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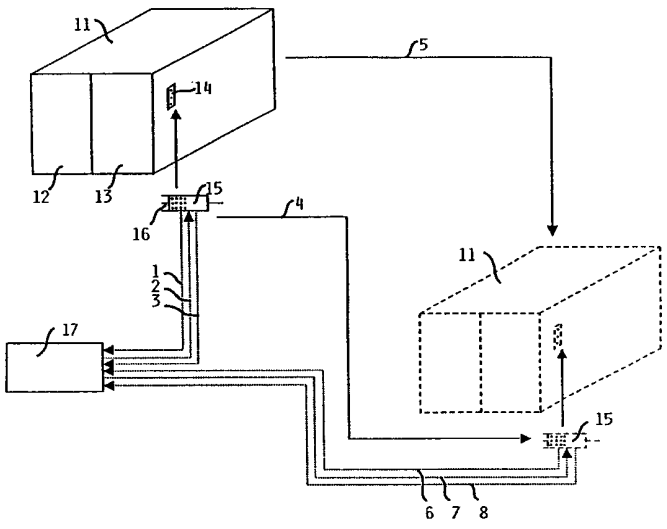
(54) Title: METHOD FOR CLOSING AND OPENING A CONTAINER



(57) Abstract: A method for successively closing and opening a container fitted with a lock, wherein the lock furthermore comprises memory means, and wherein the container is locked at a loading location by carrying out eh following steps: transmitting an identification code of the container to a central verification device via the communication means; transmitting a closing code to the memory means of the lock, via the communication means, by the central verification device; and closing the lock; and wherein the container is opened at an unloading location by carrying out the following steps: transmitting an identification code of the container to said central verification device via the communication means; trnamitting an opening code to the memory means of the lock, via the communication means, by the central verification device; comparing the opening code with the closing code; and opening the lock.

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METHOD FOR CLOSING AND OPENING A CONTAINER

The invention relates to a method for closing and/or opening a container fitted with a lock. In this connection the term container is understood to mean a transport container, such as a standard sea container, for example, or the loading space of a lorry. Such a method is generally known. The lock that locks the loading doors of the container on the outside is thereby locked and opened with a key in order to protect the, often valuable, contents of the container. The key can travel along with the container under trust of the carrier or be sent separately from the loading location to the unloading location.

The fact that such containers are quite frequently opened by malevolent individuals intending to steal the contents of the container from the rightful owner is a great worry to carriers and insurers. Especially in the case of containers whose contents are valuable it is not unusual for the lock to be opened with false keys or stolen keys, sometimes even with the co-operation of an employee of the carrier.

The object of the invention is to provide a simple, effective, efficient and reliable method for closing and/or opening a container which reduces the risk of theft of goods.

In order to accomplish that objective, a code, for example an opening code, is transmitted to the lock via telecommunication means. This it possible to open the container from a central location by remote control. Preferably, the lock comprises memory means, wherein the container is locked at a loading location by carrying out the following steps: transmitting an identification

code of the container to a central verification device via the communication means; transmitting a closing code to the memory means of the lock, via the communication means, by the central verification device; and closing the lock; and wherein the container is opened at an unloading location by carrying out the following steps: transmitting an identification code of the container to said central verification device via the communication means; transmitting an opening code to the memory means of the lock, via the communication means, by the central verification device; comparing the opening code with the closing code; and opening the lock. This method provides a reliable procedure for closing and subsequently opening the container, wherein it is made much more difficult, for example for employees of the carrier, to carry out any malevolent plans they may have.

Preferably, said communication means comprise a transceiver, more preferably a GSM and/or a satellite communication device, so that the method can be implemented independently of the telecommunication structure that is available.

The invention can be used with universal transceivers, which can be used with any type of container, but in a preferred embodiment of the method, each container has its own transceiver, and said transceiver is transported from the loading location to the unloading location separately from the container, wherein the transceiver is preferably arranged to operate only in response to a predetermined identification code of a container. In this manner the possibilities of fraud are further reduced.

The invention is in particular advantageous when the container is transported across the sea or by rail, because the amount of individual surveillance on the

container is limited with this kind of transport, unlike transport by lorry, for example.

Preferably, the transceiver comprises electrical contacts, preferably on the outside of the container, which can be connected to the lock. Preferably, the lock is located inside the container, on the inner side of the loading doors, so that it is very difficult to break open with a jemmy of with other tools. Preferably, the lock is closed and opened electrically, whereby the lock is fed from a battery that is present in side the container, and possibly by an external power supply in the case that the battery is empty or fails to work.

In a special embodiment, the transceiver furthermore comprises a GPS positioning device, wherein the position of the transceiver is preferably compared with the position of the predetermined unloading location before the central verification device transmits the opening code. In this manner a stolen container is prevented from being opened at a location other than the delivery address.

Preferably, the identification code of the container is compared with a file comprising identification codes of missing containers before the central verification device transmits the opening code. In this manner the missing containers can be prevented from being opened in a simple manner.

The invention furthermore relates to a container including a lock, a transceiver and a central verification device which are clearly arranged for being used with the method according to the invention.

The invention will now be explained in more detail by means of an exemplary embodiment of the method according

to the invention which is schematically illustrated in the figure.

The figure shows a container 11, which is intended for being transported by ship. Container 11 has a unique identification code, which is placed on the wall of the container, for example. Container 11 includes an internal lock, which is capable of locking the loading doors 12, 13. Opening and closing of the lock can only be done electrically from inside, to that end a battery is present in the container. The lock furthermore includes memory means, in which various codes can be stored, among which the identification code of the container 11. The memory means are connected to an electric contact 14, which is present in the wall on the outside of the container.

The figure furthermore shows a transceiver 15, which is preferably a satellite transceiver, so that it can be used all over the world. Transceiver 15 includes electric contacts 16, which can be plugged into the contact 14 of container 11. The unique transceiver 15 is arranged in such a manner that it can only co-operate with a specific container 11 having a specific identification code. Transceiver 15 furthermore comprises a GPS (Global Positioning System) device, which is known per se, which is capable of determining the coordinates of the position on earth and of transmitting said coordinates to the central verification device 17.

The central verification device 17 comprises a central processor unit, central memory means and a central transceiver, which is capable of communication with transceiver 15.

After the container has been loaded with goods at the

loading location, doors 12, 13 are closed. Transceiver 15 is plugged into contact 14 and the identification code is read from the memory means of the lock and transmitted to the central verification device 17 (arrow 1). In response thereto, the central verification device 17 transmits a closing code to the memory means in the lock (arrow 2) via transceiver 15. Following that, the lock is closed electrically, and confirmation thereof is transmitted to the central verification device 17 (arrow 3).

Transceiver 15 is unplugged from contact 14 and despatched to the unloading location of the container 11 by courier service (arrow 4). Container 11 is likewise transported to the unloading location, in this case by ship (arrow 5). In the figure, the container 11 and the transceiver 15 at the unloading location are illustrated in dotted lines.

In order to open container 11, transceiver 15 is plugged into contact 14 again at the unloading location, after which the identification code of container 11 is transmitted to the central verification device 17 in a similar manner as upon closing of the container (arrow 6). The central verification device verifies whether container 11 is listed as missing and whether the GPS coordinates of transceiver 15 correspond to those of the stated unloading location. If the result of both verifications is positive, the central verification device 17 transmits the opening code, which may for example be identical to the previously transmitted closing code, to the lock (arrow 7). A specific arithmetic or cryptographic connection may exist between each pair of closing and opening codes, for example. In the lock, the opening code is compared with the closing code, and if the two match, the lock will be automatically opened. If the opening code and the

closing code do not match, the lock will remain closed and consequently the container 11 cannot be opened. After the lock has been opened, confirmation thereof is transmitted to the central verification device 17 (arrow 8), after which the opening code and the closing code can be erased from the memory. New codes are used for a next closing and opening cycle, which codes may be determined at random by the central verification device 17, for example, in order to prevent fraud as much as possible.

CLAIMS

1. A method for closing and/or opening a container (11) fitted with a lock, wherein a code is transmitted (2, 7) to the lock via telecommunication means (15).

2. A method according to claim 1 for successively closing and opening the container (11), wherein the lock comprises memory means, and wherein the container (11) is locked at a loading location by carrying out the following steps:

transmitting (1) an identification code of the container (11) to a central verification device (17) via the communication means (15);

transmitting (2) a closing code to the memory means of the lock, via the communication means (15), by the central verification device (17); and

closing the lock;

and wherein the container (11) is opened at an unloading location by carrying out the following steps:

transmitting (6) an identification code of the container (11) to said central verification device (17) via the communication means (15);

transmitting (7) an opening code to the memory means of the lock, via the communication means (15), by the central verification device (17);

comparing the opening code with the closing code; and

opening the lock.

3. A method according to claim 1 or 2, wherein said communication means (15) comprise a transceiver.

4. A method according to claim 3, wherein said communication means comprise a GSM and/or a satellite communication device.

5. A method according to claim 3 or 4, wherein said transceiver (15) is transported from the loading location to the unloading location separately from the container (11).

6. A method according to claim 5, wherein the transceiver (15) is arranged to operate only in response to a predetermined identification code of a container (11).

7. A method according to any one of the preceding claims 3 - 6, wherein the transceiver (15) comprises electrical contacts (16) which can be connected to the lock.

8. A method according to any one of the preceding claims 1 - 7, wherein the container (11) is transported across the sea and/or by rail.

9. A method according to any one of the preceding claims 1 - 8, wherein the lock is located inside the container (11).

10. A method according to any one of the preceding claims, wherein the lock is closed and opened electrically, whereby the lock is fed from a battery.

11. A method according to any one of the preceding claims 3 - 10, wherein the transceiver (15) furthermore comprises a GPS positioning device.

12. A method according to claim 11, wherein the

position of the transceiver (15) is compared with the position of the predetermined unloading location before the central verification device (17) transmits the opening code.

13. A method according to any one of the preceding claims 2 - 12, wherein the identification code of the container (11) is compared with a file comprising identification codes of missing containers before the central verification device (17) transmits the opening code.

14. A container (11) fitted with a lock obviously intended for being used with the method according to any one of the preceding claims 1 - 13.

15. A transceiver (15) obviously intended for being used with the method according to any one of the preceding claims 1 - 13.

16. A central verification device (17) obviously intended for being used with the method according to any one of the preceding claims 1 - 13.

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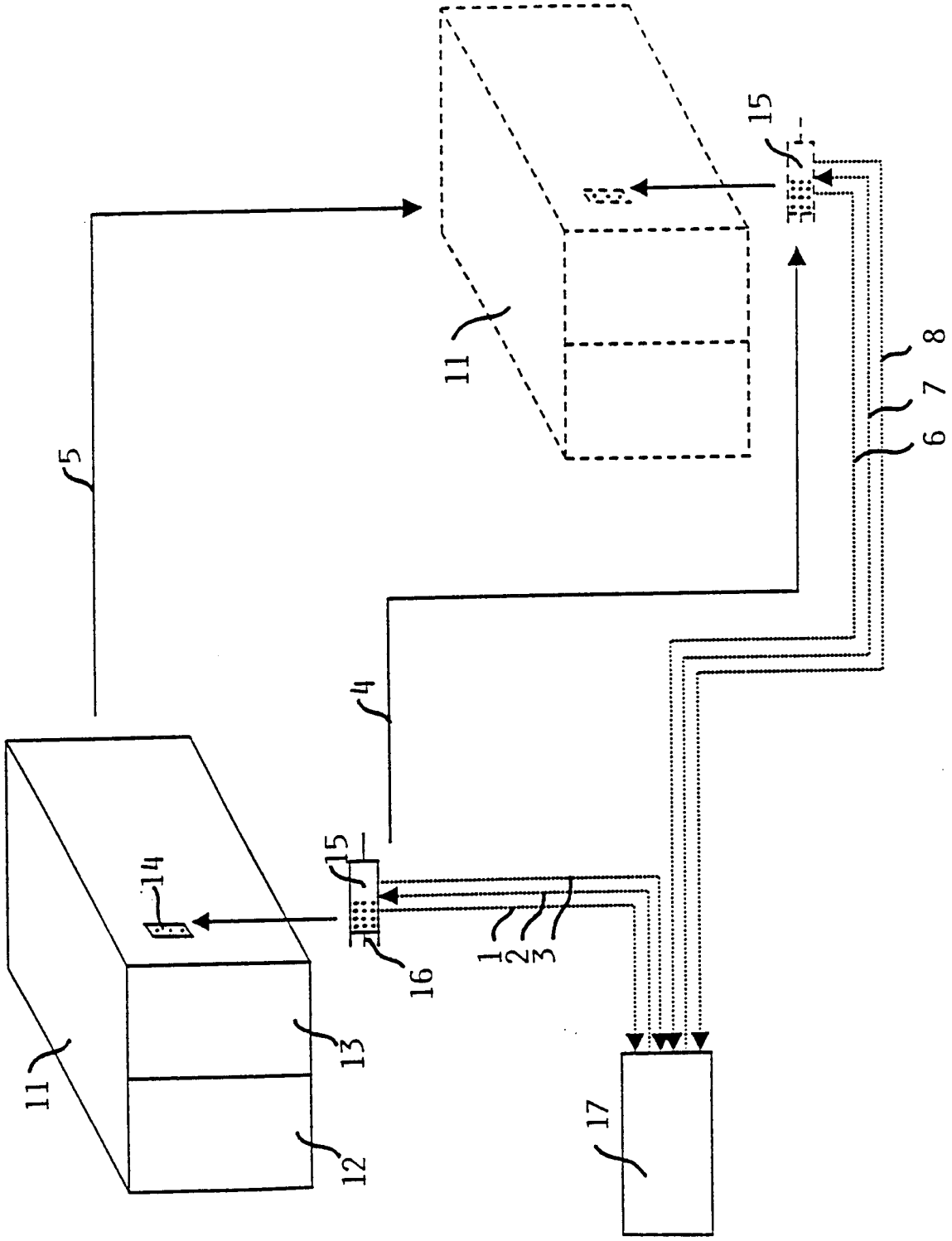

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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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 practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 907 286 A (KUMA TATSUYA) 25 May 1999 (1999-05-25) abstract; claims; figures	1,3,4, 10-12, 14-16
A	---	2,5,13
X	US 5 648 763 A (LONG GEORGE E) 15 July 1997 (1997-07-15) abstract; claims; figures	1,3,4,8, 10-12, 14-16
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A	---	2,5-7
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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