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(54) **Title**: DEVICE FOR STORING PARCELS, DEVICE FOR OPERATING A LOCK IN A DEVICE FOR STORING PARCELS, MOBILE ELECTRONIC DEVICE FOR OPERATING A DEVICE FOR STORING PARCELS, SYSTEM AND METHOD FOR DELIVERING PARCELS USING SAID DEVICES

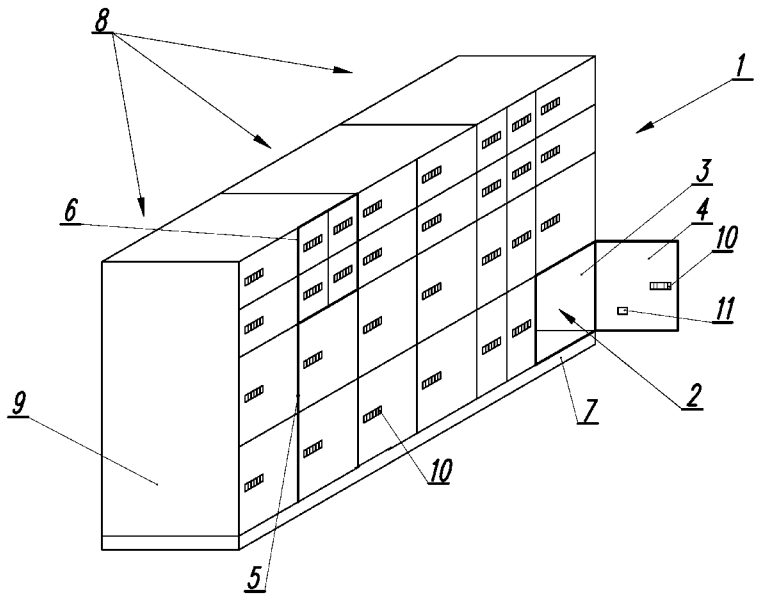


Fig. 1

(57) **Abstract**: A device for storing parcels, a device for operating a lock in a device for storing parcels, a mobile electronic device for operating a device for storing parcels, a system and a method for delivering parcels which use such devices. The invention is applicable especially in postal services, courier services, particularly in connection with e-commerce services, e.g. on-line shops where it is desirable to be able to receive/send a parcel at any time to/by a global customer. The device (1) for storing parcels, comprising at least two storage receptacles (2) with doors (4), is characterised in that each storage receptacle (2) is equipped with a mechanical combination lock (10) for closing the door (4), and with a unique marker (4), and the other components of the device do not require a continuous power supply. An electromechanical device (21) for operating the lock in the device for storing parcels, is characterised in that it comprises means (23) for cooperating with an interface (14) of a mechanical combination lock (10), an electromechanical drive (25), a control circuit (28), and means (27) for communication.

Device for storing parcels, device for operating a lock in a device for storing parcels, mobile electronic device for operating a device for storing parcels, system and method for delivering parcels using said devices

[0001] The invention relates to a device for storing parcels, a device for operating a lock in said device for storing parcels, a mobile electronic device for operating said device for storing parcels, a system and a method for delivering parcels which use such devices. The invention is applicable especially in postal services, courier services, particularly in connection with e-commerce services, e.g. on-line shops where it is desirable to be able to receive/send a parcel at any time to/by a global customer.

[0002] Devices for storing parcels and systems and methods for delivering parcels to a number of customers, which use these known devices, are known from the prior art. For example, a device for storing parcels, also known as a parcel locker, in the form of a substantially rectangular prism, having at least two storage receptacles for parcels, which can vary in size, provided for leaving parcels therein for a certain time in order to be sent/received by a customer, is known from document US20130144428. Each storage receptacle has a door of any shape and of any principle of movement relative to the other walls of the storage receptacle. The door of storage receptacles are equipped with closure means in the form of any electrically controllable lock. The device is connected to a power source making it possible to supply power to a number of components, such as a control unit, sensors of storage receptacle occupancy, indicators of storage receptacle occupancy, electrically controllable locks, a user interface, means for receiving fees, means for communication with the management centre, in particular means for communication via GSM/UMTS network or Internet, an internal lighting of storage receptacles, fans, an air conditioner, etc. Typically, the method for delivering parcels with the use of this device consists in receiving and processing, by the management centre, information on the service requested, sending, to the courier, instructions for the service execution, depositing/receiving the parcel, sending, to the customer, information necessary to receive/send the parcel from a specific

parcel locker, then identifying the customer by the parcel locker after providing identification data with the use of the user interface, and automatic opening of the door of the storage receptacle with an electric lock.

[0003] However, a disadvantage of this solution is, first of all, that a place where it is possible to supply an appropriate power is necessary to install such a device. Similarly, in the given place, there must be an appropriate GSM/UMTS network coverage and there must be a possibility of connecting to another telecommunication network. Therefore, this type of solution has limited possibilities to develop the infrastructure due to technical reasons. Secondly, in order to install such a device, it is necessary to have relevant permits to connect to the above mentioned infrastructure, which significantly increases the installation time (for example, by at least several months in Poland). Thirdly, the use of electricity grid infrastructure and of any telecommunication network on a continuous basis significantly increases operating costs of this type of devices. Fourthly, devices for storing parcels known from the prior art lead to very high investment costs due to the cost of components arranged in the device: control electronics, software and electronic components, such as e.g. a touch screen, air conditioners, heaters, electrically controlled locks, etc. A high level of complexity of the device construction results in high servicing costs of machines, and especially under extreme operating conditions, i.e. at high humidity or high temperatures, leads to a high failure rate. In addition, each known device for storing parcels must consist of at least two modules, i.e. a user interface module and at least one storage receptacle module. Therefore, quite a large minimum area is required to install the device for storing parcels. In conclusion, all these disadvantages make costs of a service using this type of devices rather high.

[0004] Therefore, the object of the invention is to provide a device for storing parcels, a device for operating a lock in the device for storing parcels, a mobile electronic device for operating the device for storing parcels, a system and a method for delivering parcels which would not have any of the above mentioned disadvantages. In particular, the object of the invention is to provide a device which

would be less expensive to manufacture, install and service, as well as which would allow launching the service in a very short time with a minimum of formalities.

[0005] The essence of the invention consists in that the device for storing parcels, comprising at least two storage receptacles with doors, is characterised in that each storage receptacle is equipped with a mechanical combination lock for closing the door, and with a unique marker, while the other components of the device do not require a continuous power supply.

[0006] Preferably, the marker is located at a standardised distance from the combination lock.

[0007] Preferably, the marker is not accessible from outside.

[0008] Preferably, the marker is located on the rear side of the door.

[0009] It is also preferable that the combination lock is equipped with an interface for setting an opening/closing code.

[0010] In another preferred variant, the storage receptacle has an opening indicator.

[0011] In another embodiment, the essence of the invention consists in that a mobile electronic device for operating a device for storing parcels, which comprises means for communication, is characterised in that it comprises means for retrieving information on a marker, means for retrieving information on a set code of a mechanical combination lock, as well as means for controlling the process of retrieving information on the marker and/or means for controlling the process of retrieving information on the set code of the combination lock.

[0012] In yet another embodiment, the essence of the invention consists in that a mobile electronic device for operating the device for storing parcels, comprising means for communication, is characterised in that it comprises means for controlling the automatic process of setting a combination lock.

[0013] In still another embodiment, the essence of the invention consists in that the system for delivering parcels, comprising at least one device for storing parcels, at least one mobile electronic

device and a management centre, is characterised in that the device for storing parcels comprises at least two storage receptacles with doors, wherein each storage receptacle is equipped with a mechanical combination lock for closing the door, and with a unique marker, the other components of the device not requiring a continuous power supply.

[0014] Preferably, the mobile electronic device comprises means for retrieving information on the marker.

[0015] Preferably, the mobile electronic device comprises means for retrieving information on the set code of the combination lock.

[0016] It is also preferable that the system comprises at least one external electromechanical device for opening and/or setting the combination lock.

[0017] Preferably, the external electromechanical device comprises means for retrieving information on the marker.

[0018] Preferably, the mobile electronic device comprises means for controlling the process of retrieving information on the marker and/or means for controlling the process of retrieving information on the set code of the combination lock.

[0019] In a preferred embodiment of the system, the mobile electronic device comprises means for controlling automatic process of setting the combination lock.

[0020] According to yet another embodiment, the essence of the invention consists in that a method for delivering parcels, comprising sending and/or receiving the parcel with the use of the device for storing parcels, operating the device for storing parcels, and sending, to the customer, information on the executed service, is characterised in that in the step of operating the device for storing parcels, the combination lock is opened with the previous code in a storage receptacle assigned to the service, the door is opened in order to deposit/receive the parcel, the mechanical combination lock is set with a new code, and the door is closed, information on the marker of this storage receptacle and on the set code is retrieved to confirm correctness of the step of operating the device.

[0021] Preferably, the information on the marker of a selected storage receptacle and on a set code is retrieved with the use of means for retrieving information on the marker and means for retrieving information on the set code of the combination lock, respectively, integrated in the mobile electronic device.

[0022] Preferably, the step of retrieving information on the marker of the selected storage receptacle and on the set code is controlled by means for controlling the process of retrieving information on the marker and/or by means for controlling the process of retrieving information on the set code of the combination lock, said means being integrated in the mobile electronic device.

[0023] It is also preferable that the combination lock is opened with the previous code, and then is set with a new code by means of an external electromechanical device which is in communication with the mobile electronic device.

[0024] According to still another aspect of the invention, the essence of the invention consists in that an electromechanical device for operating a lock in a device for storing parcels, is characterised in that it comprises means for cooperating with an interface of a combination lock, an electromechanical drive, a control circuit, and means for communication.

[0025] Preferably, the electromechanical device further comprises a power source.

[0026] The idea of constructing a device for storing parcels consists in that this device is completely devoid of components requiring a continuous power supply, i.e. all components are adapted to the lack of a continuous electric power supply, wherein the device is, at the same time, capable of cooperating with an existing infrastructure of the system for delivering parcels.

[0027] Thanks to the complete elimination of components requiring a continuous power supply, a device for storing parcels was obtained which can be installed within one day, in a greater number of places, especially in the places characterised so far by technical restrictions. At the same time, manufacturing costs of the device for storing parcels with the same number of storage receptacles are reduced by several times. Furthermore, thanks to the elimination of

the need to use electricity grid infrastructure on a continuous basis, monthly operational costs for maintaining the device are significantly decreased.

[0028] Thanks to the complete elimination of components requiring a continuous power supply, it is possible to install, in a given location, a device for storing parcels consisting of only one module, which increases the number of locations which can be included in the network.

[0029] Thanks to equipping the device with mechanical combination locks capable of being manually or automatically programmed, a device with an existing individual and limited access to a single storage receptacle, which can function within the existing infrastructure of the service provider, is obtained.

[0030] Thanks to equipping each storage receptacle with a marker which is individual within the whole network of devices, preferably mechanical, capable of being read by both the staff of the service provider, as well as by a dedicated device, preferably in an automatic manner with the use of a mobile external electronic device, it is possible to manage services based on an individual number of the storage receptacle in the known manner.

[0031] Thanks to arranging an individual marker of the storage receptacle in an area allowing a man, and in particular a mobile external device, to simultaneously read, within a single operation, both the marker, and settings of the combination locker, e.g. from the inner side of the door, it is possible to eliminate the risk of introducing incorrect data to the system.

[0032] Preferably, thanks to equipping each storage receptacle of the device for storing parcels according to the invention with a storage receptacle opening indicator and/or a mechanical sensor related thereto, it is possible to manage storage receptacles based on the opening indicator which, depending on the service being executed, can serve as an indicator of storage receptacle occupancy.

[0033] Preferably, thanks to equipping the device with mechanical combination locks capable of being automatically programmed, i.e. equipped with an interface for cooperating with a controllable electromechanical external device which cooperates with a mobile

external electronic device, it is possible to automate the process of leaving parcels in storage receptacles, thanks to remotely controlling the settings of the mechanical combination lock with the use of said mobile external electronic device which communicates with a management centre.

[0034] Thanks to the elimination of expensive components, manufacturing cost of the device for storing parcels is reduced by several times, and thereby the service provider, having the same investment budget, is able to create a network of devices several times larger.

[0035] The device for storing parcels, a system and a method for delivering parcels according to the invention are presented in detail in embodiments with reference to accompanying figures of the drawing, in which:

[0036] Fig.1 is a perspective general view of a device for storing parcels according to the invention;

[0037] Fig.2 is an enlarged perspective general view of a storage receptacle with a mechanical combination lock according to the invention;

[0038] Fig.3 is a block diagram of an external electromechanical device for operating the lock in the device for storing parcels.

[0039] Fig.4a shows a system for delivering parcels according to the first embodiment;

[0040] Fig.4b shows a system for delivering parcels according to the second embodiment;

[0041] Fig.5 is a block diagram of a management centre and a mobile electronic device, cooperating with a customer device and the external electromechanical device as part of a method for delivering parcels according to the invention;

[0042] The terms used in the specification shall be understood to mean as follows: "parcel" is any item capable of being carried, transported and deposited in the device for storing parcels, which is intended to be received or sent by the customer.

[0043] The target user of the device (1) for storing parcels can be any natural or legal person, registered or not in the system of the service provider, and who needs to send or receive any item with the use of such a device (1) for storing parcels.

[0044] The device (1) for storing parcels according to the invention can be installed in any place meeting the general conditions for the security of storing parcels, regardless of electricity grid infrastructure or telecommunication network infrastructure existing in this place. In particular, it is suitable for installation in countries or regions with very poor telecommunication and electricity infrastructures.

[0045] According to the first embodiment, shown in Fig. 1, the device (1) for storing parcels according to the invention has substantially the shape of a rectangular prism in which at least two volumes are separated which form at least two storage receptacles (2). Separation of volumes for storage receptacles in the device (1) is preferably realised by arranging internal walls (3) forming storage receptacles (2), wherein a door (4) constituting a closure for the space of the storage receptacles (2) is mounted to said internal walls (3). Preferably, the device (1) for storing parcels may be divided into smaller spaces by partition walls (5), wherein replaceable sets of storage receptacles (6) with standardised dimensions, including any quantitative and volumetric configurations of at least two storage receptacles (2), depending on the demand in a given location, are introduced to the said spaces.

[0046] The device (1) for storing parcels according to the invention is mounted in a manner secured to the substrate, for security reasons. Security measures can be constituted by an appropriate base (7), serving as a foundation, preventing movement of the device (1) for storing parcels. In another variant, any other securing means which immobilise the device (1) for storing parcels on the substrate may be used, in particular appropriate sets of screws and sockets, catches or any other mechanical means which realise strong mechanical connections.

[0047] Furthermore, the device (1) for storing parcels can be modular, i.e. can be constituted of a series of several rectangular

prisms, constituting modules (8), wherein each module (8) is equipped with a separate base (7). Therefore, it is possible to adapt the device (1) to the local demand for the service of delivering/sending parcels, i.e. to increase, decrease the amount of storage receptacles (2), as well as their configuration in terms of size. According to the invention, because a module with a user interface is not necessary to operate the device (1) for storing parcels, the device (1) for storing parcels may consist, in a particular case, of only one module (8).

[0048] The external walls (9), internal walls (3), partition walls (5) and the door (4) are preferably made of metal. Preferably, metal may be coated with suitable protective layers or with layers providing the device (1) with aesthetic qualities.

As shown in Fig. 2, the internal layers (3) and the surface of the door (4) close the space intended for depositing the parcel (P), thereby forming a single storage receptacle (2). The storage receptacle (2) can have any shape or size to the extent allowed by the external dimensions and shapes of the device (1) for storing parcels.

[0049] The door (4) can be any type of door, i.e. can rotate, perform a translational motion, roll up, etc. Depending on a particular case, it is mounted to at least one external wall (3) by appropriate mounting means, e.g. hinges, guides and rails, etc.

[0050] Each storage receptacle is marked in a visible manner, preferably on the front side of the door, with a recognisable individual number (N) of the storage receptacle for easy identification of its location by the customer (as shown in Fig. 2).

[0051] The door (4) is equipped with a mechanical combination lock (10) which closes or opens depending on the set combination of digits. The person skilled in the art will know, however, that instead of digits, generally any symbols can be used, e.g. letters, colours, images, etc. The combination lock (10) is at least 3 digital, preferably 5 digital. The lock is adapted for manual setting of a combination of symbols which opens and closes it, wherein it is possible to change the code with each use. The combination lock (10) is preferably equipped with an interface (16)

for cooperating with the electromechanical external device (21) in order to set it.

[0052] The staff operating the device (1) for storing parcels have appropriate information on which storage receptacle (2) is to be filled or emptied, i.e. know the parcel number (DN) and the individual marker of the box (RN). They also know the relevant individual code (C1) which is currently set for the storage receptacle (2) and the relevant individual code (C2) which is to be set in the mechanical combination lock (10) in order to close a given storage receptacle (2) by the staff and to open it by the customer in order to receive/send the parcel.

[0053] The staff operating the device (1) for storing parcels obtains the above mentioned data from a mobile electronic device (31). They are supplied to the mobile electronic device (31) at a time when it is within the reach of an appropriate telecommunication network. However, the staff, or an external electromechanical device (21) for operating the device (1) for storing parcels can read them in both on-line and off-line modes, whereby it is possible to operate the devices (1) for storing parcels, which are located completely out of range of a telecommunication network.

[0054] The combination lock (10) is thus coded again by the staff operating the device (1) for storing parcels at the time of depositing a parcel intended to be received, or receiving a parcel intended to be sent.

[0055] Each storage receptacle (2) of the device (1) for storing parcels is also equipped with an individual marker (11) which is arranged at a standardised distance from the combination lock (10), i.e. in such a place and at such a distance from the combination lock (10) that it is possible to read this marker (11) and settings of the combination lock (10), in particular by the mobile electronic device (31) or the external electromechanical device (21). The marker (11) contains a coded box number (N) individual within the system, or a different unique number identifiable by the system. Preferably, the marker (11) is arranged on the rear side of the door at a short distance from the combination lock (10), so that a dedicated converter of the electronic mobile device (31) could

retrieve information on settings of the combination lock (10) and, at the same time, on the number (N) of the storage receptacle (2) assigned to it. For example, when the converter in the electronic mobile device is a still/video camera, the marker (11) should be placed near the combination lock (10) at a distance allowing it to take a picture readable for the mobile electronic device. The marker (11) can be a barcode or a QR code. In another variant, the marker (11) can be any unique mechanical object capable of being automatically visually distinguished by the mobile electronic device (31). The marker (11) can be also any passive electronic device which does not require a continuous power supply, e.g. an NFC tag. Preferably, the marker (11) is neither visible nor accessible from outside.

[0056] Preferably, the storage receptacles (2) have a mechanical opening indicator (15) (i.e. an indicator of the opening of a given storage receptacle (2) since the last visit of the courier) to optimise the time of operation by the staff (courier) and to exclude any opening of storage receptacles (2) which were not visited by customers. The indicator (15) will therefore inform, depending on the case, about the fact that the customer received from a particular storage receptacle (2) a parcel deposited by the staff, or that the customer deposited in this storage receptacle (2) a parcel to be sent. The opening indicator (15) is, for example, in the form of a mechanical indicator with a window visible from outside, through which a changing colour can be seen, e.g. red/green. A person skilled in the art will, however, know that it is possible to use any mechanism the state of which will change after opening of the door by the customer. It has to be assumed that in case of a mechanism of the opening indicator (15) which is not capable of transition from one state to another, the courier, after opening the door, sets it back into a standby state.

[0057] In reference to Fig. 3, the external electromechanical device (21) cooperating with the mobile electronic device (31) in order to operate the devices (1) for storing parcels is described. The external electromechanical device (21) has means (23) for cooperating with the interface (14) of the combination lock (10), preferably an elongated key element (23) with its shape being

complementary to an opening (14) for setting in the mechanical combination lock (10). Furthermore, the external electromechanical device (21) comprises an electromechanical drive (25) used to set the means (23) for cooperating with the interface (14) of the combination lock (10) into motion. For example, after placing the elongated key element (23) in the opening (14), a stepping motor (25) can make this key element (23) to rotate in order to execute an appropriate amount and sequence of rotations in the opening (14). The external electromechanical device (21) can have its own power source (26), e.g. a battery, or can be also supplied by a different external mobile power source. The external electromechanical device (21) is further equipped with means (27) for communication. Preferably, those can be means (27) for wired and/or wireless communication. The means (27) for communication allow reception of instructions for the stepping motor from the mobile electronic device (31) communicating with other elements of the system for receiving parcels, as described hereinafter. Furthermore, the external electromechanical device (21) comprises a control circuit (28) processing the received instructions into commands for the stepping motor (25), as well as parameters of the stepping motor (25) into information on the code (C2) set in the mechanical combination lock (10). Preferably, the external electromechanical device (21) can be in the form of a programmed drill-driver with a control circuit (28), communicating with the mobile electronic device (31), for example by GSM/UMTS or Bluetooth, or any other technology if the device (1) for storing parcels located out of range of a GSM/UMTS network is operated.

[0058] Preferably, the external mobile electronic device (31) can be a mobile phone, smart phone, tablet, laptop or any other type of electronic device with a user interface, a processor and a memory, capable of storing instructions and data, and with means for wired and/or wireless communication.

[0059] The external mobile electronic device (31) transmits to the external electromechanical device (21) appropriate control instructions, individual for each storage receptacle (2). In order to open an empty storage receptacle (2), to deposit a parcel (P) therein and to close the storage receptacle (2) again, the staff

operating the device (1) for storing parcels has only to place the external electromechanical device (21) in an appropriate mechanical combination lock (10).

[0060] Embodiments of the system for delivering parcels according to the invention will be described with reference to Fig. 4a and Fig. 4b. In the figures, only those components of the system and of the devices which are related to the essence of the invention are presented. A person skilled in the art will know which other components are necessary for such a system and devices to function.

[0061] The system for delivering parcels comprises at least one device (1) for storing parcels, and preferably a network of devices (1) for storing parcels according to the invention, a network of external mobile electronic devices (31) for operating the devices (1) for storing parcels, customer devices (47) for receiving information on the service of delivering parcels, a management centre (42), a logistics centre (43), a customer database (44), a staff database (45), a base (46) of devices (1) for storing parcels and a base (48) of mobile electronic devices (31). Preferably, the system can comprise other units necessary to perform the service of delivering parcels, e.g. a service centre responsible for maintenance of devices and components in the system and their updating in terms of software if a software is installed in a given device or component.

[0062] All the devices and components of the system are respectively connected to each other, i.e. are in communication, as shown in Fig. 4a and Fig. 4b. In particular, all the devices and components communicate with the management centre (42). In the present patent application the term 'connected' should be understood in the context of a connection between any two systems as widely as possible, as every possible single or multi-way, or direct or indirect, physical or functional connection. Communication between the devices/components is performed by wire or wirelessly, preferably with the use of the Internet and GSM/UMTS networks. The person skilled in the art will appreciate that other technologies, e.g. Bluetooth, also can be used.

[0063] As shown in more detail in Fig. 5, the management centre (42) comprises, for example, means having the following functionality:

- means (42a) for obtaining information on the service ordering, wherein in the case of registered customers some of the information may come from the customer database (44), e.g. their favourite locations of the devices (1) for storing parcels, address details, etc.;

- means (42b) for informing about a status of the service, among others about an effected deposition or reception of the parcel from the storage receptacle (2), means (42b) generating information on the location of the device (1) for storing parcels, on the data and time of depositing the parcel in a given device (1) for storing parcels and on the individual number (N) of the storage receptacle (2);

- means (42c) for informing about parameters of the service to be executed, i.e. among others about location of the device (1) for storing parcels, about expected data and time of realising the service, about the individual number (N) of the storage receptacle (2), and about the marker (11) related to the individual number (N) of the storage receptacle, as well as about the code (C1) which is currently set in the mechanical combination lock (10) for a specific storage receptacle (2) in order to open it by the courier, and about the code (C2) which is to be set in the mechanical combination lock (10) in a specific storage receptacle (2) in order to open it by the customer;

- means (42d) for processing information on the executed service, i.e. among others on the location of the device (1) for storing parcels, in which a parcel to be received was deposited or a parcel to be sent was received, on the data and time of realising a successful service, on the code (C2) set in the storage receptacle (2) of the combination lock (10) and on the individual number (N) of the storage receptacle (2), and on the marker (11) related to the individual number (N) of the storage receptacle (2);

- database (42e) of current and executed orders, including, among others, a parcel status;

- means (42f) for communication.

[0064] The above mentioned means generate or retrieve information exchanged respectively with the customer device (47) or with the mobile electronic device (31) with which the staff, i.e. each courier, is equipped. It is obvious that the means (42c) for informing about the parameters of the service to be executed or the means (42d) for processing information on the executed service communicate with the mobile electronic device (31) only if there is a physical possibility of establishing a connection. Therefore, the data between the management centre (42) and the mobile electronic devices (31) are transmitted with various time delays relative to the moment of their formation on the sending side, but always in advance of the operations to be performed within the service in the system as a result of the transmission of data. This makes it possible to use the mobile electronic device (31) in off-line mode by the courier when the courier is located near the device (1) for storing parcels, located out of range of a telecommunication network.

[0065] According to the invention, the staff operating the network of devices (1) for storing parcels is equipped with the external mobile electronic device (31) and, preferably but not necessarily, with the external electromechanical devices (21).

This second variant of the system according to the invention is shown in Fig. 4b.

[0066] As shown in more detail in Fig. 5, the mobile electronic device (31) is equipped with at least the following components:

- means (37) for communication
- means (38) for storing information on parameters of the service to be executed
- means (39) for visualisation
- means (32) for retrieving information on the marker
- means (33) for retrieving information on the code (C2) set in the mechanical combination lock (10),

and preferably with:

- means (34) for controlling the process of retrieving information on the marker (11)

- means (35) for controlling the process of retrieving information on the code (C2) in the mechanical combination lock

- means (36) for off-line/on-line analysing of the retrieved information on the marker (11) and on the code (C2) set in the mechanical combination lock (10).

[0067] Thanks to the use, of the means (34, 35) for controlling the process of collecting information on the marker (11) and on the code (C2) in the mobile electronic device (31), the risk of human error made by the operator of the mobile electronic device (31) during this process is reduced. These means can be constituted by an appropriate application allowing correct positioning of the mobile electronic device (31) in relation to the combination lock (10) and the marker (11) before reading is performed, e.g. in the process of taking a picture with a camera (32, 33) which is a part of the mobile electronic device (31).

[0068] In a preferred variant, the mobile electronic device (31) is equipped with means (40) for controlling the automatic process of setting the combination lock (10). This makes it possible to control the external electromechanical device (21) which, once the combination lock (10) has been engaged with the interface (14) of, opens it with the old code (C1), and then sets a new code (C2).

[0069] The method for delivering parcels according to the invention will be described with reference to Fig. 5 in which appropriate means and paths for the exchange of information between components of the system are shown.

[0070] By carrying out the method according to the invention, customer A can send a parcel (P) in any manner, and customer (B) can use the device (1) for storing parcels according to the invention in order to open it, or customer (A) can send a parcel with the use of the device (1) for storing parcels, and customer (B) can receive the parcel in any manner. According to the first embodiment, customer A, after the introduction and delivery of relevant data to the management centre (42) via the means (42a) for obtaining information on the service ordering with the use of a customer device (47),

orders a generally defined service of delivering a parcel (P). For this purpose, the customer can, for example, use a suitable interface which is present as a form on a website which he fills in on his customer device (47). The service is recorded in the system in the database (42e), and the management centre (41)coordinates via appropriate means operations related to the registration of the parcel in the logistic centre (43), to the assignment of an appropriate courier from the staff database (45) to the service, as well as to the assignment of a mobile external device (31) to operate the device for storing parcels. The management centre (41) having assigned to the service a mobile external device (31) to which a specific courier is related, by the means (42c) for informing about parameters of the service to be executed, sends to the mobile external device (31) information about, among others, to what location and with what parcel (P) or after what parcel the courier is to go for, in which storage receptacle (2) he is to deposit or receive the parcel (P), and preferably what is the expected time he should do it. Furthermore, the mobile external device (31) receives with the use of the means (38) for processing information on parameters of the service to be executed, information on the previous code (C1) set in the mechanical combination lock (10) in a given storage receptacle (2) and on a new code (C2) which is to be set in the mechanical combination lock (10) in order to execute the current service.

[0071] In a first variant, this information is visualised with the use of the mobile external device (31) by the means (39) for visualisation, then, on the basis thereof, the courier opens the door (4) of an indicated storage receptacle (2) in an indicated device (1) for storing parcels with the use of a provided code (C1), deposits the parcel, or collects the parcel, and then sets the combination lock (10) with the use of the code (C2) and closes the door. Subsequently, information confirming already executed services is collected. Specifically, the information on the marker and the information on the set code (C2) is automatically collected with the mobile electronic device (31), and in particular with the use of the means (32) for retrieving information on the marker and of the means for retrieving information on the code (C2) set in the mechanical

combination lock (10). This step is of particular importance due to the elimination of the risk of confusion on the side of the human while introducing the data into the system. The information provided is automatically retrieved and preferably in the same manner every time.

[0072] This is possible thanks to the use of the means (34) for controlling the process of retrieving information on the marker (11) and the means (35) for controlling the process of retrieving information on the code (C2) set in the mechanical combination lock (10). These means may be in the form of a dedicated application (34, 35) or two separate applications (34), (35) in the case where sensors of various technologies are used for obtaining both types of information. For example, the information on the marker (11) and on the code (C2) in the mechanical combination lock (10) is retrieved by taking a picture with a still camera (32, 33) built in the mobile electronic device (31). In addition, the means (34, 35) for controlling the process of retrieving information generate hints for the courier in relation to picture resolution, picture frame size, etc. Thanks to these means, again the risk of introducing useless or incorrect data into the system is minimised. In the case where the marker (11) is not capable of being read in the same technology as the code (C2) from the combination lock (10), the means (34) for controlling the process of retrieving information on the marker (11) are different from the means (34) for retrieving information on the code (C2). The retrieved information on the marker (11) and on the code (C2) is analysed either in off-line mode, directly in the mobile electronic device (31) or in on-line mode via the means (36) for analysing off-line/on-line the information on the marker (11) and on the code (C2) and/or is sent right away for analysis to the management centre (42) if in the mobile electronic device (31), on-line mode is available, or with a delay when the mobile electronic device (31) switches from off-line mode to on-line mode. In the case of a positive result of the analysis of the said information (among others, correct reading and comparison with reference parameters) in the database (42e) of the current and realised services, data on a given realised service, obtained from the means (42d) for processing information on the realised service, is registered. Otherwise,

emergency procedures leading to the realisation of the service and to the registration of its state in the database (42e) are implemented. Subsequently, after the step of approval of the correctness of the step of depositing or retrieving the parcel from the storage receptacle (2), the management centre (42) notifies customer B of the completion of the service of delivering/receiving the parcel, by sending, with the use of the means (42b) for informing about the status of the service, to the customer device (47), appropriate data necessary for receiving/sending the parcel with the use of the device (1) for storing parcels. Customer B, knowing the code (C2) and the location of the device (1) and of the storage receptacle (2), opens the combination lock (10) and receives/sends the parcel (P).

[0073] In a second variant of the method for delivering parcels according to the invention, also described with reference to Fig. 5, all steps are the same with the exception of operation of the device (1) for storing parcels by the courier. According to the second variant of the method according to the invention, the courier is equipped with both the mobile electronic device (31) and the external electromechanical device (21). In this case, for setting the code (C2), means in the form of the external electromechanical device (21) are used instead of manually setting the combination lock (10). After receiving information on the parameters of the service to be executed from the management centre (42) and processing it, the mobile electronic device (31) proceeds to the step of visualising at least information on the number of the storage receptacle (2) which is to be opened. The person skilled in the art will appreciate that in addition to or instead of the means (38) for visualisation, the mobile electronic device (31) can be equipped with audio means for transmitting voice information, and therefore the courier can receive instructions in the form of sound. Therefore, the courier knows where and how to engage the external electromechanical device (21) with the interface (14) of the combination lock (10). Then, the mobile electronic device (31), thanks to the means (40) for controlling the automatic process of setting the combination lock (10), controls the external electromechanical device (21). The external electromechanical device

automatically opens the combination lock (10) with the old code (C1), and then sets a new code (C2). Preferably but not necessarily, the step of retrieving information on the set code (C2) with the use of the means (33) for retrieving information on the code (C2) set in the mechanical combination code (10) is omitted in the mobile electronic device (31). Information on the correctness of the operation of setting the code (C2) may alternatively be returned by the external electromechanical device (21). Similarly, information on the marker (11) of a given storage receptacle (2) can be retrieved automatically with the use of appropriate means for retrieving information on the marker (11), alternatively integrated in the external electromechanical device (21) which is appropriately positioned for retrieving the information on the marker (11) by the mere fact of engagement with the interface (14) of the combination lock (10). In such a variant, the marker (11) must also be located on the storage receptacle (2) in a standardised position in relation to the combination lock (10) so that a quick and/or automatic reading of two pieces of information, i.e. on the marker (11) and on the code (C2), could be possible.

[0074] In the described second variant, thanks to the use of the external electromechanical device (21), the process of operating the device (1) for storing parcels is significantly improved, and the risk of introducing incorrect data on the realised service into the system is almost completely eliminated. All the information crucial for the service requested is retrieved and automatically processed.

[0075] An advantage of the system and methods according to the invention is that, from the customer perspective, the process does not change, i.e. the customer receives the code (C2) to open the door (4) of the storage receptacle (2) by the same means as before, and after its introduction, he receives an immediate access to the storage receptacle (2) and the parcel in order to receive it or an access to an empty storage receptacle (2) in order to place a parcel therein. An advantageous difference, from the customer perspective, is that he performs fewer operations when using the device (1) for storing parcels because his operations are limited to setting the code (C2) in an appropriate mechanical combination lock (10) and to opening the door (4).

Claims

1. A device for storing parcels, comprising at least two storage receptacles with doors, **characterised in that** each storage receptacle (2) is equipped with a mechanical combination lock (10) for closing the door (4), and with a unique marker (11), the other components of the device not requiring a continuous power supply.

2. The device according to claim 1, **characterised in that** the marker (11) is located at a standardised distance from the combination lock (10).

3. The device according to claim 2, **characterised in that** the marker (11) is not accessible from outside.

4. The device according to claim 2 or 3, or 4, **characterised in that** the marker (11) is arranged on the rear side of the door (4).

5. The device according to claim 1 or 2, or 3, or 4, **characterised in that** the combination lock (10) is equipped with an interface (14) for setting an opening/closing code (C1, C2).

6. The device according to claim 1 or 2, or 3, or 4, or 5, **characterised in that** the storage receptacle (2) has an opening indicator (15).

7. An electromechanical device for operating a lock in a device for storing parcels, **characterised in that** it comprises means (23) for cooperating with the interface (14) of the mechanical combination lock (10), an electromechanical drive (25), a control circuit (28) and means (27) for communication.

8. The electromechanical device according to claim 16, **characterised in that** it further comprises a power source (26).

9. A mobile electronic device for operating a device for storing parcels, comprising means for communication, **characterised in that** it comprises means (32) for retrieving information on a marker (11), means (33) for retrieving information on a set code (C2) of a mechanical combination lock (10), as well as means (34) for controlling the process of retrieving information on the marker (11) and/or means (35) for controlling the process of

retrieving information on the set code (C2) of the combination lock.

10. A mobile electronic device for operating a device for storing parcels, comprising means for communication, **characterised in that** it comprises means (40) for controlling the automatic process of setting a combination lock (10).

11. A system for delivering parcels, comprising at least one device for storing parcels, at least one mobile electronic device and a management centre, **characterised in that** the device (1) for storing parcels comprises at least two storage receptacles with doors, wherein each storage receptacle (2) is equipped with a mechanical combination lock (10) for closing the door (4), and with a unique marker (11), the other components of the device not requiring a continuous power supply.

12. The system according to claim 11, **characterised in that** the mobile electronic device (31) comprises means (32) for retrieving information on the marker (11).

13. The system according to claim 11, **characterised in that** an external electromechanical device (21) comprises means for retrieving information on the marker (11).

14. The system according to claim 11 or 12, or 13, **characterised in that** the mobile electronic device (31) comprises means (33) for retrieving information on a set code (C2) of the mechanical combination lock (10).

15. The system according to claim 11 or 12, or 13, or 14, **characterised in that** it further comprises at least one external electromechanical device (21) for opening and/or setting the combination lock (10).

16. The system according to claim 12 or 14, or 15, **characterised in that** the mobile electronic device (31) comprises means (34) for controlling the process of retrieving information on the marker (11) and/or means (35) for controlling the process of retrieving information on a set code (C2) of the combination lock.

17. The system according to any one of claims 12 to 16, **characterised in that** the mobile electronic device (31) comprises means (40) for controlling the automatic process of setting a combination lock (10).

18. A method for delivering parcels, comprising sending and/or receiving a parcel with the use of a device for storing parcels, operating the device (1) for storing parcels, and sending information on the executed service to the customer, **characterised in that** in the step of operating the device (1) for storing parcels a mechanical combination lock (10) is opened with a previous code (C1) in a storage receptacle (2) assigned to the service, a door (4) is opened in order to deposit/receive the parcel, the mechanical combination lock (10) is set with a new code (C2), and the door (4) is closed, information on a marker (11) of this storage receptacle (2) and on the set code (C2) is retrieved to confirm correctness of the step of operating the device.

19. The method according to claim 18, **characterised in that** the information on the marker (11) of a selected storage receptacle (2) and on the new set code (C2) is retrieved, respectively, with the use of means (32) for retrieving information on the marker (11) and means (33) for retrieving information on the set code (C2) of the mechanical combination lock (10), said means being integrated in the mobile electronic device (31).

20. The method according to claim 18, **characterised in that** the information on the marker (11) of a selected storage receptacle (2) is retrieved with the use of means for retrieving information on the marker (11) which re integrated in the external electromechanical device (21).

21. The method according to claim 19 or 20, **characterised in that** the step of retrieving information on the marker (11) of the selected storage receptacle (2) and on the set code (C2) is controlled by means (34) for controlling the process of retrieving information on the marker (11) and/or by means (35) for controlling the process of retrieving information on the set

code (C2) of the combination lock, said means being integrated in the mobile electronic device (31).

22. The method according to claim 18 or 19, or 20, or 21, **characterised in that** the combination lock (10) is opened with a previous code (C1), and then is set with a new code (C2) by means of the external electromechanical device (21) which is in communication with the mobile electronic device (31).

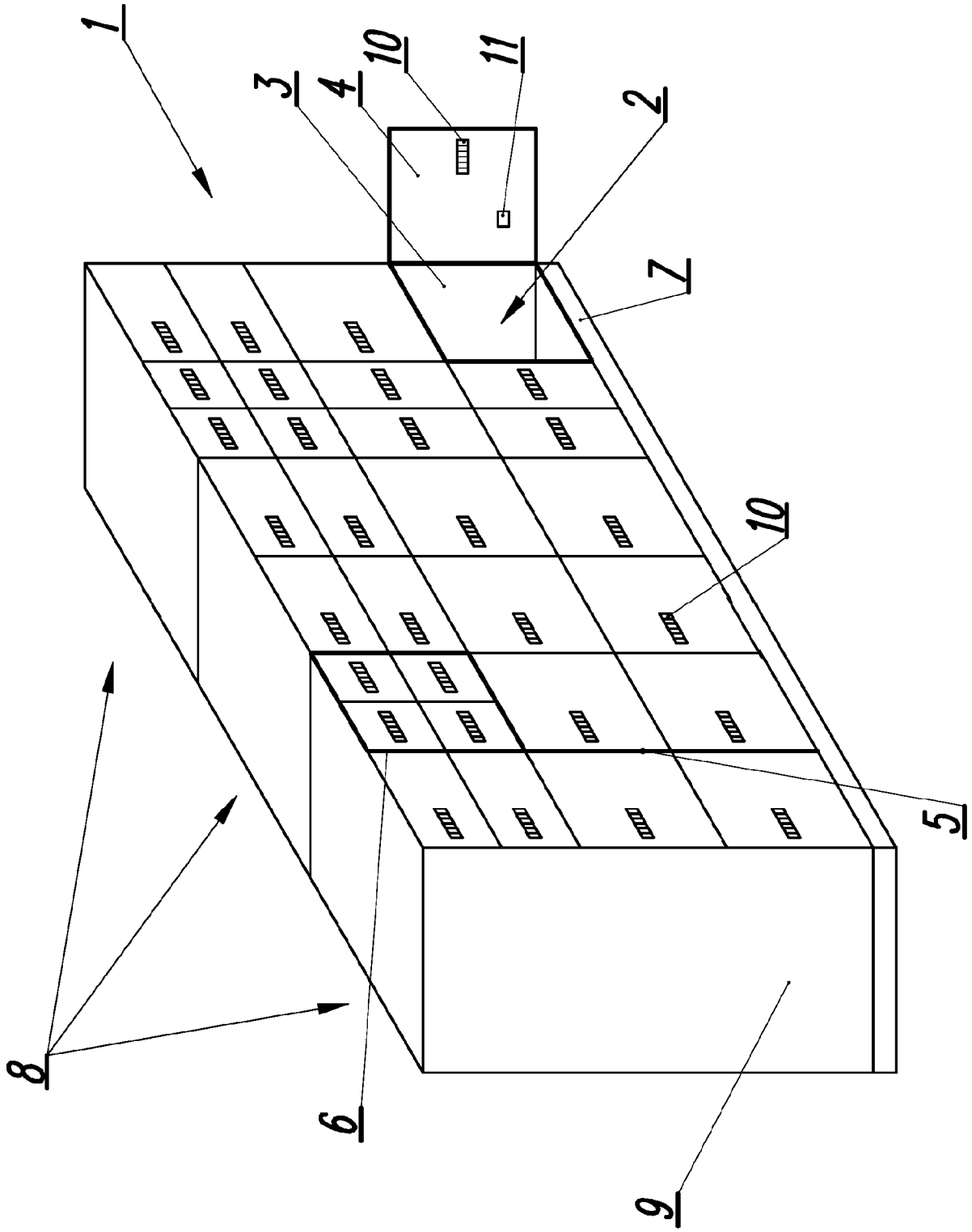


Fig. 1

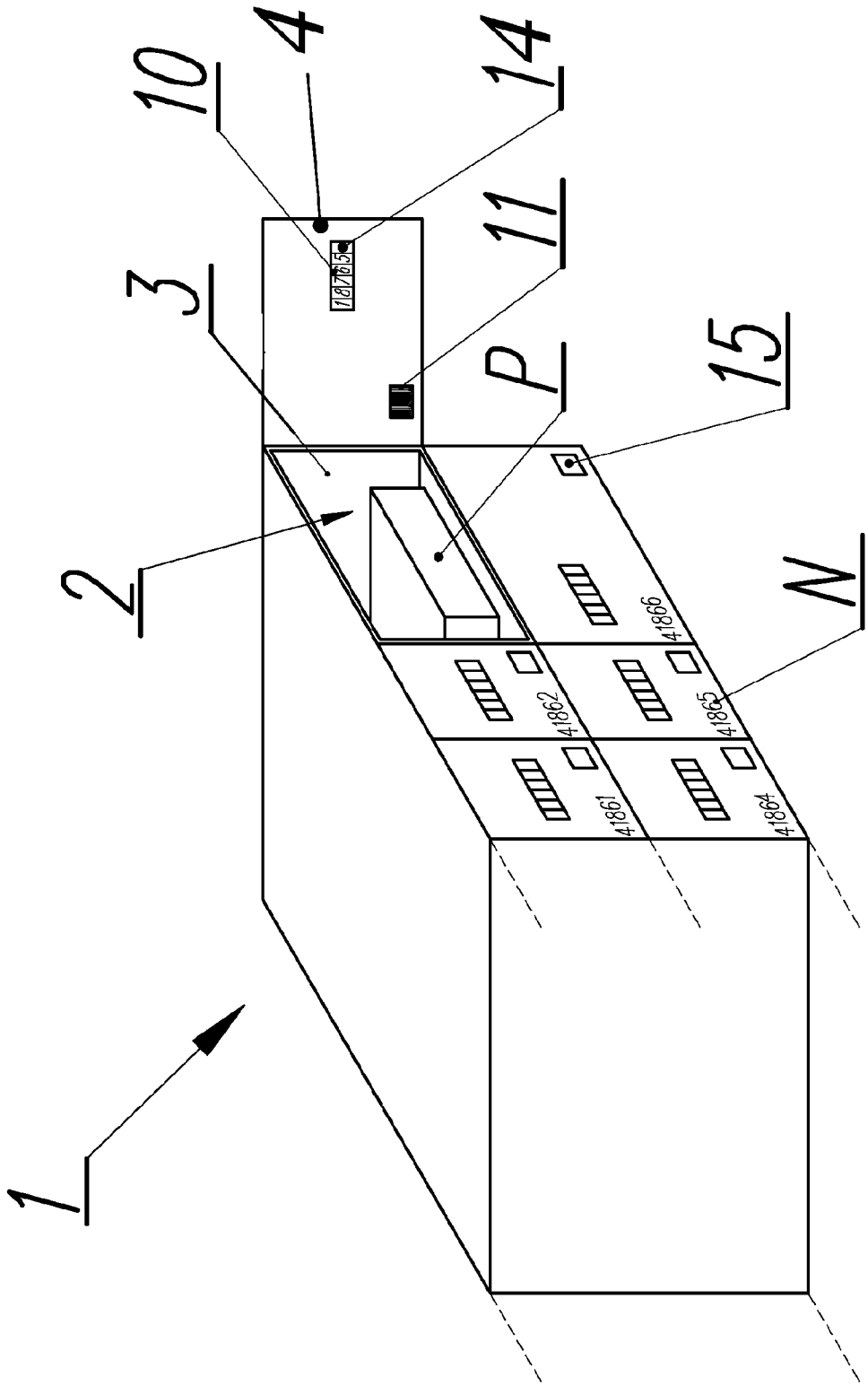


Fig. 2

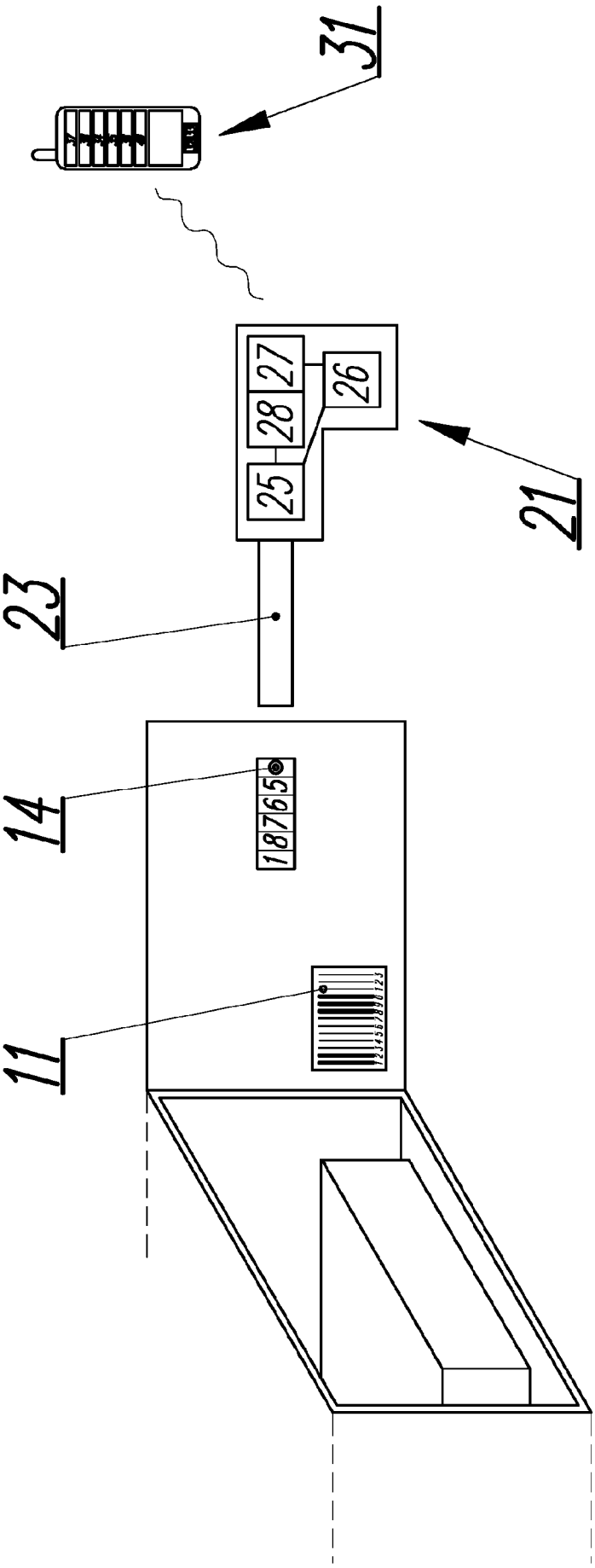
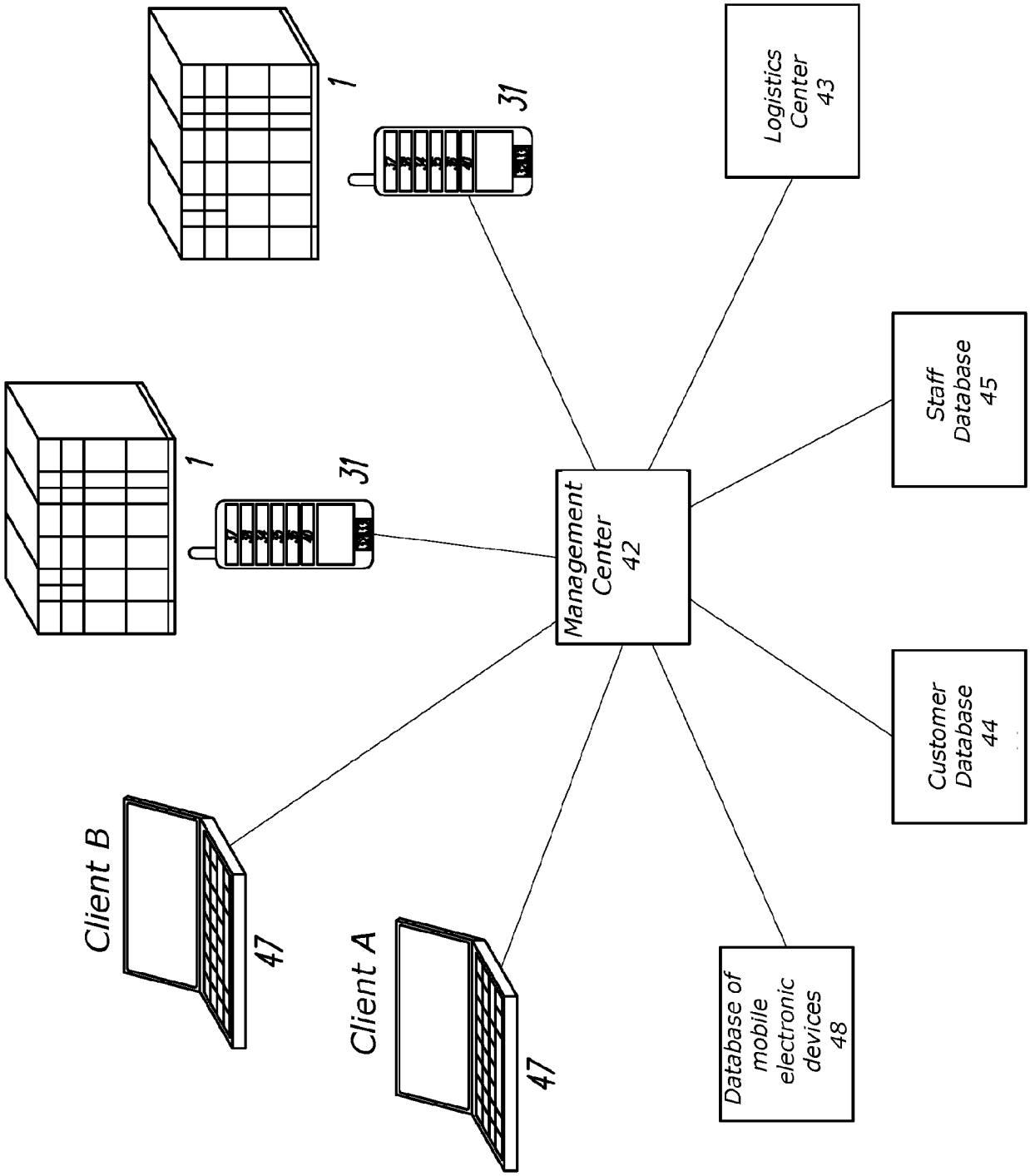


Fig. 3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31
Logistics Center 43
1
31
Staff Database 45
Management Center 42
Client B 47
Client A 47
Customer Database 44
Database of mobile electronic devices 48

Fig. 4a

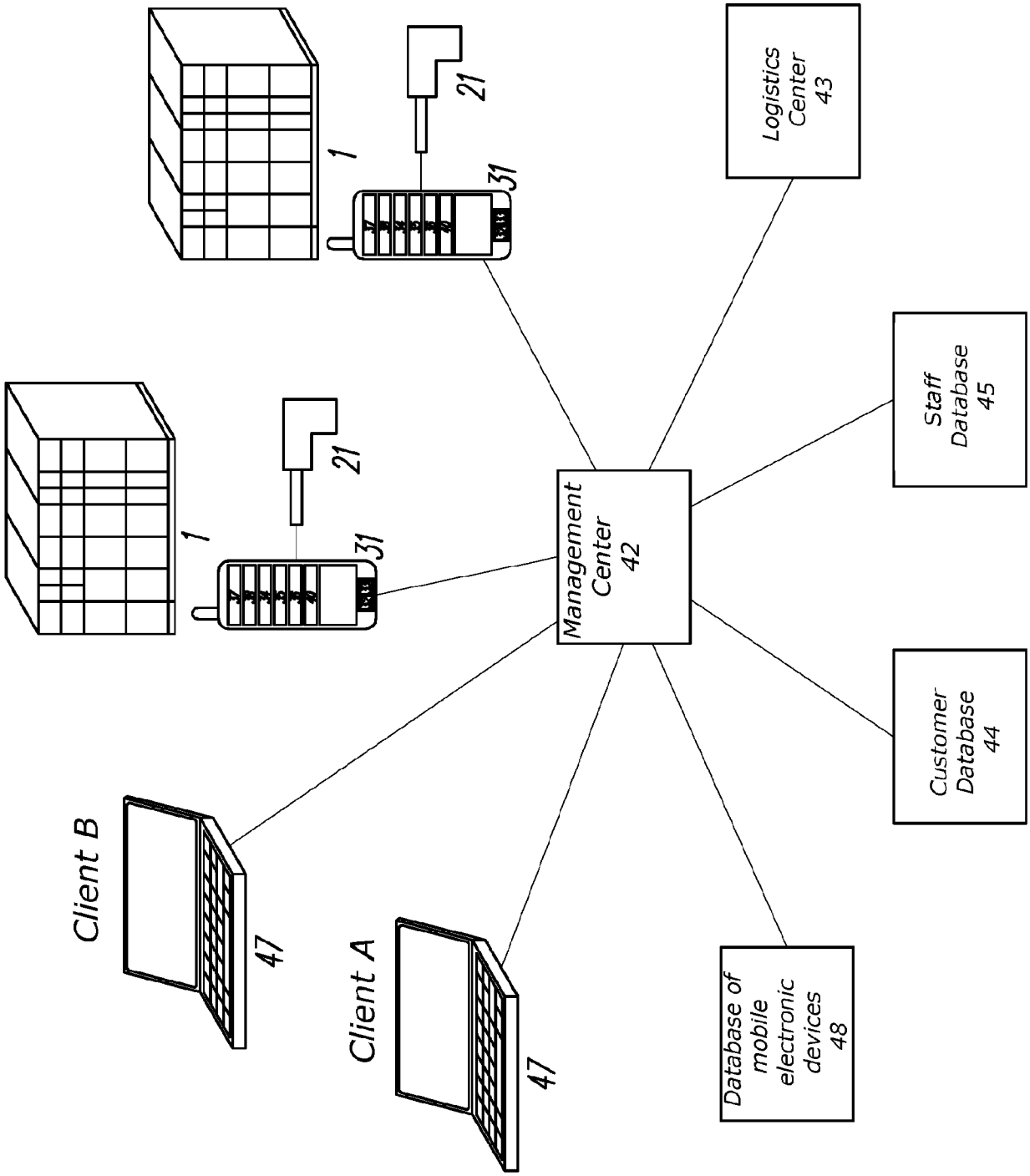
Logistics Center 43
Staff Database 45
Customer Database 44
Database of mobile electronic devices 48
Management Center 42
Client A
47
Client B
47
1
21
31
1
21
31

Fig. 4b

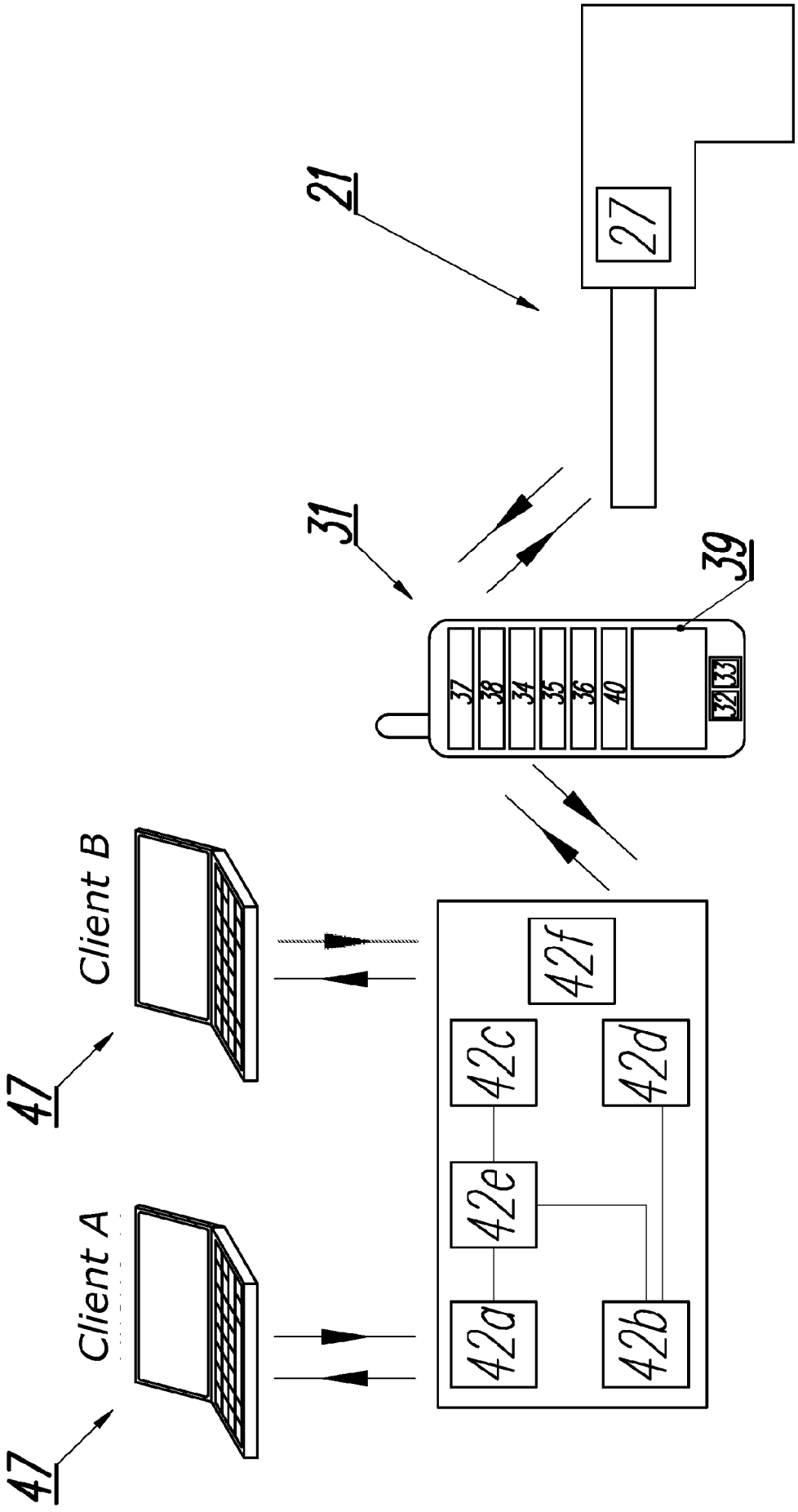
21
27
31
39
37
38
34
35
36
40
32
33
Client B
47
Client A
47
42a
42b
42c
42d
42e
42f

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/054318

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q10/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06Q G07F A47G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 10 2010 041617 A1 (RENZ ERWIN METALLWAREN [DE]) 29 March 2012 (2012-03-29) abstract paragraph [0004] - paragraph [0009] paragraph [0011] - paragraph [0012] paragraph [0018] - paragraph [0023] -----	1-6,9-22
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 August 2015	31/08/2015

Name and mailing address of the ISA/	Authorized officer
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1

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/054318

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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