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(71) Applicant: **Dresser Wayne AB**
200 61 Malmö (SE)

(72) Inventors:
- **Wemmert, Marlene**
  217 61 Malmö (SE)
- **Larsson, Bengt**
  SE-274 53 Skivarp (SE)
- **Lundgren, Christer**
  SE-243 31 Höör (SE)

(74) Representative: **Milanov, Nina Vendela Maria et al**
Awapatent AB
P.O. Box 5117
200 71 Malmö (SE)

(54) A fuel dispensing unit having a bank note acceptor and a method for emptying the same

(57) The invention relates to a fuel dispensing unit (1 a) for refuelling vehicles. The fuel dispensing unit (1a) is **characterized in that** is comprises a bank note validator (3), and a bank note acceptor having a bank note storage and an integrated security system for safe keeping of bank notes, wherein at least said bank note storage is adapted to be detachably assembled in said fuel dispensing unit. The invention also relates to a method for emptying a bank note acceptor detachable attached in a fuel dispensing unit (1 a), and to a payment terminal connected to a fuel dispensing unit.

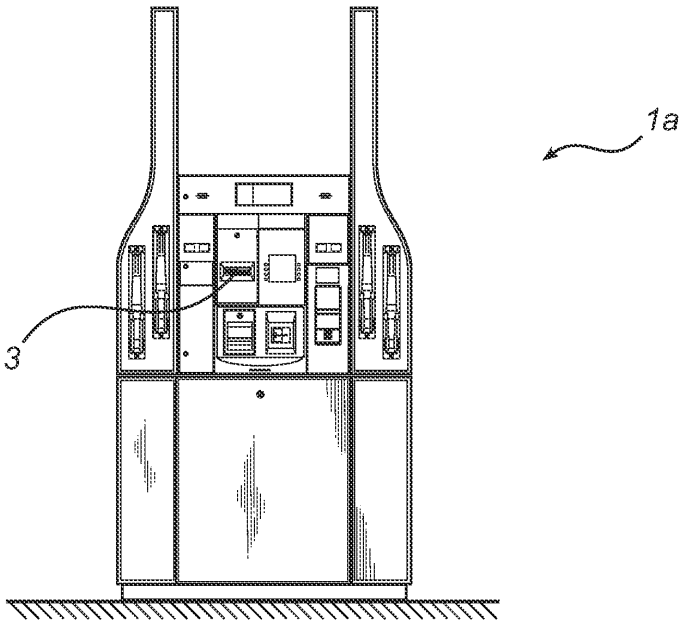

Fig. 1

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Description

Technical field

[0001] The present invention relates to a fuel dispensing unit having a bank note acceptor. The invention also relates to a method for emptying the bank note acceptor.

Technical background

[0002] When refuelling a tank of a motor vehicle today, using a self-service fuel dispensing unit, it is a common measure to pay for the fuel by means of a bank card due to the riskiness in the handling of bank notes. The use of a bank card instead of bank notes when paying for the dispensed fuel naturally eliminates problems such as how to store bank notes in the fuel dispensing unit or its payment terminal in a reliable manner, or how to empty the fuel dispensing unit or its payment terminal of bank notes without risking being robbed during the process. However, even on the market today, there is a request for the possibility of paying with bank notes instead of a bank card, or at least the option of choosing in which way to make the payment. In addition to the above, the use of bank cards may not be especially well-developed in all the countries of the world, and in some places the possibility to use bank cards is non-existent.

[0003] If payment with bank notes is to be an alternative when refuelling a motor vehicle, a safe and reliable handling of the bank notes must be guaranteed. The existing fuel dispensing units, which are able to handle bank notes, are generally provided with a payment terminal next to and connected with said fuel dispensing unit. The payment terminal is handling all of the necassary transactions. However, the safety regarding storing the bank notes in the fuel dispensing unit or its payment terminal and emptying said fuel dispensing unit or its payment terminal of its bank notes is far from satisfiying.

[0004] US-4,900,906, for example discloses an automated system for controlling a fuel dispensing pump. The system comprises a debit card vending apparatus, which apparatus has automated means for accepting the payment either in cash, credit or IC cards, means for automated verifying of said payment methods and means for issuing a system's debit card, and a gasoline pump controlling apparatus, which apparatus has automated means for controlling the operation of said fuel pump activity according to information obtained from said system's debit card. Means to allow a user of said debit card vending apparatus to enter required information are also provided. The cash inserted in the system above are stored in a little metal box, which is easy to acess through a opening in the back of the payment terminal.

[0005] A problem associated with the system above and prior art is the unsatisfying safety precautions in regard to the handling of bank notes around a fuel dispensing unit.

Summary of the invention

[0006] It is an object of the present invention to provide an improvement of the prior art. More particularly, it is an object of the present invention to provide a fuel dispensing unit which is able to handle bank notes, in addition to a bank card, in a safe and secure manner.

[0007] These and other objects as well as advantages that will be apparent from the following description of the present invention are achieved by the fuel dispensing unit according to the independent claims.

[0008] Thus, the present invention provides a fuel dispensing unit for refuelling vehicles, characterized in that said fuel dispensing unit comprises a bank note validator, and a bank note acceptor having a bank note storage and an integrated security system for safe keeping of bank notes, wherein at least said bank note storage is adapted to be detachably assembled in said fuel dispensing unit. This is advantageous in that the bank notes inputted in the fuel dispensing unit will be carefully validated and safely stored within the bank note acceptor. Additionally, since at least the bank note storage is detachable, the risk of being robbed when the bank note acceptor is to be emptied is essentially decreased due to the integrated security system in the bank note acceptor. Accordingly, if only the bank note storage is detached when the bank note acceptor is to be emptied, the security system will be placed within the bank note storage.

[0009] The bank note validator and the bank note acceptor may be integrated, which is advantageous in that manufacturing and mounting costs regarding these parts will be decreased.

[0010] The bank note acceptor may substantially have the shape of a box, which is advantageous in that it will be easy to handle.

[0011] The integrated security system in said bank note acceptor may comprise an ink cartridge adapted to explode if said bank note acceptor is tampered with. This feature will increase the safety level for the personnel handling the fuel dispensing unit and decrease the risk of criminals trying to rob the same when unsupervised. The fact that the bank note acceptor is equipped with an ink cartridge is discouraging for a potential robber, since the robber would know that even if the bank note acceptor could be stolen, it would ruin the bank notes stored inside upon intrusion. This naturally applies for the bank note acceptor when it is attached within the fuel dispensing unit as well as when removed from said fuel dispensing unit.

[0012] The bank note acceptor may further comprise at least one key reader for activation and deactivation of said security system, said key reader may be a Dallas key reader. The use of a key reader increases the level of security even further. The security system integrated in the bank note acceptor will react upon movements if not deactivated by means of the key reader, and potentially trigger the ink cartridge within the bank note acceptor.

[0013] The bank note acceptor may further comprise at least one sensor for detecting when said bank note acceptor is tampered with. Different kinds of sensors may be used in order to detect movements and motions of the bank note acceptor when the security system is still activated. Thereby, the ink cartridge may be triggered due to unauthorized movements of the bank note acceptor, which movements are detected by means of said at least one sensor.

[0014] The bank note acceptor may further comprise a connector for connection to the fuel dispensing unit, through which the fuel dispensing unit and the bank note acceptor communicate. The connector may also be used for docking the bank note acceptor to a docking station, for example stationed in a back office.

[0015] The bank note acceptor may further comprise a timer. The timer may be used when the security system in the bank note acceptor is at least partly deactivated and the bank note acceptor is removed from the fuel dispensing unit, in order to set a predetermined time interval before reactivating the security system. This way, theft of the bank note acceptor when removed from the fuel dispensing unit may result in triggering the ink cartridge.

[0016] The bank note acceptor may further comprise a sabotage net, which is advantageous in that the sabotage net may be adapted to trigger the ink cartridge if tampered with, thereby neutralizing the bank notes within the bank note acceptor.

[0017] According to a second aspect of the present invention, the invention relates to a method for emptying a bank note acceptor detachably attached in a fuel dispensing unit. The method comprises establishing access to said bank note acceptor, deactivating at least one first sensor and activating a timer in said bank note acceptor by means of a first key reader, docking said bank note acceptor in a docking station within a predetermined time interval set by the timer, deactivating an ink cartridge and at least one second sensor in said bank note acceptor by means of a second key reader, and opening said bank note acceptor. Following this method when emptying the bank note acceptor will essentially decrease the risk of being robbed. The integrated security system in the bank note acceptor will this way be partly activated even when said bank note acceptor is removed from the fuel dispensing unit. Thus, it will be pointless to steal the bank note acceptor even if removed from the fuel dispensing unit.

[0018] According to a third aspect of the invention, the invention relates to a payment terminal connected to a fuel dispensing unit, comprising a bank note validator, and a bank note acceptor having a bank note storage and an integrated security system for safe keeping of bank notes, wherein at least said bank note storage is adapted to be detachably assembled in said payment terminal. This is advantageous in that the bank notes inputted in the payment terminal will be carefully validated and safely stored within the bank note acceptor. Additionally, since at least the bank note storage is detachable, the risk of being robbed when the bank note acceptor is to be emptied is essentially decreased due to the integrated security system in the bank note acceptor. Accordingly, if only the bank note storage is detached when the bank note acceptor is to be emptied, the security system will be placed within the bank note storage.

[0019] The bank note validator and the bank note acceptor may be integrated, which is advantageous in that manufacturing and mounting costs regarding these parts will be decreased.

[0020] The bank note acceptor may substantially have the shape of a box, which is advantageous in that it will be easy to handle.

[0021] The integrated security system in said bank note acceptor may comprise an ink cartridge adapted to explode if said bank note acceptor is tampered with. This feature will increase the safety level for the personnel handling the payment terminal and decrease the risk of criminals trying to rob the same when unsupervised. The fact that the bank note accepter is equipped with an ink cartridge is discouraging for a potential robber, since the robber would know that even if the bank note acceptor could be stolen, it would ruin the bank notes stored inside upon intrusion. This naturally applies for the bank note acceptor when it is attached within the payment terminal as well as when removed from said payment terminal.

[0022] The bank note acceptor may further comprise at least one key reader for activation and deactivation of said security system, said key reader may be a Dallas key reader. The use of a key reader increases the level of security even further. The security system integrated in the bank note acceptor will react upon movements if not deactivated by means of the key reader, and potentially trigger the ink cartridge within the bank note acceptor.

[0023] The bank note acceptor may further comprise at least one sensor for detecting when said bank note acceptor is tampered with. Different kinds of sensors may be used in order to detect movements and motions of the bank note acceptor when the security system is still activated. Thereby, the ink cartridge may be triggered due to unauthorized movements of the bank note acceptor, which movements are detected by means of said at least one sensor.

[0024] The bank note acceptor may further comprise a connector for connection to the payment terminal, through which the payment terminal and the bank note acceptor communicate. The connector may also be used for docking the bank note acceptor to a docking station, for example stationed in a back office.

[0025] The bank note acceptor may further comprise a timer. The timer may be used when the security system in the bank note acceptor is at least partly deactivated and the bank note acceptor is removed from the payment terminal, in order to set a predetermined time interval before reactivating the security system. This way, theft of the bank note acceptor when removed from the payment terminal may result in triggering the ink cartridge.

[0026] The bank note acceptor may further comprise a sabotage net, which is advantageous in that the sabotage net may be adapted to trigger the ink cartridge if tampered with, thereby neutralizing the bank notes within the bank note acceptor.

[0027] Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the [element, device, component, means, etc]" are to be interpreted openly as referring to at least one instance of said element, device, component, means, etc., unless explicitly stated otherwise.

Brief description of the drawings

[0028] The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of preferred embodiments of the present invention, with reference to the appended drawings, where the same reference numerals will be used for similar elements, wherein:

Fig. 1 is a schematic view of a fuel dispensing unit having a bank note acceptor,
Fig. 2a is a perspective view of the bank note acceptor when locked,
Fig. 2b is a perspective view of the bank note acceptor when opened,
Fig. 3a-3d show how to remove the bank note acceptor from the fuel dispensing unit,
Fig. 4 is a schematic view of a fuel dispensing unit and its payment terminal, which payment terminal has a bank note acceptor.

Detailed description of preferred embodiments of the invention

[0029] Fig. 1 illustrates a fuel dispensing unit 1a having a bank note acceptor 2 detachably assembled within said fuel dispensing unit 1a. The bank note acceptor 2 is used to store bank notes inputted in the fuel dispensing unit 1 a in order to improve the safety level around said fuel dispensing unit 1 a.

[0030] In Fig. 2a, the bank note acceptor 2 is illustrated when locked. The bank note acceptor 2 has the shape of a box and comprises a bank note validator 3, a Dallas key reader 4, a LED 5 and a connector (not shown), which are all visible from the outside of the bank note acceptor 2. The bank note validator 3 validates the bank notes inputted in the fuel dispensing unit 1 a. The functions of the Dallas key reader 4 and the LED 5 will be described below. The connector is used for connection between the bank note acceptor 2 and the fuel dispensing unit 1 a. Also, the connector can be used for docking the bank note acceptor 2 to a docking station, for example stationed in a back office at a gas station. The bank note acceptor 2 further comprises a handle 6 in order to carry said bank note acceptor 2 when removed from the fuel dispensing unit 1 a. Also, a lid lock 7 is provided on the bank note acceptor 2 in order to access the inside of said bank note acceptor 2.

[0031] Fig. 2b illustrates the bank note acceptor 2 when opened. A bank note storage 8 is provided within the bank note acceptor 2, in which an integrated security system is installed. The security system comprises an ink cartridge (not shown) adapted to explode if the bank note acceptor 2 is tampered with. The bank note acceptor 2 also has several sensors (not shown) in order to detect if said bank note acceptor 2 is tampered with. A timer (not shown) and a sabotage net (not shown) are also provided within the bank note acceptor 2. The function of the timer will be described below. The sabotage net is provided on the inside of the walls in the bank note acceptor 2. If an intruder would penetrate one of the walls and thus the sabotage net, the ink cartridge would explode immediately, thereby destroying all of the bank notes. Finally, the bank note acceptor 2 comprises a main board (not shown) for controlling the security system and a bank note transporter 9 for transporting the inputted bank notes from the bank note validator 3 to the bank note storage 8.

[0032] Figs. 3a-3d illustrate how to remove the bank note acceptor 2 from the fuel dispensing unit 1a.

[0033] In Fig. 4 a fuel dispensing unit 1 b having payment terminal 12 is illustrated. The payment terminal 12 has a bank note acceptor 2 detachably assembled within said payment terminal 12. The bank note acceptor 2 is used to store bank notes inputted in the payment terminal 12 in order to improve the safety level around said fuel dispensing unit 1 b.

[0034] When using bank notes in order to pay for a refuelling of a motor vehicle, the bank notes are inputted into the bank note validator 3 accessible from the front of the fuel dispensing unit 1 a, as shown in Fig. 3a. The bank notes are validated in said bank note validator 3 and, if accepted, transported via the bank note transporter 9 to the bank note storage 8 located in the bank note acceptor 2. Due to the integrated security system within the bank note acceptor 2, the bank notes are safely stored in the fuel dispensing unit 1a until the bank note acceptor 2 and its bank note storage 8 will be emptied.

[0035] When the bank note acceptor 2 is located in the fuel dispensing unit 1 a, the integrated security system is in a pump mode. In the pump mode, an ink system controlling the ink cartridge and several different sensors are activated. The sensors consist of a lid sensor, a temperature sensor, a liquid sensor, a motion sensor and a tilt sensor. In case of tampering with the bank note acceptor 2, detected by the sensors, the ink system will trigger the ink cartridge.

[0036] In order to empty the bank note acceptor 2 of its bank notes, it must be removed from the fuel dispensing unit 1 a. Two different key locks 10, 11 must be opened to expose the bank note acceptor 2, as illustrated in Fig. 3b and Fig. 3c. The security system is now in an

open pump mode, but the ink system controlling the ink cartridge and all of the sensors are still activated. The security system can then shift from the open pump mode to a walk mode using a Dallas key against the Dallas key reader 4. In the walk mode, the ink system together with the lid sensor, temperature sensor and liquid sensor are still activated. However, the motion sensor and the tilt sensor are deactivated. The bank note acceptor 2 can now be removed from the fuel dispensing unit 1 a, thereby disconnecting the connector from the fuel dispensing unit 1 a. Also, in the walk mode, the timer is activated and set to reactivate the motion sensor and tilt sensor within a predetermined time interval if the connector is not connected to a docking station, provided for example in a back office. If the time interval set by the timer is about to expire or if the power disappears, a light from the LED 5 will alert the personnel handling the bank note acceptor 2. The personnel can also be alerted in other ways, such as by means of a sound. In the case of the time interval expiring before the bank note acceptor 2 is docked in the docking station, the bank note acceptor 2 will assume an alarm mode, wherein the motion sensor and the tilt sensor will be reactivated. However, if the bank note acceptor 2 is docked in the docking station before the time interval expires in the walk mode, the bank note acceptor 2 will assume a back office mode. In the back office mode, the ink system controlling the ink cartridge and all of the sensors are activated but the timer is deactivated. Finally, the bank note acceptor 2 can switch from the back office mode to an off mode by means of a Dallas key against the Dallas key reader 4. In the off mode, the ink system controlling the ink cartridge and all of the sensors are deactivated, so that the lid lock 7 can be opened and the bank note storage 8 can be emptied.

[0037] The security system in the bank note acceptor 2 can of course be designed in many different ways and the included components can be varied in size, shape and amount. Also, the bank note acceptor 2 can be used in other applications, such as a payment terminal belonging to a fuel dispensing unit.

[0038] According to a second aspect of the invention a method for emptying a bank note acceptor detachably attached in a fuel dispensing unit is provided comprising establishing access to said bank note acceptor, deactivating at least one first sensor and activating a timer in said bank note acceptor by means of a first key reader, docking said bank note acceptor in a docking station within a predetermined time interval set by the timer, deactivating an ink cartridge and at least one second sensor in said bank note acceptor by means of a second key reader, and opening said bank note acceptor.

[0039] According to a third aspect of the invention a payment terminal connected to a fuel dispensing unit is provided, comprising a bank note validator, and a bank note acceptor having a bank note storage and an integrated security system for safe keeping of bank notes, wherein at least said bank note storage is adapted to be detachably assembled in said payment terminal. An example of such a payment terminal may be seen in Fig. 4. Apart from the arrangement in a payment terminal 12, such a bank note validator and bank note acceptor work in the same way as described above for the embodiment in which the bank note validator and bank note acceptor are arranged in a fuel dispensing unit 1 a.

[0040] The invention has mainly been described above with reference to a few embodiments. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the invention, as defined by the appended claims.

Claims

1. A fuel dispensing unit (1a) for refuelling vehicles, **characterized in that** said fuel dispensing unit (1a) comprises
   a bank note validator (3), and
   a bank note acceptor (2) having a bank note storage (8) and an integrated security system for safe keeping of bank notes, wherein at least said bank note storage (8) is adapted to be detachably assembled in said fuel dispensing unit (1a).

2. A fuel dispensing unit (1a) according to claim 1, wherein said bank note validator (3) and said bank note acceptor (2) are integrated.

3. A fuel dispensing unit (1a) according to claims 1 or 2, wherein said bank note acceptor (2) substantially has the shape of a box.

4. A fuel dispensing unit (1a) according to any of the preceding claims, wherein said integrated security system in said bank note acceptor (2) comprises an ink cartridge adapted to explode if said bank note acceptor (2) is tampered with.

5. A fuel dispensing unit (1a) according to any of the preceding claims, wherein said bank note acceptor (2) further comprises at least one key reader (4) for activation and deactivation of said security system.

6. A fuel dispensing unit (1a) according to claim 5, wherein said at least one key reader (4) is a Dallas key reader.

7. A fuel dispensing unit (1a) according to any of the preceding claims, wherein said bank note acceptor (2) further comprises at least one sensor for detecting when said bank note acceptor (2) is tampered with.

8. A fuel dispensing unit (1 a) according to any of the preceding claims, wherein said bank note acceptor (2) further comprises a connector for connection to

the fuel dispensing unit (1 a).

9. A fuel dispensing unit (1 a) according to any of the preceding claims, wherein said bank note acceptor (2) further comprises a timer.

10. A fuel dispensing unit (1 a) according to any of the preceding claims, wherein said bank note acceptor (2) further comprises a sabotage net.

11. Method for emptying a bank note acceptor (2) detachable attached in a fuel dispensing unit (1a), comprising
establishing access to said bank note acceptor (2),
deactivating at least one first sensor and activating a timer in said bank note acceptor (2) by means of a key reader (4),
docking said bank note acceptor (2) in a docking station within a predetermined time interval set by the timer,
deactivating an ink cartridge and at least one second sensor in said bank note acceptor (2) by means of the key reader (4), and
opening said bank note acceptor (2).

12. A payment terminal (12) connected to a fuel dispensing unit (1 b), comprising
a bank note validator (3), and
a bank note acceptor (2) having a bank note storage (8) and an integrated security system for safe keeping of bank notes, wherein at least said bank note storage (8) is adapted to be detachably assembled in said payment terminal (12).

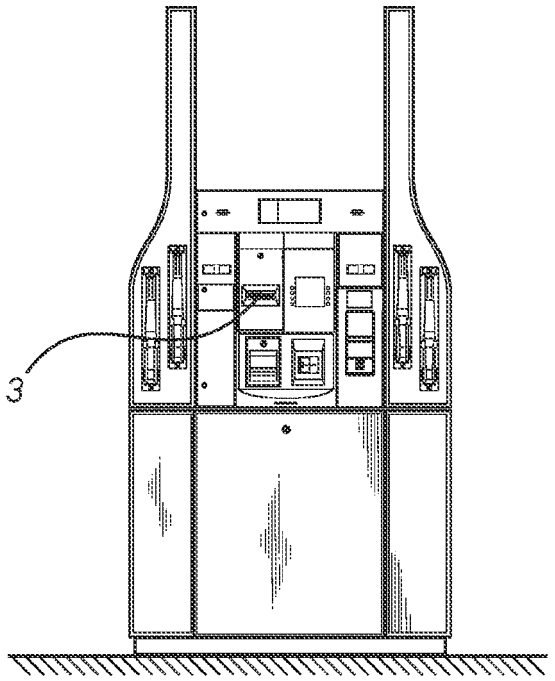

Fig. 1

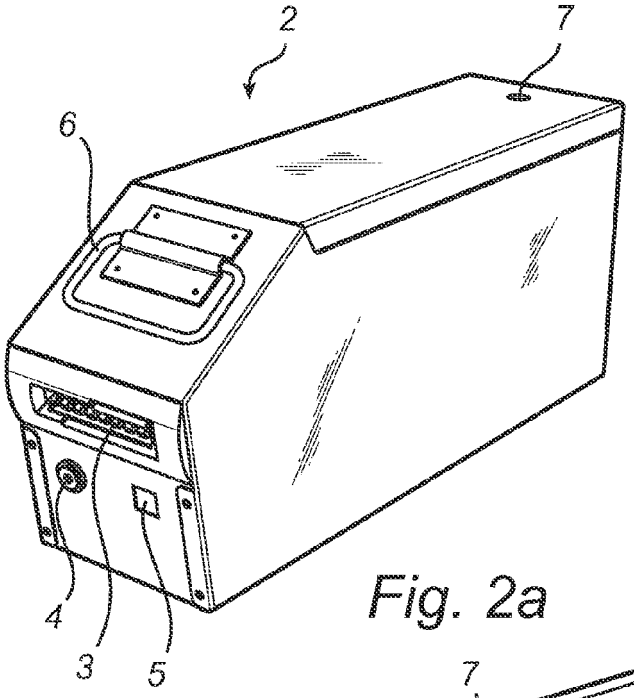

Fig. 2a

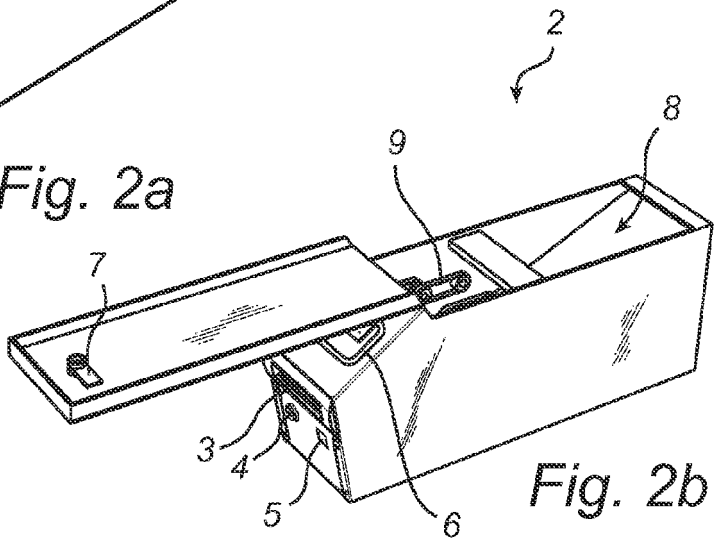

Fig. 2b

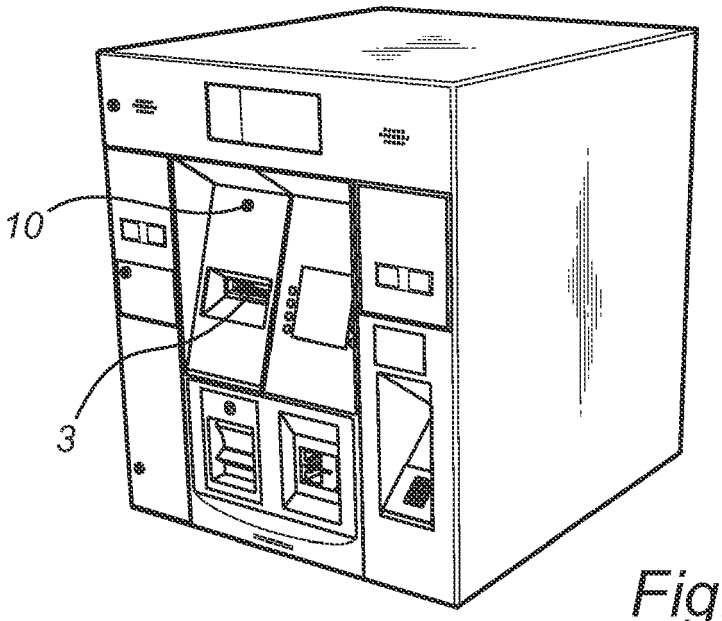

Fig. 3a

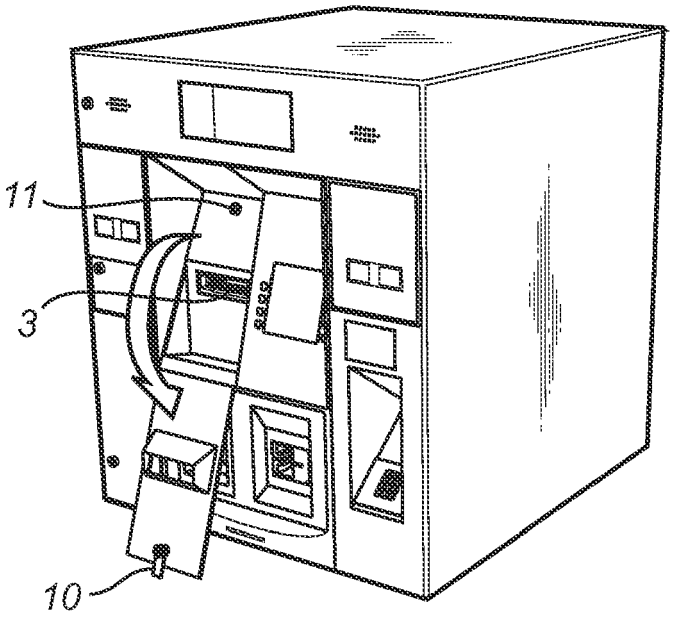

Fig. 3b

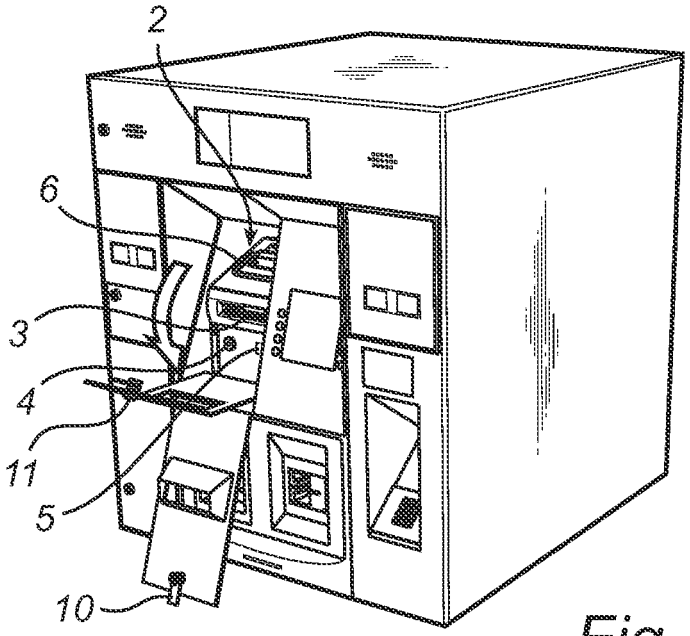

Fig. 3c

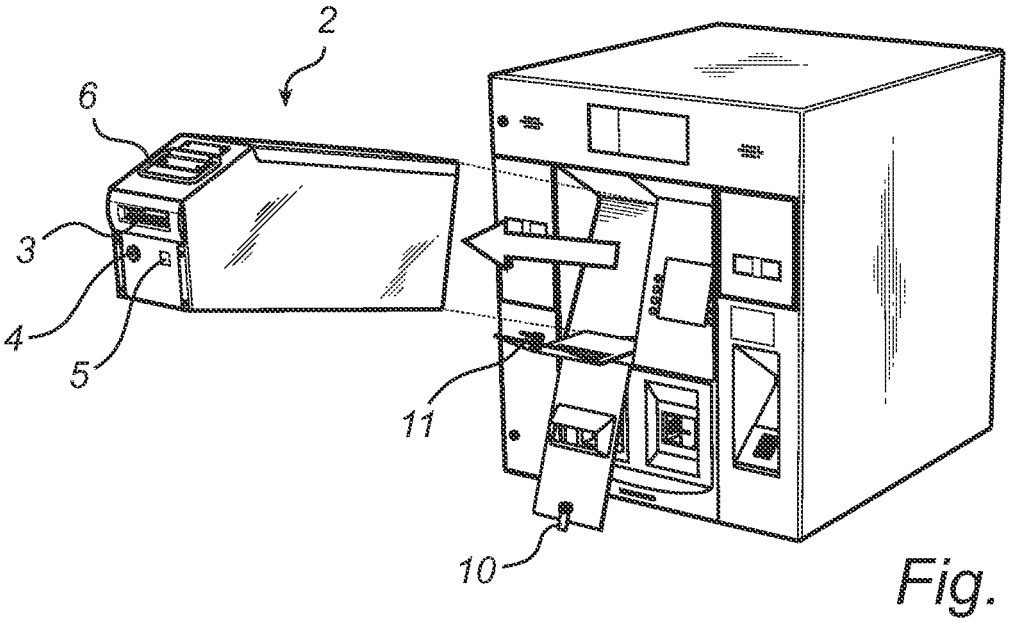

Fig. 3d

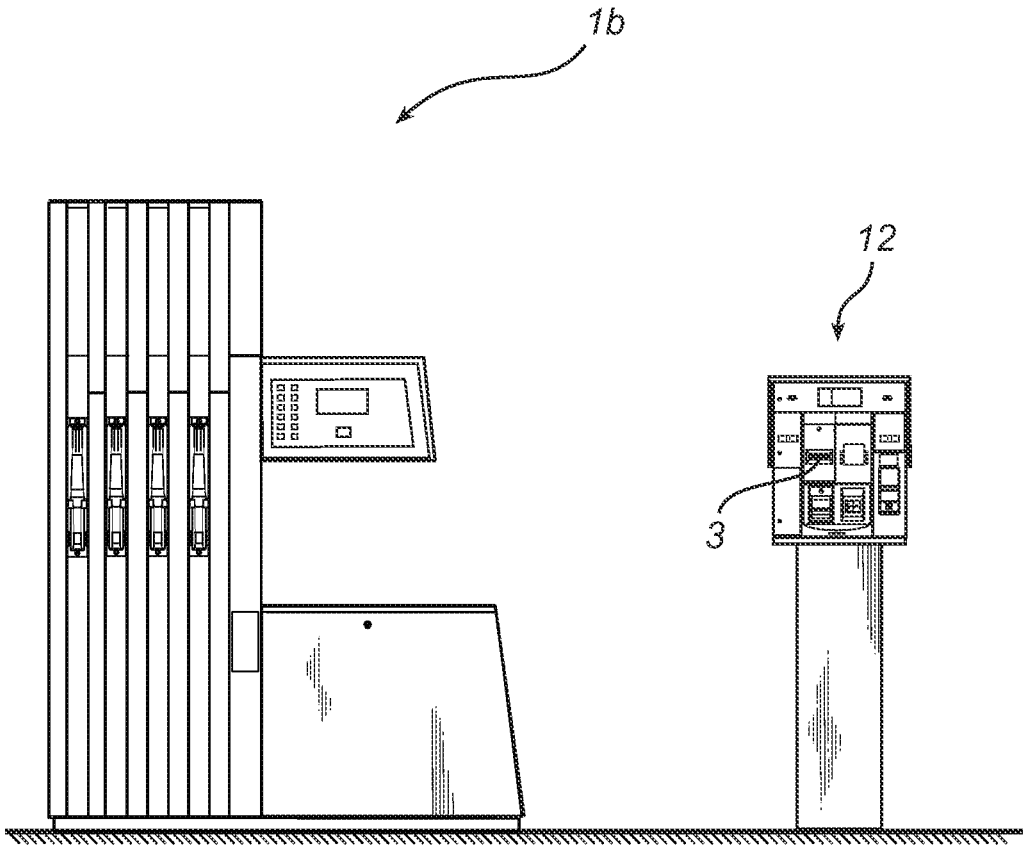

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 09 15 2162

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 996 888 A (GROMATZKY JONATHAN A [US]) 7 December 1999 (1999-12-07) * column 3, line 53 - column 4, line 24 * * column 5, line 53 - column 6, line 49 * * figure 3A *	1-12	INV. G07F13/02 E05G1/14 G07D11/00
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TECHNICAL FIELDS SEARCHED (IPC)

G07F
G07D
E05G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 June 2009	Spitaler, Thomas

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 15 2162

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05-06-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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