 transmits a request to reset the total flow rate to the flow rate measurement apparatus 11b. At step S715, the flow rate measurement apparatus 11b resets the total flow rate registered in memory which is not shown, and at step S715, transmits a reset completion notification to the information processing apparatus 20.

Then, at step S717, the information processing apparatus 20 notifies an exchange completion to the deliverer terminal apparatus 30, and replacement of the gas container GB is completed.

【0082】

<Registration of the gas container information>

When the replacement of the gas container GB by a deliverer is performed, the gas container data is registered. The gas container data is data that is corresponded to a user by means of the user identification information or the measurement apparatus identification information, and includes gas container identification information, initial

amount of the gas container GB, a gas container type, pre-exchange gas container data identification information, the deliverer identification information that installed the gas container, installation date and time, remaining amount, the deliverer identification information that collected the gas container, and collection date and time. Note that, the initial amount does not necessarily need to be stored for each user, as in the present embodiment, because the initial amount is information for calculating the refund amount described below. For example, the type of gas container GB delivered to the user base 1 is stored in association with a user, and furthermore, the weight and capacity corresponding to the initial amount may be configured to be registered for each type of this gas container. Alternatively, if the remaining amount of the gas container GB installed at the user base 1 can be obtained directly from the measurement data, no initial amount is required. Namely, if the remaining amount of LP gas can be calculated or estimated from the received gas pressure or the weight, no initial amount is required. For example, if the database stores the weight of the gas container GB alone, the remaining amount may be determined from the weight of the gas container GB at the time of collection and the weight of the container alone.

【0083】

<Gas container data of installed gas container> In the present embodiment, the information processing apparatus 20 receives the request to start exchange at step S702, then issues new gas container identification information, and registers the initial amount of the gas container GB, the gas container type, the pre-exchange gas container data identification information, the deliverer identification information that installed the gas container, the installation date (the delivery completion date) in the database.

【0084】

The database stores a gas container master. The gas container master includes, for each the gas container GB type, the weight and capacity of the gas container GB when fully filled with LP gas, the weight of the gas container when LP gas is empty, and a gas container GB usage fee. In the present embodiment, it is assumed that the usage fee includes the cost of installation and collection, but these may be determined based on other data.

【0085】

Herein, when the measurement apparatus 11 is the weight measurement apparatus 11a, the initial amount is the weight obtained at step S711. When the measurement apparatus 11 is the flow rate measurement apparatus 11b, the capacity is determined as the initial amount from the gas container master and the gas container type of gas container GB to be replaced that is transmitted from the deliverer terminal apparatus 30 at step S702. When the measurement apparatus 11 is the weight measurement apparatus 11a, the weight may be determined as the initial amount based on the gas container master and the gas container type of gas container GB to be installed.

【0086】

As pre-exchange gas container data identification information, for example, identification information of the gas container data that has not been entered can be entered such as “deliverer identification information that collected the gas container” or “collection date and time”, or the like out of the gas container about a user stored in database (in the present embodiment, determined by the user identification information and the measurement apparatus identification information). The deliverer identification information that installed the gas container is the deliverer identification information transmitted at step S702 or the like.

【0087】

The remaining amount management unit 234 calculates the remaining amount of LP gas in the gas container GB based on the initial amount, and the usage amount or the amount of after use, and registers in gas capacity data. This usage amount and the amount of after use are calculated at least based on the measurement data transmitted from the measurement apparatus 11 after the request to start an exchange. Preferably, the remaining amount may be calculated every when the measurement apparatus 11 transmits the measurement data at the predetermined transmission timing, and be registered in the gas container data. This allows the remaining amount of LP gas in the user base 1 at a certain point in time to be grasped, and to be used for adding to the delivery list described below or the like.

【0088】

<Gas container data of collected gas container>

Furthermore, the remaining amount (the collection amount), “deliverer identification information that collected the gas container”, and the collection date and time are entered according to the gas container data of a collected gas container. The remaining amount management unit 234 calculates the remaining amount (the collection amount) based on the measurement data transmitted from the measurement apparatus 11 after the request to start an exchange at step S702. “Deliverer identification information that collected the gas container” is the delivery identification information transmitted at step S702 or the like.

【0089】

In the present embodiment, the remaining amount management 234 determines the

remaining amount of LP gas based on the initial amount of gas container data about the pre-exchange gas container GB and the measurement data (the weight or the total flow rate of the pre-exchange gas container) obtained at step S706, and registers in the collected gas container data.

【0090】

More specifically, if the remaining amount is calculated based on the weight, the remaining amount management unit 234 obtains the weight of gas container used in the user facility from the weight measurement apparatus 11a, and calculates the LP gas consumption based on the initial amount and the obtained weight. Furthermore, the consumption is subtracted from the weight of gas filled in the gas container stored in the gas container master, and the remaining amount that is the weight of unused LP gas is calculated. Alternatively, the remaining amount may be calculated from the obtained weight and the weight when the gas container is empty stored in the gas container master

【0091】

If the remaining amount is calculated based on the flow rate, the remaining amount management unit 234 obtains the total flow rate of the gas container used in the user facility from the flow rate measurement apparatus 11b, and calculates the remaining amount of LP gas based on the initial amount and the obtained total flow rate.

【0092】

<Determination of the refund amount to a user>

The refund processing unit 235 calculates the refund amount to a user based on the initial amount, and usage amount or the amount of after use. In the present embodiment, the refund processing unit 235 calculates the refund amount based on the remaining

amount that the remaining amount management unit 234 has calculated when the gas container GB is collected. The calculated refund amount is registered in association with a user as refund amount data, and when the refund amount is used (when appropriated to settlement), may be corresponded to what was used for and date of use. In the present embodiment, the refund amount data includes refund amount data identification information, the user identification information (or the measurement apparatus identification information), a refund amount, and refund amount based on the amount of refund.

【0093】

The refund amount, in the present embodiment, is a purchase cost of a newly installed gas container, or is financial refund amount for usage fee of the collected gas container. Alternatively, the refund amount may be given to a user as electronic money or point. Alternatively, the refund amount may be the refund amount that will be refunded due to an increase in the capacity of the next gas container purchased

【0094】

The refund processing unit 235 stores payment information of each user in database. The payment information for a user is generated, when the type of gas container GB in the user base 1 is installed. The payment information, for example, includes the usage fee of the gas container GB determined by an installed gas container GB, the refund amount used for the usage fee, invoice amount calculated from the usage fee and the refund amount, and payment data identifying payment for this invoice amount. In the present embodiment, the payment information includes payment identification information, the gas container data identification information, the refund amount data identification information, invoice amount that is obtained by subtracting the refund amount from the

usage fee, and the payment data. The refund processing unit 235 determines invoice amount that is the cashless amount of payment for a user based on the usage fee and the refund amount.

【0095】

It is assumed that the payment of the refund amount and the usage fee is made in cashless mode based on the refund amount calculation, but the payment may be non-cashless depending on a user's situation. However, the cashless payment reduces complicated fee exchange, and also contributes greatly to delivery efficiency by reducing exchange time or the like. In the present embodiment, information about the cashless payment or other payment method is register as the payment data. The payment data is generated by a payment system included in the delivery management system 0 or by an external payment system, and is information passed to the information processing apparatus 20.

【0096】

<Delivery management>

The database stores the delivery base information.

The delivery base information includes the delivery base identification information that uniquely identifies the delivery base 3, a name of the delivery base 3, a telephone number, an address, location information of the address.

In addition, the deliverer information includes the deliverer identification information, a name of the deliverer, deliverer contact information (a telephone number and a destination for information transmission), is corresponded to the delivery base identification information that uniquely identifies the delivery base 3 which the deliverer belongs

【0097】

Fig. 8, Fig. 9 are flowcharts showing a method for making the delivery list. The information processing apparatus 20 calculates a date that is an exchange threshold for each user base 1 (hereinafter, referred to as a processing date) based on the delivery completion date and the measurement data for each user base 1, and executes each process to deliver a new gas container GB before LP gas runs out completely.

【0098】

The prediction unit 233 predicts the processing date of the gas container GB at each user base 1 based on the delivery completion date stored in database. Then, a corresponding user is added to the delivery candidate list. In the present embodiment, the prediction unit 233 analyzes LP gas consumption trend at each user facility based on the delivery completion date, the initial amount, and the measurement data and/or the remaining amount, and predicts the processing date of each user. Then, the user is added to the delivery candidate list.

【0099】

<Delivery candidate lists>

Fig. 10 (a) is a diagram showing an example of a configuration information of the delivery candidate list. In addition, Fig. 10 (b) is a diagram showing an example of a detailed information of the delivery candidate list. The configuration information includes identification information of the delivery candidate list, the processing date, a desired confirmation date, a desired confirmation flag (already done/not yet done), and start and end date of a desired delivery date. The detailed information includes the identification information of the delivery candidate list, the user identification information, the delivery

base identification information, a response flag (received/not yet), a responded desired delivery date, a desired time frame, and a reception date and time of a response.

【O100】

In the present embodiment, the delivery candidate list, as shown as the configuration information, is a list generated for each the processing date, and presents the desired delivery date and time to a user on the desired confirmation date to be set based on the processing date or the like. The desired delivery date and time is presented as a choice of multiple dates during a specified period as the start and end date. In addition, the time frame is also presented together with the desired delivery date. The desired time frame is presented as multiple candidates such as, for example, (1) 8 - 12 p.m., (2) 13 - 15 p.m., (3) 15 - 17 p.m., (4) 17 - 20 p.m. or the like, and a user selects the desired time frame from here.

【O101】

The delivery list can include multiple delivery candidate (user). As shown in the detailed information, the delivery candidate list can include a user, the delivery base that a user has contracted with, and status and content of a response, or the like on the desired delivery date.

【O102】

At step S801 in Fig. 8, the prediction unit 233 calculates the processing date for a user whose remaining amount of LP gas meets predetermined conditions. That the remaining amount of LP gas meets predetermined conditions is, for example, a case that a predicted available period becomes less than N days, or a case that the remaining amount falls below a predetermined rate of an initial amount.

【O103】

At step S802, the prediction unit 233 predicts LP gas consumption speed from the initial amount retrieved at step S801 and the received measurement data, or the like, and calculates the processing date that the remaining amount of LP gas reaches a predetermined exchange threshold from current remaining amount. Then, each user is added to the delivery candidate list of each processing date. If the prediction unit 233 has completed the processing for all retrieved gas container data (YES at step S803), go to step S804.

【O104】

Herein, a user who uses the gas container GB receiving the switching signal, because of high priority of replacement, is added to first delivery candidate list (for example, the delivery candidate list with today's or next day's confirmation of preferences or the like), which includes the same delivery base and delivery area (step S805). If a user at the user facility receiving the switching signal has already been added to other delivery candidate list, the user is removed from the other delivery candidate list. Note that at step S803, when addition to the delivery candidate list is completed, a user with the same attributes (the same delivery base identification information and delivery area) may be configured to be aggregated to one or more sheets based on the delivery base and the delivery area corresponded to the user added to the delivery candidate list. This allows a user with a common area to be added to the same delivery candidate list, and delivery can be more efficient.

【O105】

Note that, for example, the prediction unit 233 adds a user to the delivery candidate list

based on the processing date, but may remove or may not add the user whose the remaining amount of the gas container GB is a predetermined amount, in other words a user who used less LP gas than predicted, out of users who have been added to the delivery candidate list, or a user who is attempted to be added to the delivery candidate list.

【O106】

In Southeast Asia countries or the like, the gas container can be installed indoors such as a kitchen or the like (for example, under a sink or the like). Hence, because it is necessary to enter the house to replace the gas container, user's presence or agreement can be necessary. At step S806, the delivery management unit 232 presents the candidate date to a user who becomes the delivery candidate on the desired confirmation date.

【O107】

The delivery management unit 232 presents multiple candidate dates that a user can be present to the user terminal apparatus 10 of a user who is set as the delivery candidate, and the reception unit 231 receives a combination of date and time frame as the desired delivery date and time from the user terminal apparatus 10. The presentation and reception of the candidate date may be executed by transmitting URL (Uniform Resource Locator) of form to enter the candidate date and time to a destination for information transmission. It may also be transmitted using SMS addressed to a telephone number. In addition, it may be executed by transmitting and receiving a message via messaging platform. In addition, it may be presented orally by an operator or by automated voice over the telephone. When the reception unit 231 receives the candidate date, it sets the response flag in the detailed information of the delivery candidate list to responded, and adds the desired delivery date, the desired date, the desired time frame,

and the reception date and time of response.

【0108】

<Creation of the delivery list>

Fig. 10 (c) is a diagram showing an example of the configuration information of the delivery list. In addition, Fig. 10 (d) is a diagram of an example of the detailed information of the delivery list. The configuration information includes identification information of the delivery list, identification information of the delivery base in charge of delivery, the delivery date. The detailed information includes the identification information of the delivery list, the user identification information, the desired time frame of delivery, the delivery area, delivery status, and the processing date and time when the delivery status was changed.

【0109】

The delivery management unit 232 generates the delivery list, and adds a user to the delivery schedule list for delivery on the desired delivery date. The user is added to the detailed information of the delivery list (delivery schedule list) that is unconfirmed based on the delivery area corresponded to a user and the received desired delivery date. In the present embodiment, according to the configuration information, the delivery list is generated for each combination of the delivery base and the delivery area. Note that, for example, the delivery list may be generated for each the delivery date and the delivery base.

【0110】

At step S901, a user who has responded the desired delivery date and time (YES at step S901) is added to the delivery list with the desired delivery date and time as the delivery

date (step S902). Herein, the delivery list is confirmed to a day before the delivery date or the like (step S903), and may be configured not to be added to a delivery destination (user base 1) of the delivery list, or the like after confirmed.

【O111】

On the other hand, at step S904, a user who has not responded to the desired delivery date and time by a response deadline (YES at step S904), for example, is added to the delivery list with next day after as the delivery date (step S905). Herein, for example, the user who has not responded (delivery area ID : 4, delivery base : 3000001) may be added to the unconfirmed delivery list where the delivery base 3 (3000001) is the delivery list for delivery area ID (4). Alternatively, the user who has not responded may be configured to be added to a candidate list for redelivery

【O112】

The database stores a geographical arrangement of the delivery area, and the delivery management unit 232 may integrate multiple delivery lists. Alternatively, if the delivery list is not distinguished by the delivery area, the delivery list may be divided according to the delivery area of the user base 1 included in the delivery list. Alternatively, a user included in a delivery list may be moved to other delivery list or the delivery list may be divided, using the location information of the user base 1 in addition to or instead of the delivery area.

【O113】

At step S906, the delivery management unit 232 makes the delivery route information based on the delivery list. The delivery management unit 232 determines a delivery route by calculation method of the existing delivery planning problem or machine learning

based on the number of user base 1, the desired time frame, and the location information of the user base 1 included in the delivery list. Then, at step S907, the delivery management 232 transmits the delivery list and the delivery route to at least one delivery terminal apparatus 30 that belongs to each delivery base 3.

【O114】

A delivery person of the delivery base 3 delivers the gas containers GB filled with LP gas to each user base 1 in order based on the delivery list and the delivery route. If the delivery management unit 232 does not generate the delivery route, a deliverer determines the delivery route based on the delivery list transmitted to each delivery base 3. The delivery list can be divided, be integrated, or move a user in the delivery base 3.

【O115】

Each delivery base 3 is corresponded to the delivery identification information for each user base 1 that is the delivery destination or for each delivery list, using the delivery terminal apparatus 30. In addition, a work schedule of a deliverer is registered in the database, and the delivery management unit 232 can also add the delivery identification information to the configuration information of the delivery list, and generate the delivery list for each deliverer.

【O116】

When the deliverer identification information is corresponded to, on the individual deliverer's deliverer terminal apparatus 30, the delivery list to be made by the own deliverer is displayed, and the delivery status for the individual user base 1 in the delivery list can be entered. The delivery status is, for example, "Before Delivery", "Delivery Complete", "Absence", or the like. When the delivery status is entered on the deliverer

terminal apparatus 30, the reception unit 231 changes the delivery status in the detailed information of the delivery list, and adds its processing date and time to the detailed information.

【O117】

<Emergency response>

The deliverer terminal apparatus 30 is configured to be able to upload its own location to the information processing apparatus 20 at each predetermined time or the like. When the reception unit 231 receives the location information from the deliverer terminal apparatus 30, it corresponds the deliverer identification information, the location information, and its receiving time, and stores in database as the deliverer location information.

【O118】

<Creation of emergency information>

Fig. 11 is used to explain about a flowchart for the creation of emergency information. Step S1101 to S1106 are processing procedures when the measurement apparatus 11 of the user base 1 detects an abnormality, and step S1111 to step S1116 are processing procedures when the information processing apparatus 20 detects an abnormality.

【O119】

If the measurement apparatus 11 of Fig. 11 detects an abnormality, first, at step S1101, if the gas leak sensor 14 detects an abnormality at the user base 1, at step S1102, the control unit 110 drives the gas cutoff device 13 to cutoff the gas. In addition, at step S1103, warning sound is reported from the measurement apparatus 11. At step S1104, the gas leak sensor 14 detecting an abnormality reports it to the information processing apparatus

20. Specifically, the control unit 110 of the measurement apparatus 110 or the gas leak sensor 14 transmits a warning signal to the information processing apparatus 20. At this time, the measurement apparatus identification information is corresponded to the warning signal, so that it is possible to determine which user base 1 the notification is coming from.

【0120】

At step S1105, the emergency response request unit 236 generates the emergency information and registers it in the database. The emergency information includes emergency identification information, the user identification information (or the measurement apparatus identification information), occurrence date and time, operator identification information, emergency status, the deliverer identification information of a deliverer who rushes to the site, and response date and time. At step S1105, at least, the emergency information, the user identification (the measurement apparatus identification information), and the occurrence date and time are entered. The emergency status is set to, for example, “Not Responded”, “Deliver Dispatched”, or “Completed”, or the like.

【0121】

In addition, at step S1106, the emergency response request unit 236 notifies the user terminal apparatus 10 of an abnormal situation. The notification may be performed by transmitting a message or the like to a destination in the user information. It may also be transmitted using SMS with a telephone number as the destination. In addition, it may be performed by transmitting a message via messaging platform. Instead of or in addition to this, operator or automated voice calls may also be made, and it may be notified orally by an operator or by automated voice over the telephone.

【0122】

On the other hand, if the information processing apparatus 20 detects an abnormality, first, at step S1111, the emergency response request unit 236 detects an abnormality. The case of detecting an abnormality is, for example, when the measurement data received from the measurement apparatus 11 shows abnormal value, more specifically, when gas pressure received as the measurement data exceeds a threshold, or if weight received as the measurement data exceeds a threshold (for example, when weight reaches 0 or the like), or the like, the emergency response request unit 236 detects an abnormality.

【O123】

At step S1111, when the emergency response request unit 236 detects an abnormality, at step S1112, the emergency response request unit 236 generates emergency information and registers it in the database. Then, at step S1113, a gas cutoff request signal is transmitted to the measurement apparatus 11 of the user base 1 based on the measurement apparatus identification information of the measurement apparatus 11 detecting an abnormality.

【O124】

When the measurement apparatus 11 receives the gas cutoff request signal, at step S1114, the control unit 110 drives the gas cutoff device 13 to cutoff the gas. In addition, at step S1115, the warning sound is reported from the measurement apparatus 11. In addition, at step S1116, the emergency response request unit 236 notifies the user terminal apparatus 10 of an abnormal situation.

【O125】

<Arrangement for emergency responding deliverer >

Fig. 12 is a flowchart for asking deliverer to rush to a site. The emergency response

request unit 236 determines a deliverer to rush to a site based on the location of the deliverer terminal apparatus 30.

【0126】

At step S1201, when the emergency information that has not been responded to is registered, information is displayed on the operator terminal apparatus 200 based on the emergency information. Note that, in the present embodiment, the emergency status determines whether or not the emergency information has not been responded. At step S1202, the emergency response request unit 236 obtains the location of the user base 1 of an express destination. In the present embodiment, the address and/or the location information included in the user information are obtained from information that identifies a user corresponded to the emergency information (the user identification information)

【0127】

At step S1203, the emergency request unit 236 retrieves a deliverer (deliverer terminal apparatus 30) in vicinity of the user base 1 from the location of the user base 1 obtained at step S1202 and the deliverer location information stored in database. At this time, the search targets are not only a deliverer belonging to the delivery base 3 contracted by a user, but also a deliverer belonging to the delivery base 3 other than the one to which a user belongs ~~the delivery base 3 contracted by a user~~. Herein, for example, a deliverer who is within predetermined distance from the location of the user base 1 is searched, and as the result of retrieving, the prior order may be prioritized in order of proximity to the user base 1. Note that, the priority may be obtained simply by comparing distances, or a score may be calculated by, for example, multiplying distance by a distance coefficient and further multiplying by an affiliation coefficient in the case of a deliverer belonging to the delivery base 3 contracted by a user, or the like, and the order may be determined

based on the score.

【O128】

When the emergency response request unit 236 determines a deliverer to request, it transmits the location or the user identification information of the user facility, and the telephone number or the deliverer identification information of the deliverer to request. In the present embodiment, at step S1204, the emergency response request unit 236 transmits one or more deliverers out of nearby deliverers obtained as the result of the search to the operator terminal apparatus 200 as a deliverer who is a candidate to request to rush to a site. At this time, the location information, the name, the affiliation, the telephone number or the like of the deliverer are transmitted together to the operator terminal apparatus 200. Note that, the user identification information and the deliverer identification information are transmitted to the operator terminal apparatus 200, and information of the telephone number or the like may be obtained by requesting from the operator terminal apparatus 200 to the database. Then, at step S1205, an operator calls a deliverer based on the information that the operator terminal apparatus 200 has received, and requests the deliverer to rush to a site.

【O129】

Fig.13 is an example of screen in the operator terminal apparatus 200. The operator screen W13 includes user information display section W131, delivery information display section W132, request complete button W133, map display section W134, next page button W135, and previous page button W136. In the user information display section W131, user's name, an address, a telephone number, or the like are displayed as information about a user (the user base 1). In the deliverer information display section W132, deliverer's name, a telephone number, or the like are displayed as information of

deliverer received from the emergency request unit 236. An operator calls a deliverer based on the information displayed on the deliverer information display section W132, and requests to rush to a site. If the operator can request to rush to a site, by pushing the request complete button W133, the emergency response request unit 236 corresponds the deliverer identification information to the emergency information, and changes the emergency status to “Deliverer Dispatched”.

【O130】

In the map display section W134, the location information of a deliverer displayed on the deliverer information display section W132 and the user base 1 are displayed on a map. In addition, the next page button W135 and previous page button W136 are buttons to switch the list of deliverers when there are multiple deliverers who can be contacted.

【O131】

Note that, herein, in the present embodiment, although the operator requests to rush to a site by calling a deliverer, this may be, for example, a call made by IP telephony function configured to be available from the operator terminal apparatus 200. Alternatively, calls may be configured to be made sequentially by rank of deliverers retrieved by automated voice.

【O132】

In addition to or instead of over-the-phone calls, information is transmitted to the deliverer terminal apparatus 30 of one or more deliverers retrieved at step S1203, and an operator may request to rush to a site. At this time, when the emergency response request unit 236 determines the deliverer to request, it transmits the location of the user base 1 of the express destination or the user identification information to the destination of the

deliverer. The deliverer terminal apparatus 30 receiving the user identification information may request the information about the location of the user base 1 based on it from the information processing apparatus 20, and may receive it. In addition, the emergency response request unit 236 may be configured to be able to receive notification to rush to a site from the deliverer terminal apparatus 30 of a deliverer, and corresponds the deliverer identification information to emergency information by receiving this, and may change the emergency status to “Deliverer Dispatched”. Note that, transmitted information may have address of an express destination, user’s name, a telephone number or the like, the user base 1 and/or user’s information of an express destination.

【O133】

In addition, although the gas cutoff device 13 and the gas leak sensor 14 are listed earlier as an element of the present system, even if the present system does not have these, to perform basic function such as not running out of gas and refunding charges based on gas usage, although the gas cutoff device 13 and the gas leak sensor 14 are not necessary configuration elements, these should be configured within the system for safety reasons.

Reference Signs List

【O134】

- 0 : delivery management system
- 1 : user base
- 2 : management system
- 3、3a、3b : delivery base
- 3a1、3a2、3an : deliverer terminal apparatus
- 10 : user terminal apparatus

11 : measurement apparatus

11a : weight measurement apparatus

11b : flow rate measurement apparatus

12 : communication device

13 : gas cutoff device

14 : sensor

14a : gas container

15 : regulator

16 : gas pressure measurement device

20 : information processing apparatus

21 : communication unit

22 : memory unit

23 : control unit

30 : deliverer terminal apparatus

90 : terminal apparatus

91 : communication unit

92 : memory unit

93 : control unit

94 : input unit

95 : output unit

110 : control unit

111 : communication unit

112 : weight measurement unit

113 : flow rate measurement unit

200 : operator terminal apparatus

231 : reception unit

232 : delivery management unit

233 : prediction unit

234 : remaining amount management unit

235 : refund processing unit

236 : emergency response request unit

GB : gas container

NW : network

W13 : operator screen

W131 : user information display section

W132 : deliverer information display section

W133 : request complete button

W134 : map display section

W135 : next page button

W136 : previous page button

CLAIMS

1.

A delivery management system managing delivery of a gas container to a user who uses portable gas fuel enclosed in the gas container,

the delivery management system

stores the user and a delivery completion date in database correspondingly to register delivery of a gas container to a user facility,

obtains usage amount or the amount of after use of a gas container used in the user facility,

calculates refund amount to the user based on the usage or the amount of after use.

2.

The delivery management system according to claim 1,

the delivery management system comprising:

a measurement apparatus for measuring the usage amount or the amount of after use; an information processing apparatus; and a deliverer terminal apparatus used by a deliverer,

wherein measurement apparatus identification information is stored in the database in association with user identification information,

the measurement apparatus or the deliverer terminal apparatus transmits deliverer identification information of a deliverer replacing the gas container, and the measurement apparatus identification information to the information processing apparatus in association,

the information processing apparatus stores the delivery completion date for an eligible user facility in the database in association with the user based on received the measurement apparatus identification information and the deliverer identification information.

3.

The delivery management system according to claim 2,
wherein the measurement apparatus is a weight measurement apparatus capable of measuring weight as the amount of after use,
the delivery management system obtains the weight of a gas container used at a user facility, and calculates the refund amount based on the weight, and the weight of the gas container alone or the weight of gas filled in the gas container.

4.

The delivery management system according to claim 2,
wherein the measurement apparatus is a flow rate measurement apparatus capable of measuring flow rate as the usage amount,
the delivery management system obtains flow rate of a gas container used in a gas container at a user facility, and calculates the refund amount based on the flow rate.

5.

The delivery management system according to any one of claim 2 to 4,
the delivery management system located at a user base, and comprising a gas leak sensor capable of communicating with the information processing apparatus,

wherein the database stores user information including the location of a user facility,
and corresponded to the user identification information,

the deliverer terminal apparatus transmits its own location to the information processing
apparatus,

the gas leak sensor reports to the information processing apparatus when detecting an
abnormality,

the information processing apparatus receiving the report determines a deliverer to rush
to a site based on the location of the deliverer terminal apparatus.

6.

The delivery management system according to claim 5,

the delivery management system comprising an operator terminal apparatus capable of
communicating with the information processing apparatus,

wherein the database stores a telephone number of the deliverer terminal apparatus as
deliverer contact information,

the information processing apparatus transmits user identification information or the
location of the user facility where a gas leak sensor that has reported are located, and a
telephone number or deliverer identification information of the deliverer to request to the
operator terminal apparatus when determining the deliverer to request.

7.

The delivery management system according to any one of claim 5 or 6,

wherein the database stores a destination for information transmission to the deliverer
terminal apparatus as deliverer contact information,

the information processing apparatus transmits user identification information or the location of the user facility where a gas leak sensor that has reported are located to the destination when determining the deliverer to request.

8.

The delivery management system according to any one of claim 6 or 7,
wherein the database stores a destination or a telephone number for information transmission to the user terminal apparatus as user contact information,
the information processing apparatus receiving the report transmits the user contact information to an operator terminal apparatus or reports to the user terminal apparatus using the user contact information.

9.

The delivery management system according to any one of claim 5 to 8,
wherein the user is stored in the database in association with a deliverer who made a contract for delivery of the gas container,
the information processing apparatus determines the deliverer to request out of deliverers including a deliverer those who are not in a contractual relationship with a user of an express destination.

10.

The delivery management system according to any one of claim 1 to 9,
wherein the information processing apparatus is configured to be able to communicate with a user terminal apparatus,

sets an appropriate user to delivery candidate list based on past delivery completion date stored in association with the user,

presents multiple candidate dates and times to the user terminal apparatus of a user set to the delivery candidate, and receives a desired delivery date from the user terminal apparatus,

adds the user to a delivery schedule list for delivery on the desired delivery date.

11. The delivery management system according to claim 10,

wherein in the database, delivery areas are set in association with each user,

the information apparatus presents multiple dates and time frames as the multiple candidate dates to a user terminal apparatus of the user added to the delivery candidate list,

receives a combination of the date and the time frame as the desired delivery from the user terminal apparatus date,

adds the user to a delivery schedule list based on the delivery area corresponded to a user and received the desired delivery date.

12. The delivery management system according to any one of claim 10 or 11 citing any one of claim 2 to 4,

wherein receives a measurement result of the gas container from the measurement apparatus,

deletes the user from the delivery candidate list who has a predetermined remaining amount of gas in the gas container out of the users added to the delivery candidate list.

13. A delivery management method managing delivery of a gas container to a user who uses portable gas fuel enclosed in the gas container,

the delivery management system executes:

a step for storing the user and a delivery completion date in database correspondingly to register delivery of a gas container to a user facility;

a step for obtaining usage amount or the amount of after use of a gas container used in the user facility;

a step for calculating refund amount to the user based on the usage or the amount of after use.

14. The delivery management method according to claim 13, The delivery management system, furthermore, executes a step for determining the amount of payment of cashless payment to the user based on the refund amount.