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(54) **Procedure and system for the collection management in a toll plaza**

(57) The invention relates to a method and system for the management of the collection in a toll station, which comprises using a safe with electronic means for the recognition of the insertion and extraction of identified bags, which carry money values inserted by collectors who have calculated said values, in combination with a station server computer, a terminal through which the monetary units of each bag are stored, a counting server

of a collecting entity and a central control server, the bags being inserted in a collecting compartment of the safe through a door provided with means for reading a first bag identifier and different means for reading a second bag identifier during the passage of the bag into the compartment, storing said first and second read identifiers for each bag and communicating data to a remote control centre.

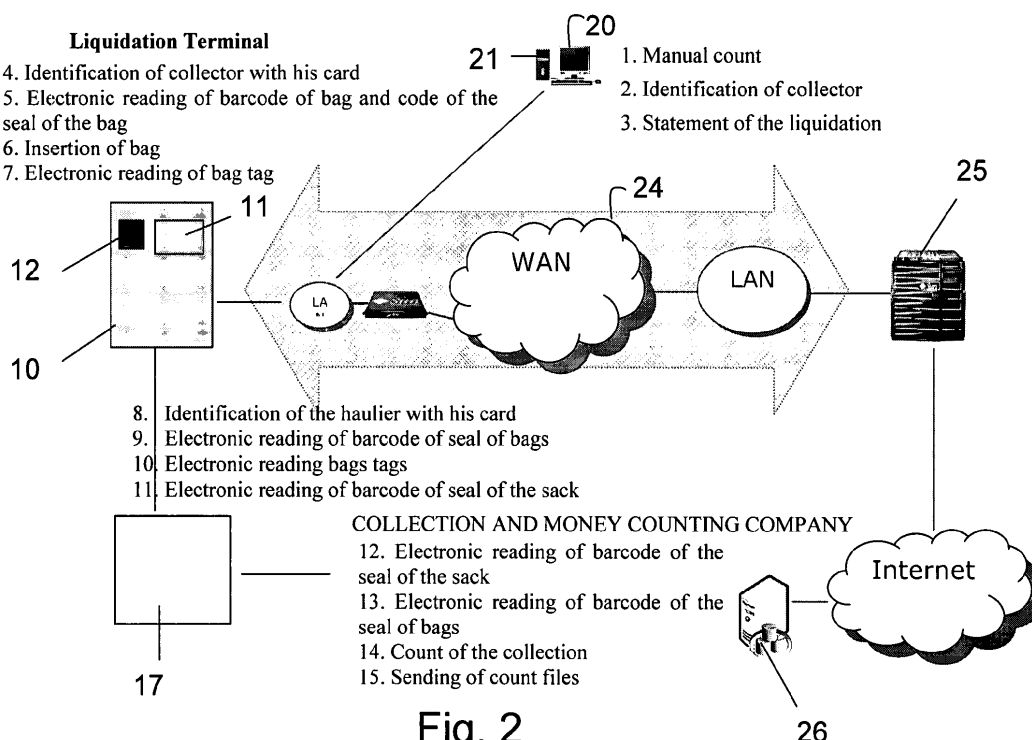


Fig. 2

Description

[0001] The present invention relates, in a first aspect, to a method for the management of the collection by electronic means and computer support, in a toll station, in which a safe equipped with electronic means for the recognition of the insertion and extraction of identified bags is used, which bags contain money values and are inserted in the safe by collectors who have previously calculated said values, while at the same time their data is transferred by means of a terminal to a computer acting as a station server, a counting server of a collecting entity which extracts the bags from the safe and proceeds to a count and a central control server having been provided.

[0002] The invention also relates, in a second aspect to a system for implementing the mentioned method, comprising the interconnection of several computers acting as a server and the mentioned electronic safe.

Prior State of the Art

[0003] Patent EP-B10201427 describes a safe provided for a toll station, although this patent describes security closure means and an arrangement for the easy extraction of a receptacle acting as a collecting compartment for a collection.

[0004] Electronic systems applied to toll for different functions, involving the use of wired and wireless computer networks, are known in the state of the art, such as those described in patent applications JP10149465, JP2006268418 and in patent ES-T3-2119387.

[0005] Systems for the management of the collection of a toll station have also been disclosed in the state of the art, comprising a safe equipped with electronic means for the recognition of the insertion and extraction of identified bags which contain money values loaded by collectors and which are inserted by said collectors who have previously calculated said values, after their personal identification, comprising as associated support means a computer acting as a station server and a terminal through which each collector transfers the result of the calculation in monetary units of a series of collections to said station server, and stores them in a bag. The mentioned server connects when necessary and transfers these data to a control centre.

[0006] The invention proposes in an environment such as the one explained a method and system in which the traceability of the money values is assured at all times of the operating cycle, from the collection, insertion of several amounts in bags, which are counted by collectors, such as the insertion and exit from the safe, transfer to the collecting centre and transmission to the control centre of the amount collected, linking said central control server, electronic safe and counting server in a coordinated and two-way manner.

Description of the Invention

[0007] The present invention relates, in a first aspect, to a method for the electronic management with computer support (mainly, information flow control) of the collection in a toll station, which is based on the use of a known electronic safe equipped with electronic means for the recognition of the insertion and extraction of bags, each of them duly identified, which contain money values and which are inserted in the safe by collectors who have previously calculated said values and extracted therefrom by employees of a security and transport collecting company. In order to suitably implement this method the mentioned safe must be in combination with:

- a computer acting as a local server or station server;
- a data input terminal, by means of which the inserted bags, i.e. information per bag, are stored in said station server, wherein each bag identifier has associated therewith the result of a calculation of the monetary units which have been loaded therein; the mentioned terminal communicates with the local server and with the electronic safe, informing of the bags to be delivered in advance;
- a central control server to which information relating to the events of interaction with the safe (mainly accesses and exits of bags with money values) is sent at determined times,
- a counting server, wherein a security and transport company which collects the collection carries out a count

the link between said control server and said two-way counting server (controlled from said control server) being such that a monitoring of the collection can be performed in said central control server at all times, being able to trace each of the events of interaction with the safe of the method.

[0008] The method proposed, in a possible preferred form of implementation, comprises the following steps:

- inserting the bags in a collecting compartment of the safe through a door of the safe provided with means for reading a first bag identifier (such as a barcode) and, in a preferred embodiment, also for reading another additional identifier (such as a barcode) associated with a closure guarantee seal of the bag before the insertion of the bag and with different means for reading (for example electronic card or TAG reader) a second bag identifier (electronic tag or TAG) during the passage of the bag into the compartment, storing (it is generally a transfer of the data to the local or station server) said first and second read identifiers for each bag;
- extracting, from time to time, a number of bags accumulated in said safe and reading said first and second identifier of each bag, and storing said data (again it is generally a transfer of data, in this case,

- to the central server or remote control centre or to the local server and therefrom to the central server);
- transferring the bags extracted from the safe, forming a collection remittance by a security and transport company to a collection centre equipped with a collection server;
 - communicating the insertion and extraction data of bags of the safe related to said collection remittance to said remote control centre and a part of the extraction data, identifying at least the extracted bags (by their two seal and bag identifiers) to said collection centre, from the station server;
 - reading by electronic means the mentioned first identifier and second identifier of each bag in said collection centre and opening the bags to calculate a money value or count of the collection remittance; and
 - communicating the final collection data of each collection remittance to said control centre.

[0009] In a preferred example, the bags are transferred in sacks, which are in turn duly identified, which contain several bags, and the information of the sack identifiers is also sent to the control centre which likewise forwards them to the counting centre, whereby the latter has additional information of the elements which make up the collection remittance which it must receive.

[0010] It is observed that by means of the mentioned steps, there is at all times a control of the content (money value and individual bag number) and location of the bags from the time of their formation, by a collector of the toll station, during their loading, storage in the safe and unloading from said safe, and during their transfer to the counting centre. It should be pointed out:

- that the safe knows, before receiving the bags, which bags it is going to receive, because this information is sent to the safe from the insertion terminal, when the formation of the bags with money values ends;
- the counting centre receives information of at least the bags which it is going to receive from the central server, therefore upon the arrival thereof (as has been mentioned with the bags arranged in the sacks), a first verification which checks if all the extracted bags have arrived at the counting centre is performed.

[0011] A very precise monitoring of the degree of coincidence of the information of the formed bags and those which have really been loaded in the safe of the toll station as well as of the bags extracted from the safe and received in the counting centre can be performed in the control centre by means of the associated server.

[0012] In relation to the system for implementing the method of the invention, it is based mainly on the fact that the electronic safe is connected to said station server and/or to said central unit to communicate all the events

related to the circulation, storage and extraction of the bags containing money values and consisting of reading identifiers associated with the mentioned bags in their entrance, fall into the compartment and exit from the mentioned safe and that said counting server of said collecting entity has a two-way connection to said central control server to receive information of the extracted bags and to transmit the reading of said identifiers associated with each received bag, as well as a total collection after a final count.

[0013] The communication between the safe and the station server takes place by means of a local access network (LAN), whereas the communication with the remote central server takes place through a network such as the Internet (WAN) for example, by means of a dedicated or protected conduit.

Brief Description of the Drawings

[0014]

Figure 1 is a representative diagram of the electronic system for the management of the collection of a toll station, organised around the electronic safe of this invention. The steps of the method have been indicated together with each of the elements of the system.

Figure 2 depicts the steps of the method together with the elements involved.

Detailed Description of an Embodiment

[0015] Figure 1 shows that the electronic safe of the invention 10 has, next to an access door, a barcode reader, for the step of inserting the bags. This operation is generally performed by the personnel in charge, such as a collector of the toll station, moving the bag provided with a seal with a tag closer to a barcode reader.

[0016] Inside the safe and next to the insertion conduit, there has been provided an RFID (radio frequency) antenna for reading an RFID tag or TAG also attached to each bag. It is thus verified that the bag identified by the first reading really has fallen into an inner or collecting compartment of the safe 10.

[0017] In the step of inserting bags, the identification of the collector with an identification card for example, the electronic reading of at least a barcode (although advantageously the reading of a first barcode associated with the bag and of a second barcode associated with a guaranteed closure seal of the bag is proposed), the insertion of the bag and finally the electronic reading of the electronic RFID tag or TAG associated with each bag, are performed by means of accessing the safe,.

[0018] Next to the extraction door 16, there is an RFID antenna 15 for controlling the bag exit and a barcode reader 14.

[0019] In the step of extracting bags, the identification of the haulier with, for example, an identification card,

the electronic reading of the barcode of the seal of the bags, the electronic reading of the TAG of the bags and the electronic reading of a seal associated with sacks which group a determined number of bags, are performed by means of the mentioned detector devices or sensors.

[0020] Figure 1 likewise shows a work station 20 in which the actions of manual counting actions, identification of a collector and statement of the liquidation which is inserted in a bag are performed. This information passes to a local server 21 or station server from which the information is sent (output arrow 24) to a central server not depicted in the figure.

[0021] Arrow 22 indicates that the server and the safe have a two-way dialogue, such that a detection of any possible discrepancy between the statement (formed bag) and insertion is established. Finally, arrow 23 indicates that the safe again has a dialogue in the exit step with the station server in order to detect any type of discrepancy between insertion and extraction.

[0022] Figure 2 shows a description which indicates a possible spatial distribution of the active agents, showing the transport entity 17 and the counting centre 26, as well as the central server 25, and the interrelation of these elements is shown by means of arrows.

Claims

1. A method for the management of the collection in a toll station, wherein a safe equipped with electronic means for the recognition of the insertion and extraction of identified bags is used, which bags contain money values and are introduced by collectors who have previously calculated said values, in combination with a computer acting as a station server, a terminal through which the result of a calculation in monetary units which is present in each bag is stored in at least said station server, a counting server of a collecting entity and a central control server, **characterised by** comprising the following steps:

- inserting the bags in a collecting compartment of the safe through a door provided with means for reading at least one first bag identifier before the insertion and different means for reading at least one second bag identifier during the passage of the bag into the compartment, storing said first and second read identifiers for each bag;
- extracting a number of bags accumulated in said safe and reading said at least first and second identifiers of each bag, and storing said data;
- transferring the bags extracted from the safe, forming a collection remittance to a collection centre equipped with a collection server;
- communicating the insertion and extraction data

of bags of the safe related to said collection remittance to said remote control centre, and a part of the extraction data, identifying at least the extracted bags to said collection centre, from the station server;

- reading by electronic means the mentioned at least one first identifier and at least one second identifier of each bag in said collection centre and opening the bags to calculate a money value or count of the collection remittance; and
- communicating the final collection data of each collection remittance to said control centre.

2. The method according to claim 1, **characterised in that** said storing of said at least one first and one second identifier of each of the bags circulating through the safe and forming a collection remittance, both during their insertion and during the extraction, takes place in the station server to which said safe is communicated.
3. The method according to claim 1, **characterised in that** said storing of said at least one first and one second identifier of the bags circulating through the safe and the seal which closes them, both during their insertion and during the extraction, takes place in the central server to which said safe is communicated.
4. The method according to claim 2 or 3, **characterised in that** the bags integrate a third identifier associated with a seal which closes them, and **in that** said second identifier is read and its reading is communicated to a server to which said safe is linked, both during the insertion of the bag and during its extraction.
5. The method according to claim 4, **characterised in that** said first identifier is a barcode identifying the collector who has prepared the bag and providing information about the calculated money value thereof and said third identifier provides information about the bag opening operation.
6. The method according to claim 1, **characterised in that** said second identifier is an electronic tag (TAG), containing additional information identifying the bag.
7. The method according to claim 1, **characterised in that** in said step of extracting the bags, such bags are arranged in sacks, which are closed by identification seals and optionally by TAGs, and **in that** said identification elements of the sacks are read and sent to the control centre which sends them to the collection centre and **in that** in the collection centre the sack identifiers are read and sent to said control centre.
8. The method according to claim 1, **characterised in**

that the station server is in two-way communication with the electronic safe, both in its entrance to detect any discrepancy between the statement to the station server from the terminal where the bags are formed and the real insertion of bags, and in the exit of the safe to detect any discrepancy between the inserted and extracted bags. 5

9. The method according to claim 1, **characterised in that** for the formation of the bags a manual count is performed of a group of monetary units which make up a liquidation and are inserted in a bag, provided with a seal and a TAG, then carrying out a statement of said liquidation by a collector, and identification of said collector and transfer of said data from said terminal to said station server. 10
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10. A system for the management of the collection in a toll station, which integrates: 20

a safe equipped with electronic means for the recognition of the insertion and extraction of identified bags which contain money values and which are inserted by collectors who have previously calculated said values; 25

a computer acting as a station server,
a terminal through which each collector transfers the result of the calculation in monetary units of a series of collections to said station server, and stores them in a bag; 30

characterised in that it further comprises a counting server of a collecting entity, and a central control server

said safe being connected to said station server and/or to said central unit to communicate all the events consisting of reading identifiers associated with the mentioned bags in their entrance or exit from the mentioned safe and **in that** said counting server of said collecting entity has a two-way connection to said central control server to receive information of the extracted bags and to transmit the reading of said identifiers associated with each received bag, as well as a total collection. 35
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11. The system according to claim 10, **characterised in that** said station server or part thereof is integrated in the safe. 50
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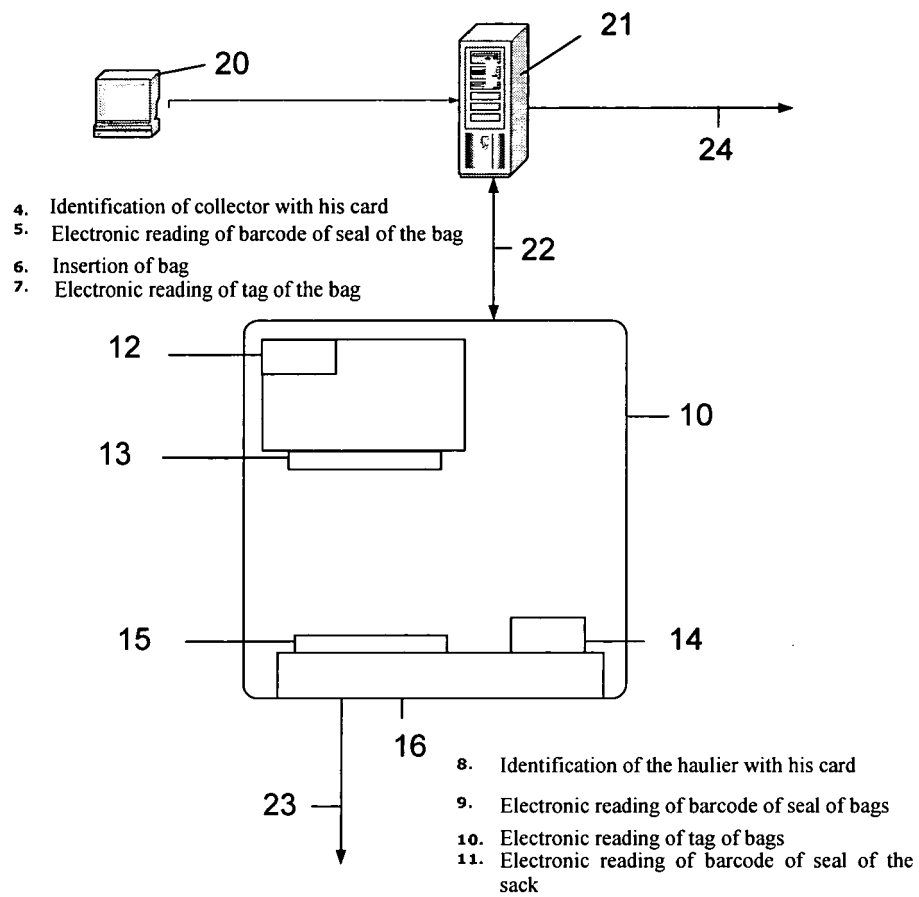


Fig. 1

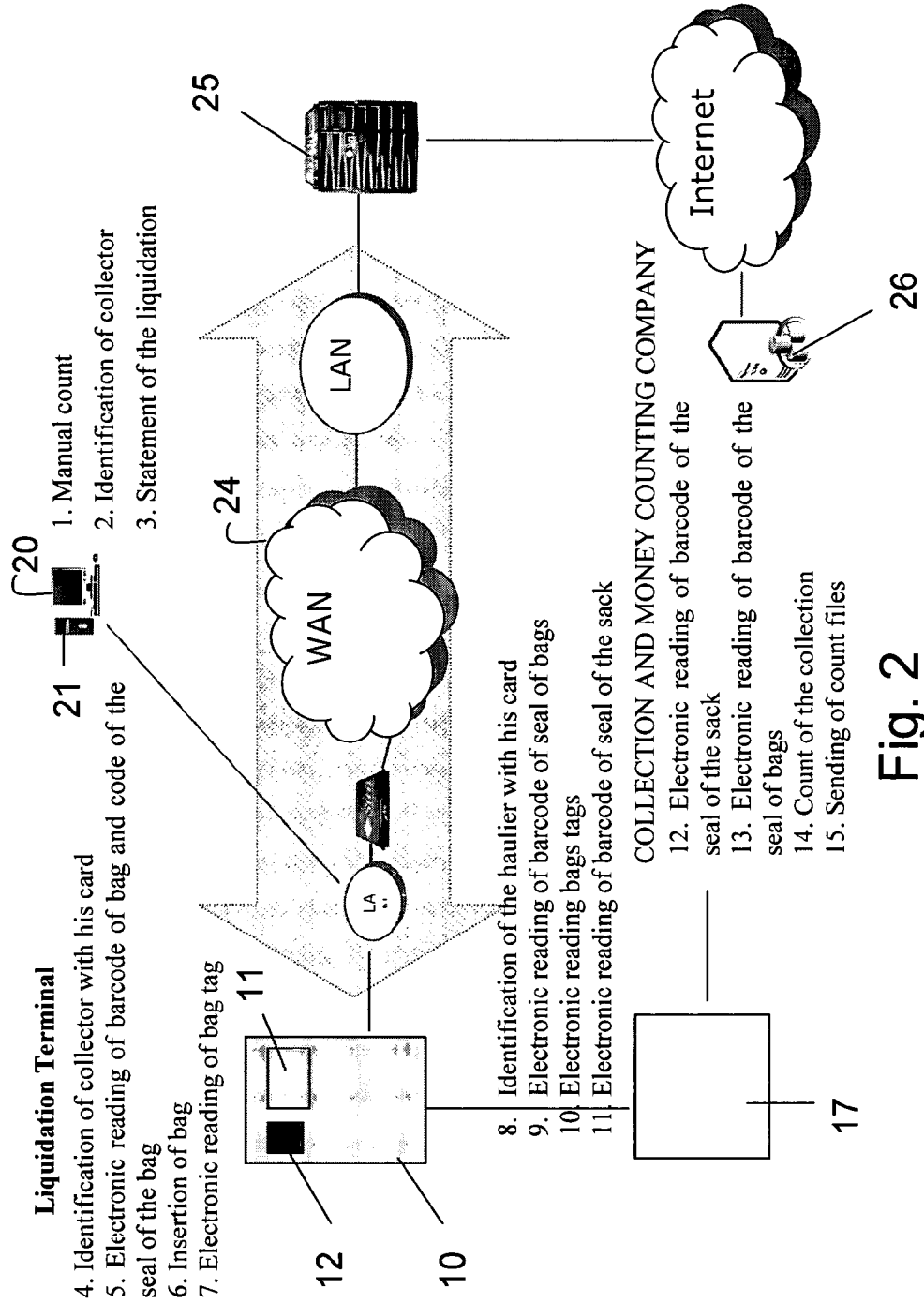


Fig. 2



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