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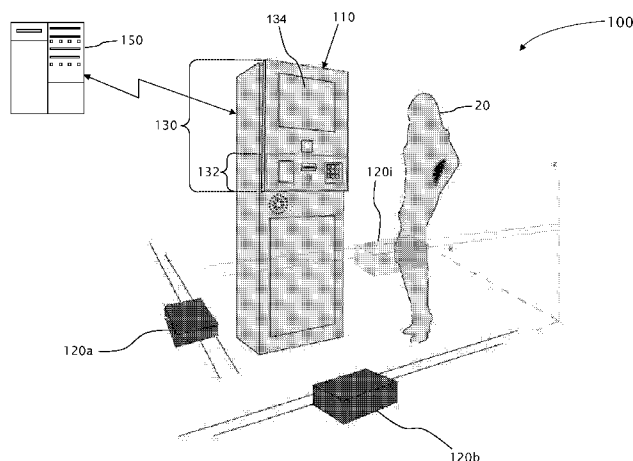
(54) **Title:** SYSTEMS AND METHODS FOR INVENTORY MANAGEMENT OF GENERIC MOBILE OBJECTS

Fig. 1

(57) **Abstract:** A method and systems for dispensing and collecting mobile objects for temporary use by a user. The system includes at least one control unit having at least one identification-related-data-collecting unit, a verification unit, and at least one lock-mechanism unit. Preferably, the lock-mechanism unit is controllably operated by the control unit, to thereby facilitate the releasing or collecting of at least one mobile object. The at least one identification-related-data-collecting unit facilitates the collection of input identification related data associated with the user, the identification related data can later be bound to an identifier of the user. The identification related data may be extracted from identification means selected from the group including identification documents, identification devices, and unique personal physical identification features. The control unit is in communication flow with the verification unit to thereby provide the identification related data to the verification unit, wherein the verification unit transmits permissive data associated with the user and based on the identification related data. The control unit activates the lock-mechanism unit, based on the permissive data, to thereby enable the dispensing or collecting of at least one mobile object.



SYSTEMS AND METHODS FOR INVENTORY MANAGEMENT OF GENERIC MOBILE OBJECTS

5 FIELD OF THE INVENTION

The present invention generally relates to inventory management systems and methods for controlled dispensing and collecting of generic mobile objects.

BACKGROUND OF THE INVENTION

10 Managing unidentifiable mobile objects, such as shopping carts, having no individual identity means attached thereto or integrated therein, is a known problem.

The term "generic" as used herein with conjunction with an object, refers to an object having no individual identity, tracking device or identification means. If the does have an individual identity, then that individual identity is not being used.

15 In some prior art attempts to resolve the costly problem, individual identification means are coupled with each mobile object which is later being coupled with an individual user. However, these attempts have proven to be impractical, being either complex or expensive or both.

20 There is therefore a need and it would be advantageous to have a system and methods for managing the inventory of generic mobile objects.

SUMMARY OF THE INVENTION

The principle intentions of the present invention include providing a system and methods for dispensing and collecting generic movable objects.

25 According to the teachings of the present invention, there is provided a system for dispensing and collecting mobile objects for temporary use by a user. The system includes at least one control unit having at least one identification-related-data-collecting unit, a verification unit, and at least one lock-mechanism unit. Preferably, the lock-mechanism unit is controllably operated by the control unit, to thereby
30 facilitate the releasing or collecting of at least one mobile object.

The at least one identification-related-data-collecting unit facilitates the collection of input identification related data associated with the user, the identification related data including an identifier of the user. The identification related data may be extracted from identification means selected from the group including
5 direct user input such as a name and/or password, identification documents, identification devices, and unique personal physical identification features. For example, an identification card, a credit card, a membership card, an RFID key, a RF device, a barcode, a physical key, one or more unique personal physical identification features such as biometric features and/or any other commonly used identification
10 means.

The control unit is in communication flow with the verification unit to thereby provide the identification related data to the verification unit, wherein the verification unit transmits permissive data associated with the user and based on the identification related data. The control unit activates the lock-mechanism unit, based on the
15 permissive data, to thereby enable the dispensing or collecting of at least one mobile object.

Upon receiving the permissive data by the control unit, wherein the permissive data allows a user to obtain at least one mobile object, the control unit unlocks a lock-mechanism unit to thereby enable a user to take a mobile object.

20 Upon receiving the permissive data by the control unit, wherein the permissive data allows a user to return at least one mobile object, the control unit unlocks the at least one lock-mechanism unit to thereby enable a user to return a mobile object.

Optionally, the control unit and the verification unit are embodied as a single physical unit. For example, the verification unit may be a component that is integrated
25 in the control unit.

Optionally, the verification unit is a remote unit, such as a server of a third party.

Optionally, the mobile objects are carts.

Preferably, the control unit is adapted to dispense or collect is single mobile
30 object at a time.

Optionally, the lock-mechanism unit includes three operating states:

a) a mobile-object-release-state, wherein the mobile-object-release-state facilitates the dispensing of a mobile-object;

b) a mobile-object-receive-state, wherein the mobile-object-receive-state facilitates the collecting of a mobile-object; and

5 c) a locked-state, wherein in the locked-state, the lock-mechanism unit disables both the dispensing and the receiving of a mobile-object.

It should be noted that when the lock-mechanism is in mobile-object-release-state the collection of mobile devices is prevented by the lock-mechanism unit. Similarly, when the lock-mechanism is in mobile-object-receive-state the dispensing
10 of mobile devices is prevented by the lock-mechanism unit.

It should be noted that when the lock-mechanism prevents the dispensing of mobile devices, the whole stack of mobile devices is locked by a single lock-mechanism unit. That is, the locking of the stack of mobile devices is not done on an individual basis.

15 Optionally, the default idle state of the system is the locked-state.

Optionally, the lock-mechanism unit is either in a mobile-object-release-state or in a mobile-object-receive-state, wherein either the dispensing or the returning of a mobile-object requires applying a minimal manual force provided by the user.

Optionally, the lock-mechanism unit is either in a mobile-object-release-state
20 or in a mobile-object-receive-state, wherein either the dispensing or the returning of a mobile-object requires applying a minimal manual force by a motor, such as an electric motor.

Optionally, the lock-mechanism unit further includes a free-state, wherein in the free-state both the dispensing and the receiving of a mobile-object are enabled
25 simultaneously.

Preferably, during maintenance or malfunctioning of the system, the default idle state of the lock-mechanism is set to the free-state.

According to further teachings of the present invention, there is provided a method for dispensing and collecting mobile objects for temporary use by users. The
30 method includes the steps of:

- a) restricting a mobile object movement within a predefined zone using at least one lock-mechanism unit, wherein the restricting is controlled by a control unit, having at least one identification-collecting unit with at least one input device, and wherein the control unit is in communication flow with a verification unit;
- 5 b) receiving identification information from at least one user using the at least one identification-related-data-collecting unit, wherein the identification related data includes an identifier of the user to thereby uniquely identify the user;
- c) transmitting identification related data to the verification unit by the control unit;
- 10 d) transmitting permissive data associated with the user from the verification unit to the control unit;
- e) activating the at least one lock-mechanism unit to thereby facilitate the dispensing or collecting of the preconfigured number of mobile-objects, in accordance with the permissive data; and
- 15 f) updating the verification unit by the control unit upon completion of either the dispensing or collection of a mobile-object.

Optionally, the permissive data contains a refusal to either dispense or return a mobile object.

Optionally, the permissive data is a permission to dispense a mobile object.

20 Optionally, the permissive data is a request to return a mobile object.

Optionally, the mobile objects are carts.

Optionally, the mobile objects are motorized vehicles.

25 Optionally, a user is identified using identification means selected from the group including a user direct input, identification documents, identification enabling devices, and unique personal physical identification features.

Optionally, a user is identified using direct user input, either at the control unit or directly communication with the third party verification unit.

BRIEF DESCRIPTION OF THE DRAWINGS

30 The present invention will become fully understood from the detailed description given herein below and the accompanying drawings, which are given by

way of illustration and example only and thus not limitative of the present invention, and wherein:

Fig. 1 is a general schematic block diagram illustration of mobile-objects-inventory-control system for dispensing and collecting unidentifiable mobile objects, according to some embodiments of the present invention.

Fig. 2 shows a schematic flowchart diagram of a method for controlling dispensing and collecting of unidentifiable mobile objects, according to some embodiments of the present invention.

10 DETAILED DESCRIPTION OF THE INVENTION

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided, so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

An embodiment is an example or implementation of the inventions. The various appearances of "one embodiment," "an embodiment" or "some embodiments" do not necessarily all refer to the same embodiments. Although various features of the invention may be described in the context of a single embodiment, the features may also be provided separately or in any suitable combination. Conversely, although the invention may be described herein in the context of separate embodiments for clarity, the invention may also be implemented in a single embodiment.

Reference in the specification to "one embodiment", "an embodiment", "some embodiments" or "other embodiments" means that a particular feature, structure, or characteristic described in connection with the embodiments is included in at least one embodiment, but not necessarily all embodiments, of the inventions. It is understood that the phraseology and terminology employed herein is not to be construed as limiting and are for descriptive purpose only.

Methods of the present invention may be implemented by performing or completing manually, automatically, or a combination thereof, selected steps or tasks. The order of performing some methods step may vary. The descriptions, examples,

methods and materials presented in the claims and the specification are not to be construed as limiting but rather as illustrative only.

Meanings of technical and scientific terms used herein are to be commonly understood, unless otherwise defined. The present invention can be implemented for testing or practice with methods and materials equivalent or similar to those described herein.

Reference is now made to the drawings. Fig. 1 is a general schematic block diagram illustration of a mobile-objects-inventory-control system **100** for controlled dispensing and collecting of generic mobile objects, according to some embodiments of the present invention. Mobile-objects-inventory-control system **100** includes at least one control unit **110**, wherein each control unit **110** controls at least one lock-mechanism unit **120** and wherein each control unit **110** includes a control panel **130**, having an identification-related-data-collecting unit **132** and optionally, a display **134**. Mobile-objects-inventory-control system **100** further includes a verification unit **150** for verifying obtained user's identification related data and thereby, either approve the releasing or receiving of a mobile object or refuse to serve that user.

Mobile-objects-inventory-control system **100** is designed to be used by a random user **20**, that can be verified by control unit **110** via identification-related data collecting unit **132**. Control unit **110** is operatively connected to verification unit **150** that verifies identification related data provided by the user, and transmits back to control unit **110** either an approval to dispense/receive a mobile object or a refusal to serve that user. Typically, verification unit **150** is a computerized repository that serves the entity that possesses the generic mobile objects and has access to data related to users, including identification related data associated with the users.

For the sake of clarity, a verification unit as used herein refers to a unit that verifies the credibility of a user to use the system of the present invention. The verification the credibility of a user to use the system of the present invention can be performed in a variety of ways. The verification unit may be embodied, with no limitations, as remote computerized device adapted to identify the user using received identification related data collected via identification-related-data-collecting unit **132**. The identification related data may be collected from an identification card, a credit card, a membership card, an RFID key, a RF device, a barcode, a physical key, a virtual key one or more unique personal physical identification features such as

biometric features and/or any other commonly used identification means. In some embodiments, verification unit **150** is embodied as an integral part of control unit **110**.

It should be noted that each control unit **110** may include a number of identification panels **130** that may be used simultaneously by a respective number of
5 users **20**.

Lock-mechanism unit **120** may be set to three main operational states, the first state being to idle state. Typically, in the operational idle state of mobile-objects-inventory-control system **100** is a locked-state, in which lock-state lock-mechanism unit **120** disables both the dispensing and the receiving of a mobile-object. In a
10 mobile-object-release-state, lock-mechanism unit **120_i** is configured to allow the release of a mobile object. In a mobile-object-receive-state, lock-mechanism unit **120_i** is configured to allow the return of a mobile object.

Preferably, lock-mechanism unit **120** may be set to a fourth state, the free-state. In the free-state both the dispensing and the receiving of a mobile-object are
15 enabled simultaneously. The free-state may be useful in non-operation situations such as during maintenance or malfunctioning of mobile-objects-inventory-control system **100**, the default idle state of lock-mechanism **120** is set to the free-state.

Reference is now made to Fig. 2, showing a schematic flowchart diagram of a method **200** for dispensing and/or collecting at least one mobile object, according to
20 embodiments of the present invention, wherein the at least one mobile object has no unique identification means or a tracking device attached thereto or integrated therein. Typically, in the operational idle state **201** of mobile-objects-inventory-control system **100** is a locked-state, in which lock-state lock-mechanism unit **120** disables both the dispensing and the receiving of a mobile-object.

25 Method **200** includes the following steps:

Step 210: Obtaining user identification related data.

User **20_i** approaches control unit **110** in order to either obtain at least one mobile object or return at least one mobile object. User **20_i** is required to provide identification related data via a variety of identification means
30 provided by identification-related-data-collecting unit **132** of control unit **110**. The identification means includes, with no limitations, a user direct input,

identification documents such as identification cards, credit cards, membership cards and identification devices such as Bluetooth devices, RFID devices and other RF devices, barcodes, keys, unique personal physical identification features such as biometric features and/or any other commonly used
5 identification means.

Step 220: transmitting identification related data to a verification unit.

Identification-related-data-collecting unit **132** reads the identification means provided by user **20_i** and control unit **110** sends the identification related data to verification unit **150**.

10 **Step 235:** checking what is the next activity allowed for that user.

Upon positively verifying identification related data provided by user **20_i**, verification unit **150** determines if user **20_i** is allowed to use the system and if so, verification unit **150** further determines if user **20_i** should return a lent mobile object or if user **20_i** should be allowed to lend a mobile object.

15 Verification unit **150** then transmits the determined response to control unit **110**. Typically, verification unit **150** is a computerized repository of a third party that serves the entity that possesses the generic mobile objects and has access to data related to users, including identification related data associated with the users.

20 If the determined response is a refusal, go to Step **299** and exit. Thereby, the operational idle state **201** is maintained.

If the determined response is to allow the receiving of a mobile object, go to Step **250**.

Step 240: activating the lock-mechanism unit to allow the release of a mobile object.

25 The determined response obtained by control unit **110** from verification unit **150** is that user **20_i** is allowed to receive a mobile-object.

Control unit **110** activates a respective lock-mechanism unit **120_i** to allow the release of a mobile object, that is, lock-mechanism unit **120_i** is set to be in a mobile-object-release-state.

30 **Step 245:** checking if the released mobile object was taken.

Typically, user **20_i** is given a preconfigured time interval to take a mobile object. Typically, to take the available mobile object, force is applied onto lock-mechanism unit **120**. Optionally, the force is added by a motor, such as an electric motor, instead of or in addition to user **20_i**. The available mobile object is dispensed, and preferably, lock-mechanism unit **120** moves back to the idle state being the locked-state.

If no mobile objects were taken within the preconfigured time interval, go to **Step 299**.

Go to step **260**.

- 10 **Step 250**: activating the lock-mechanism unit to allow a controlled return of a mobile object.

The determined response obtained by control unit **110** from verification unit **150** is that user **20_i** is allowed to return a mobile object.

- 15 Control unit **110** activates a respective lock-mechanism unit **120_i** to allow a receiving of a mobile object, that is, lock-mechanism unit **120_i** is set to be in a mobile-object-receive-state.

Step 255: checking if a mobile object was received.

- 20 Typically, user **20_i** is given a preconfigured time interval to return a mobile object. Typically, to return a mobile object, force is applied onto lock-mechanism unit **120**. Optionally, the force is applied by a motor, such as an electric motor, instead of or in addition to user **20_i**. The mobile object is typically pushed in, and preferably, lock-mechanism unit **120** moves back to the idle state being the locked-state.

- 25 If no mobile objects were returned within the preconfigured time interval, go to **Step 299**.

Step 260: reporting to the verification unit.

- 30 Upon successful completion of a dispensing/receiving of a mobile object by user **20_i**, the successful completion of the activity is reported to verification unit **150**, to thereby facilitate verification unit **150** to update the data associated with user **20_i**.

Step 299: Return to idle state **201**.

(end of method **200** of determining a financial credibility status)

5 In variations of the present invention, verification unit **150** and control unit **110** are adapted to allow the release and receive of more than one mobile object at a time.

In some embodiments of the present invention, the mobile objects are carts.

In some embodiments of the present invention, the mobile objects are tools taken/returned by servicemen of a company providing, for example, maintenance services.

10 In some embodiments of the present invention, the mobile objects are beach/pool/spa towels in vacation resorts.

In some embodiments of the present invention, the mobile objects are golf carts/trolleys, either motorized or not, at golf dedicated courts or clubs.

15 In some embodiments of the present invention, the mobile objects are sunshades, umbrellas, beach chairs and/or beach cabins in a dedicated beach resort.

In some embodiments of the present invention, the mobile objects are recreational motorized vehicles, such as cars, trucks, scooters or go-carts at a dedicated renting facility.

20 In some embodiments of the present invention, the mobile objects are medical or paramedical equipment, including wheel-chairs, rollator walkers and equipment the like, at a medical facility.

25 In some embodiments of the present invention, the mobile objects are research related material, substance or equipment such as restricted drugs, dangerous substances and dedicated restricted equipment, at a research facility, a medical facility, a paramedical facility or a production facility.

In some embodiments of the present invention, control unit **110** activates a lock-mechanism unit **120_i** to release a preconfigured number of mobile objects.

Optionally, to control the number of released/collected mobile objects, lock-mechanism unit **120** may further include a sensor adapted to sense the number of released/collected mobile objects.

5 In variations of the present invention, a fine imposed on a user that fails to return a lent mobile object, which fine is collected via the cellular services provider of that user.

10 Although the present invention has been described with reference to the preferred embodiment and examples thereof, it will be understood that the invention is not limited to the details thereof. Various substitutions and modifications have been suggested in the foregoing description, and others will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within the scope of the invention as defined in the following claims.

Claims:

1. A system for dispensing and collecting mobile objects for temporary use by a user, the system comprising:

- a) at least one control unit comprising at least one identification-related-data-collecting unit;
- b) a verification unit; and
- c) at least one lock-mechanism unit,

wherein said lock-mechanism unit is controllably operated by said control unit, to thereby facilitate the releasing or collecting of at least one mobile object;

wherein said at least one identification-related-data-collecting unit facilitates the collection of input identification related data associated with the user, said identification related data including an identifier of the user;

wherein said control unit is in communication flow with said verification unit to thereby provide said identification related data to said verification unit;

wherein said verification unit transmits permissive data associated with the user and based on said identification related data; and

wherein said control unit activates said lock-mechanism unit to thereby enable the dispensing or collecting of at least one mobile object.

2. The system as in claim 1, wherein upon receiving said permissive data by said control unit, and wherein said permissive data allows a user to obtain at least one mobile object, said control unit unlocks one of said at least one lock-mechanism unit to thereby enable a user to take a mobile object.

3. The system as in claim 1, wherein upon receiving said permissive data by said control unit, and wherein said permissive data allows a user to return at least one mobile object, said control unit unlocks one of said at least one lock-mechanism unit to thereby enable a user to return a mobile object.

4. The system as in claim 1, wherein when said at least one lock-mechanism unit prevents the release of said mobile objects, said mobile objects are held as a stack by one of said at least one lock-mechanism unit.

5. The system as in claim 1, wherein said control unit and said verification unit are embodied as a single physical unit.
6. The system as in claim 1, wherein said verification unit is a remote unit.
7. The system as in claim 1, wherein a user is identified using identification means selected from the group including a user direct input, identification documents, identification devices, and unique personal physical identification features.
8. The system as in claim 1, wherein said mobile objects are carts.
9. The system as in claim 1, wherein said control unit is adapted to dispense or collect a single mobile object at a time.
10. The system as in claim 1, wherein said lock-mechanism unit comprises three operating states:
 - a) a mobile-object-release-state, wherein said mobile-object-release-state facilitates the dispensing of a mobile-object;
 - b) a mobile-object-receive-state, wherein said mobile-object-receive-state facilitates the collecting of a mobile-object; and
 - c) a locked-state, wherein in said locked-state, said lock-mechanism unit disables both the dispensing and the receiving of a mobile-object.
11. The system as in claim 10, wherein the default idle state of the system is said locked-state.
12. The system as in claim 10, wherein said lock-mechanism unit is either in a mobile-object-release-state or a mobile-object-receive-state, and wherein said either dispensing or returning of a mobile-object requires applying a minimal manual force provided by the user.
13. The system as in claim 10, wherein said lock-mechanism unit is either in a mobile-object-release-state or a mobile-object-receive-state, and wherein said either dispensing or returning of a mobile-object requires applying a minimal manual force by a motor.
14. The system as in claim 10, wherein said lock-mechanism unit further comprises a free-state, and wherein in said free-state both said dispensing and the receiving of a mobile-object are enabled simultaneously.

15. The system as in claim 14, wherein during maintenance or malfunctioning of the system, the default idle state of said lock-mechanism is set to said free-state.
16. A method for dispensing and collecting mobile objects for temporary use by users, said method comprising the steps of:
- a) restricting a mobile object movement within a predefined zone using at least one lock-mechanism unit, wherein the restricting is controlled by a control unit, having at least one identification-related-data-collecting unit with at least one input device, and wherein said control unit is in communication flow with a verification unit;
 - b) receiving identification information from at least one user using said at least one identification-related-data-collecting unit, wherein said identification related data includes an identifier of the user to thereby uniquely identify the user;
 - c) transmitting identification related data to said verification unit by said control unit;
 - d) transmitting permissive data associated with the user from said verification unit to said control unit;
 - e) activating said at least one lock-mechanism unit to thereby facilitate the dispensing or collecting of said preconfigured number of mobile-objects, in accordance with said permissive data; and
 - f) updating said verification unit by said control unit upon successful completion of either the dispensing or collection of a mobile-object.
17. The method as in claim 16, wherein said permissive data contains a refusal to either dispense or return a mobile object.
18. The method as in claim 16, wherein said permissive data is a permission to dispense a mobile object.
19. The method as in claim 16, wherein said permissive data is a request to return a mobile object.
20. The method as in claim 16, wherein said mobile objects are carts.
21. The method as in claim 16, wherein said mobile objects are golf carts/trolleys, either motorized or not, at golf dedicated courts or clubs.

22. The method as in claim 16, wherein said mobile objects are sunshades, umbrellas, beach chairs and/or beach cabins in a dedicated beach or pool facilities at a resort or dedicated property.
23. The method as in claim 16, wherein said mobile objects are motorized vehicles, including cars, trucks, scooters or recreational go-carts at a dedicated renting facility.
24. The method as in claim 16, wherein said mobile objects are medical or paramedical equipment, including wheel-chairs and rollator walkers, at a medical facility.
25. The method as in claim 16, wherein said mobile objects are research related material, substance or equipment, including restricted drugs, dangerous substances and dedicated restricted equipment, at a research facility, a medical facility, a paramedical facility or a production facility.
26. The method as in claim 16, wherein a user is identified using identification means selected from the group including identification documents, identification enabling devices, and unique personal physical identification features.
27. The method as in claim 16, wherein a user is directly communicating with the verification unit, bypassing said identification-related-data-collecting unit of said control unit.
28. The method as in claim 16, wherein said identification related data is communicated by a third party means directly to said verification unit, bypassing said identification-related-data-collecting unit of said control unit.

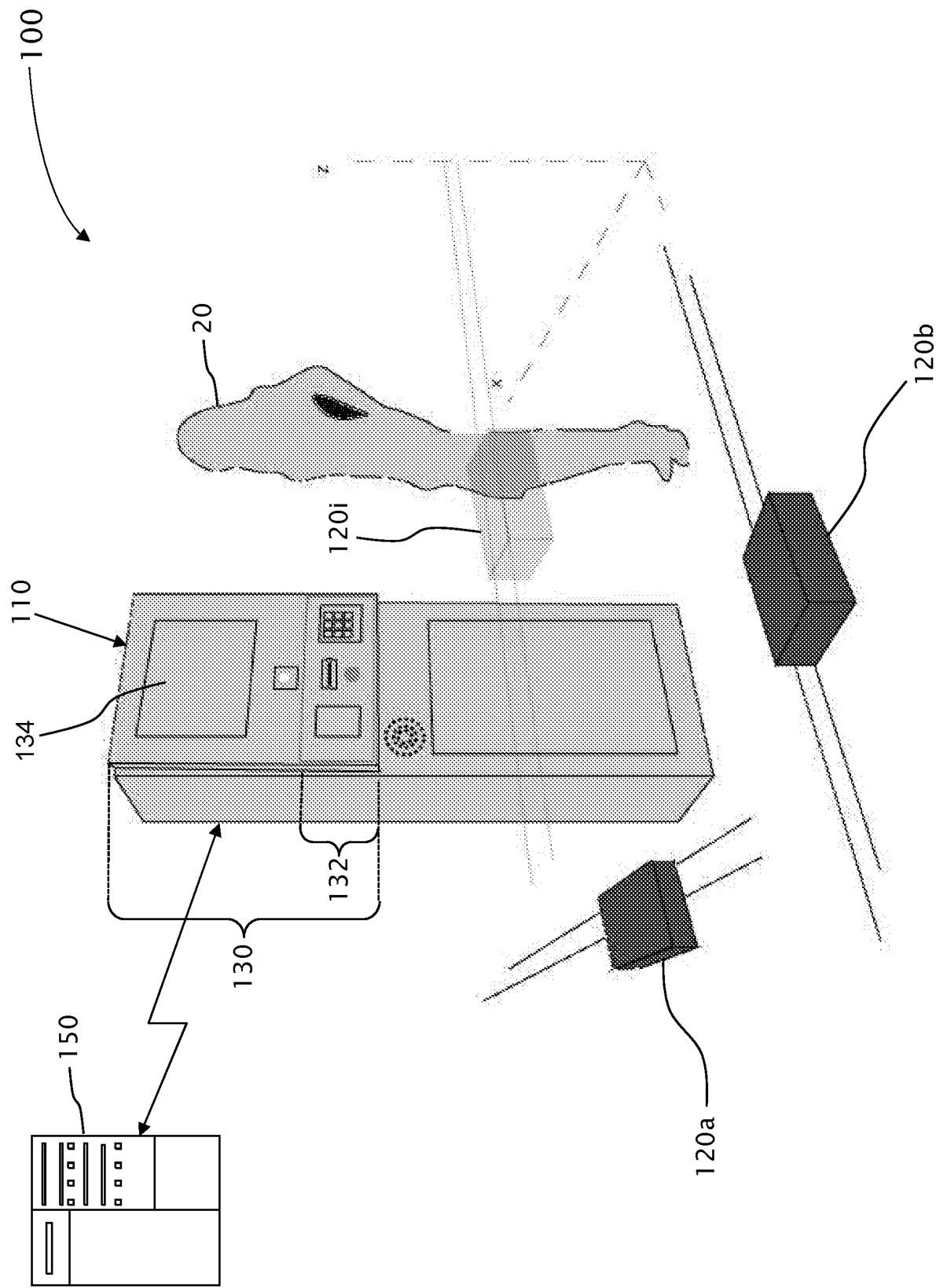


Fig. 1

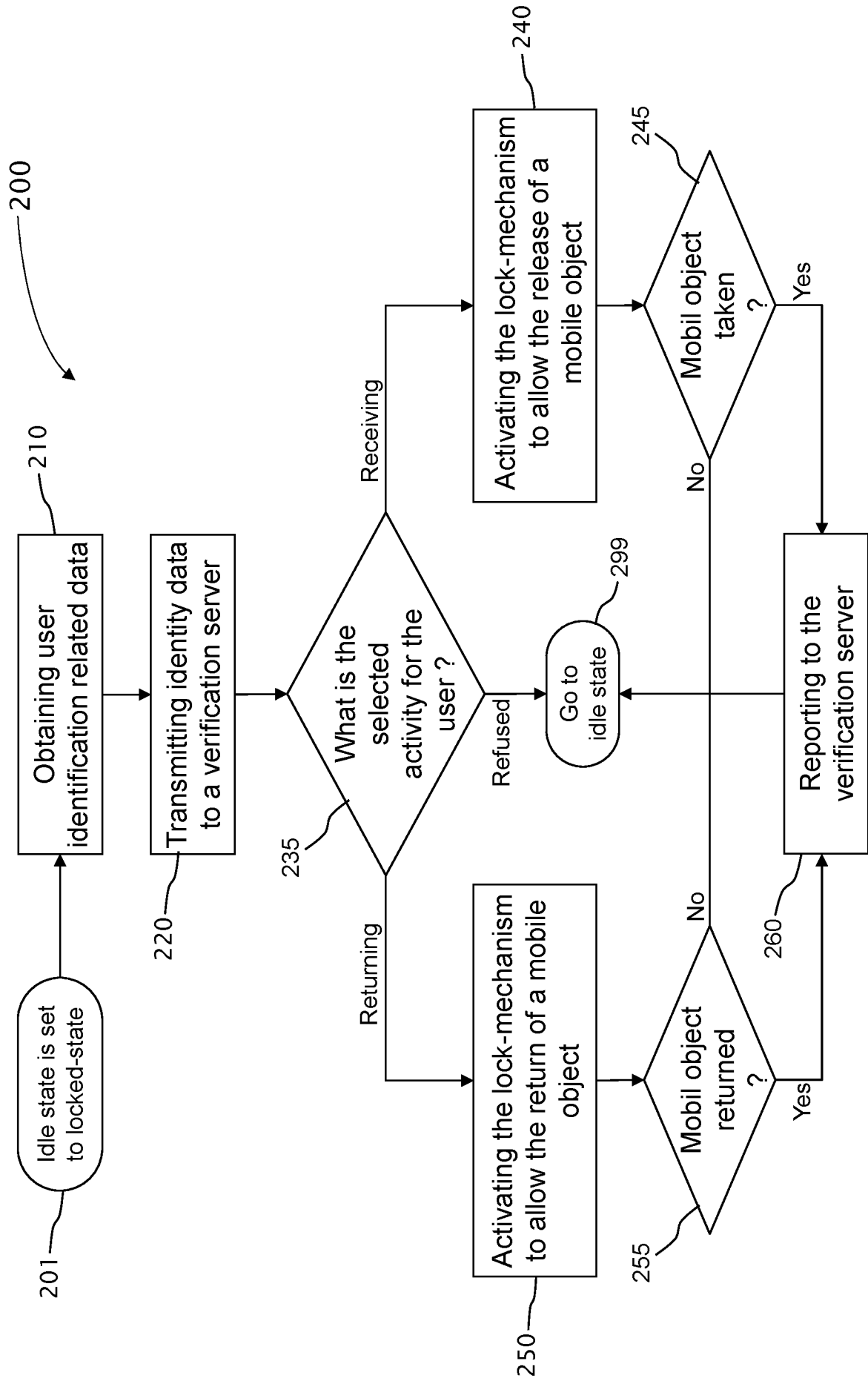


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL2015/050873

A. CLASSIFICATION OF SUBJECT MATTER

IPC (2015.01) G07F 17/10, G07F 7/08

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)

IPC (2015.01) G07F 17/10, G07F 7/08

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)

Databases consulted: Esp@cenet, Google Patents, FamPat database

Search terms used: locking mechanism, object, control, identification

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2491340 A Smith 05 Dec 2012 (2012/12/05) entire document	1-3,7,10-15,17-19, 26-28
X	US 5917407 A Squire et al. 29 Jun 1999 (1999/06/29) entire document	1,4-6,8,9,20-25



Further documents are listed in the continuation of Box C.



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