



(11) **EP 2 113 890 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.11.2009 Bulletin 2009/45

(51) Int Cl.:
G07F 11/54 (2006.01)

(21) Application number: **08165655.5**

(22) Date of filing: **01.10.2008**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
RO SE SI SK TR**
Designated Extension States:
AL BA MK RS

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(30) Priority: **01.10.2007 IT VR20070136**

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(54) **Rotating machine with smart management system for the distribution of objects through modular cells**

(57) A rotating machine (10) with a smart management system for the distribution of objects through modular cells comprising a mobile, multi-level magazine (11) employing rotating disc technology and multiple doors and where the mobile, multi-level magazine is mounted on a power-driven central vertical shaft (15) and comprises a series of discs (12) one above the other and divided into segments (13) of variable size.

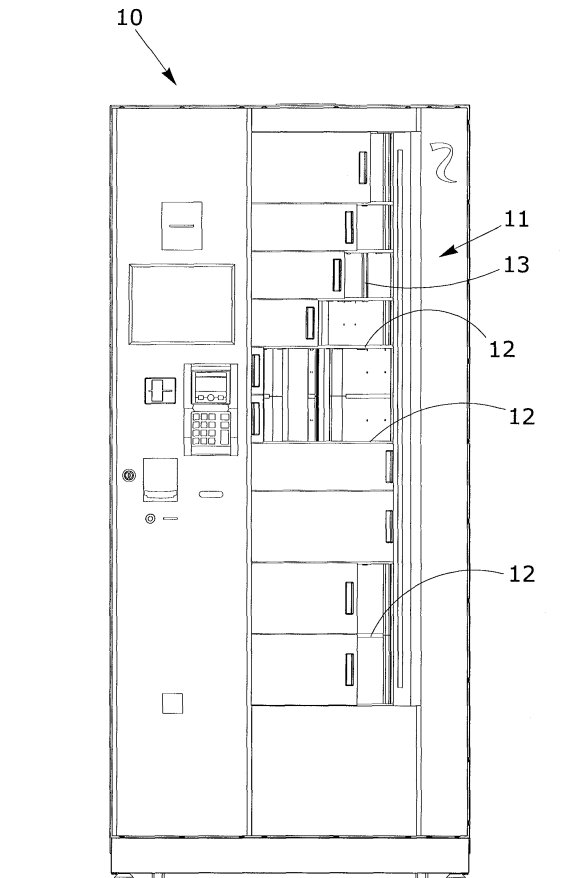


Fig. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a rotating machine with a smart management system for the distribution of objects through modular cells.

[0002] In particular the present invention relates to an automatic vending machine which combines the principal advantages of two existing solutions and introduces new characteristics which increase usability and the range of uses.

[0003] The product according to the present invention substantially comprises an automatic vending machine employing rotating disc technology (i.e. a mobile multi-level magazine) with multiple doors.

[0004] The present invention relates primarily to the field of automatic small- and medium-size vending equipment and enables the production, using the same components, of vending machines optimised for a wide variety of applications. The same parts can be used to produce practically an infinite variety of configurations.

BACKGROUND ART

[0005] Current technology includes known solutions involving the use of automatic vending machines.

[0006] The sector for automatic vending machine produces two main types of product: automatic vending machines for the sale of high value objects and automatic vending machines for the sale of food products.

[0007] The first type, that is, vending machines for the sale of valuable objects, are usually adaptations of machines developed for other purposes such as the sale of home videos. Most of these systems have a gantry type design where a gripper picks the objects up from a drawer unit in the machine where they are stored.

[0008] The main drawbacks of this type of solution are its cost and its lack of flexibility. These vending machines are also rather complex and require precision manufacturing methods and painstaking maintenance procedures.

[0009] Vending machines for the sale of food products, on the other hand, have to be produced at a lower cost and are therefore simpler in construction, practically without any user interface and optimised mainly for their original design purpose.

[0010] There are two main types of design used for food vending machines: the rotating disc type with a mobile magazine and the spiral type.

[0011] There are hybrid models combining the spiral and gantry designs but these have not found widespread acceptance on the market given that they are limited to the handling of objects such as bottles and Tetrapak cartons.

[0012] Food vending machines are relatively inexpensive, they are reliable and they are simple to construct and maintain. However, the relative simplicity of these

machines mean that they can only perform a limited number of functions and do not have smart systems enabling more advanced management and operation of the machine itself.

DESCRIPTION OF THE INVENTION

[0013] The present invention provides a rotating machine with a smart management system with modular cells and a payment unit which is designed to eliminate or at least to reduce the shortcomings described above.

[0014] The present invention provides in particular an automatic vending machine employing rotating disc technology (i.e. a mobile, multi-level magazine) with multiple doors whose special feature is that it provides a magazine comprising a series of discs mounted one above the other and divided into segments of variable size.

[0015] This is obtained by the use of an automatic rotating machine with a smart management system for the distribution of objects through modular cells, whose characteristics are described in the main claim.

[0016] The dependent claims of the present solution describe advantageous embodiments of the invention.

[0017] The main advantages of this solution, in addition to those which derive from the very simple and at the same time secure management of dispensing, concern the fact that with the management system according to the present invention the magazine can be configured by varying the width of the segments of each disc and also by joining together segments one on top of the other with the object of making a sector which is of greater height.

[0018] In addition it is also possible to connect two vending machines to each other so that they operate as a single unit.

[0019] These variations can also be performed on a vending machine which has already been installed thereby enabling a reconfiguration of the machine without having to return it to the factory for modification.

[0020] This solution creates a series of new possibilities not possible with the products currently available and in use.

[0021] In particular, the vending machine according to the present invention makes it possible to produce, starting out with the same components, of vending machines optimised for a variety of applications. The same parts can be used to produce practically an infinite variety of configurations.

[0022] In addition, it is possible to vary the application of a vending machine by simply reconfiguring it. The discs can be configured in different ways, level by level, so that it is possible to dispense products of very different sizes from the same vending machine.

DESCRIPTION OF THE DRAWINGS

[0023] Further features and advantages of the invention will become apparent from the description of an em-

bodiment which follows with reference to the annexed drawings, given purely by way of a non-limiting example, in which:

- Figure 1 shows a side view of a complete automatic rotating vending machine with a smart management system with modular cells according to the present invention.
- Figure 2 shows an axonometric view of a vending machine according to present invention;
- Figure 3 shows a diagrammatic view of the rotating turntable with modular cells;
- Figures 4 to 6 show transparent, partially transparent and complete views of the automatic vending machine.

DESCRIPTION OF ONE EMBODIMENT OF THE INVENTION

[0024] With reference to the annexed drawings, the automatic rotating vending machine with a smart management system with modular cells is indicated in its entirety by the numeral 10 and substantially comprises an automatic vending machine employing rotating disc technology, that is, of a type with a mobile, multi-level magazine.

[0025] Figure 1 shows that the machine according to the invention is an automatic vending comprising a multi-level mobile magazine 11 employing rotating disc technology of the multi-door type as shown in the figures.

[0026] The multi-level mobile magazine, mounted on a central shaft with a vertical axis, comprises a series of discs 12 one above the other which are divided into segments 13 of variable size.

[0027] The magazine can be configured by varying the width of the segments 13 of each individual disc 12 and by joining two segments one above the other in order to form sectors with a greater height.

[0028] These variations can also be performed on a vending machine which has already been installed thereby enabling a reconfiguration of the machine without having to return it to the factory.

[0029] The parts comprising the magazine are modular and can be stacked one above the other to form sectors which are twice or three times the usual height.

[0030] This solution creates a series of new possibilities not possible at the present time with current products. In particular:

it is possible, starting out with the same components, to produce vending machines optimised for a variety of applications. Using the same parts it is possible to produce a practically infinite range of configurations;

- it is possible to vary the application of a vending machine by simply reconfiguring it;
- it is possible to configure the discs in different ways, level by level, so that it is possible to dispense products of very different sizes from the same vending machine.

[0031] Product dispensing is performed by the magazine which rotates to present the user with the product selected.

[0032] The magazine is moved by a single motor 14 driving the central shaft 15; this characteristics considerably simplifies machine architecture and maintenance.

[0033] The product is picked up by the user from a series of doors, positioned one above the other, where there is one door for each disc of the magazine.

[0034] The sideways travel of the door can be configured in order to limit the size of the door opening.

[0035] The door is operated by hand by the user; an alarm system detects when the user has forgotten to close the door.

[0036] The fact that the customer picks up the object directly from the magazine cell by opening a door simplifies the design of the vending machine and, at the same time, removes the need to use devices such as user belts or gantry axes. These characteristics advantageously reduce overall costs and increase reliability.

[0037] The "smart" characteristic of the vending machine is obtained by using a personal computer architecture with a modular software structure which enables the use of both standard application programs and the realisation of customized applications programmed for particular needs.

[0038] The only standard characteristics are the basic components which enable access for the customer interface program to all the vending machine hardware (magazine, payment unit, receipt printer, biometric reader, customer identification unit and so on).

[0039] It will be possible to use the vending machine in three different configurations:

- Slave configuration: the vending machine is connected to an external system which in turn enables consultation of the machine contents; in this case the vending machine acts as an add-on module to the external system. In this case the object to be purchased is selected at a separate selection station or stations and then picked up from the vending machine. Multiple vending machines can be connected together to form a system of this type where a battery of vending machines side-by-side offer the user a wide selection of products.
- Stand-alone configuration: in this case the front panel of the vending machine incorporates a selection system comprising a TFT monitor and a touchscreen. This configuration provides a stand-alone vending machine with advanced functions for the sale of objects and also for the sale of services such

as recharging phone cards, downloading logos and ring tones and paying utility bills. A stand-alone vending machine can be connected to multiple slave machines to form a complete system where the stand-alone machine acts as the selection station for the other machines in the system.

- Combined configuration: in this case the vending machine acts as the controller for a group of magazines where the entire system operates as a single large unit. The invention as described above refers to a preferred embodiment. Naturally, while the principle of the invention remains the same, the details of construction and the embodiments may vary widely with respect to what has been described and illustrated purely by way of the example, without departing from the scope of the present invention.

Claims

1. A rotating machine (10) with a smart management system for the distribution of objects through modular cells, **characterised in that** it comprises a mobile, multi-level magazine (11) employing rotating disc technology, mounted on a power-driven central vertical shaft (15), and comprising a series of discs (12) one above the other and divided into segments (13) of variable size.
2. The rotating machine (10) with a smart management system and with modular cells according to the previous claim, **characterised in that** the magazine can be configured by varying the width of the segments (13) of each individual disc (12) and by joining two segments one above the other in order to form sectors with a greater height.
3. These variations can also be performed on a vending machine which has already been installed thereby enabling a reconfiguration of the machine without having to return it to the factory for modification.
4. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the parts comprising the magazine are modular and can be stacked one above the other to form sectors which are twice or three times the usual height.
5. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the product is dispensed by the magazine which rotates to present the user with the product selected.
6. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the magazine is moved by a single motor (14) driving the central shaft (15).
7. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the product is picked up by the user from a series of doors, positioned one above the other, where there is one door for each disc of the magazine.
8. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the sideways travel of the door can be configured in order to limit the size of the door opening.
9. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the door is operated by hand by the user and an alarm system detects when the user has forgotten to close the door.
10. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the vending machine is operated and controlled by using a personal computer architecture with a modular software structure which enables the use of both standard application programs and the realisation of customized applications programmed for particular needs.
11. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the vending machine can be used in two different configurations:
 - Slave configuration: the vending machine is connected to an external system which in turn enables consultation of the machine contents and in this case the vending machine acts as an add-on module to the external system.
 - Stand-alone configuration: in this case the front panel of the vending machine incorporates a selection system comprising a TFT monitor and a touch-screen and thus provides a stand-alone vending machine with advanced functions for the sale of objects and also for the sale of services such as recharging phone cards, downloading logos and ring tones and paying utility bills.
12. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** a stand-alone vending machine can be connected to multiple slave machines to form a complete system where

the stand-alone machine acts as the selection station for the entire system.

13. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** multiple vending machines can be installed alongside each other so that they operate as a single unit. 5
14. The rotating machine (10) with a smart management system and with modular cells according to one of the previous claims, **characterised in that** the vending machine, in addition to being used in the stand-alone or slave configurations, can also be used in a combined configuration whereby one vending machine acts as the controller for a group of magazines where the entire system operates as a single large unit. 10 15

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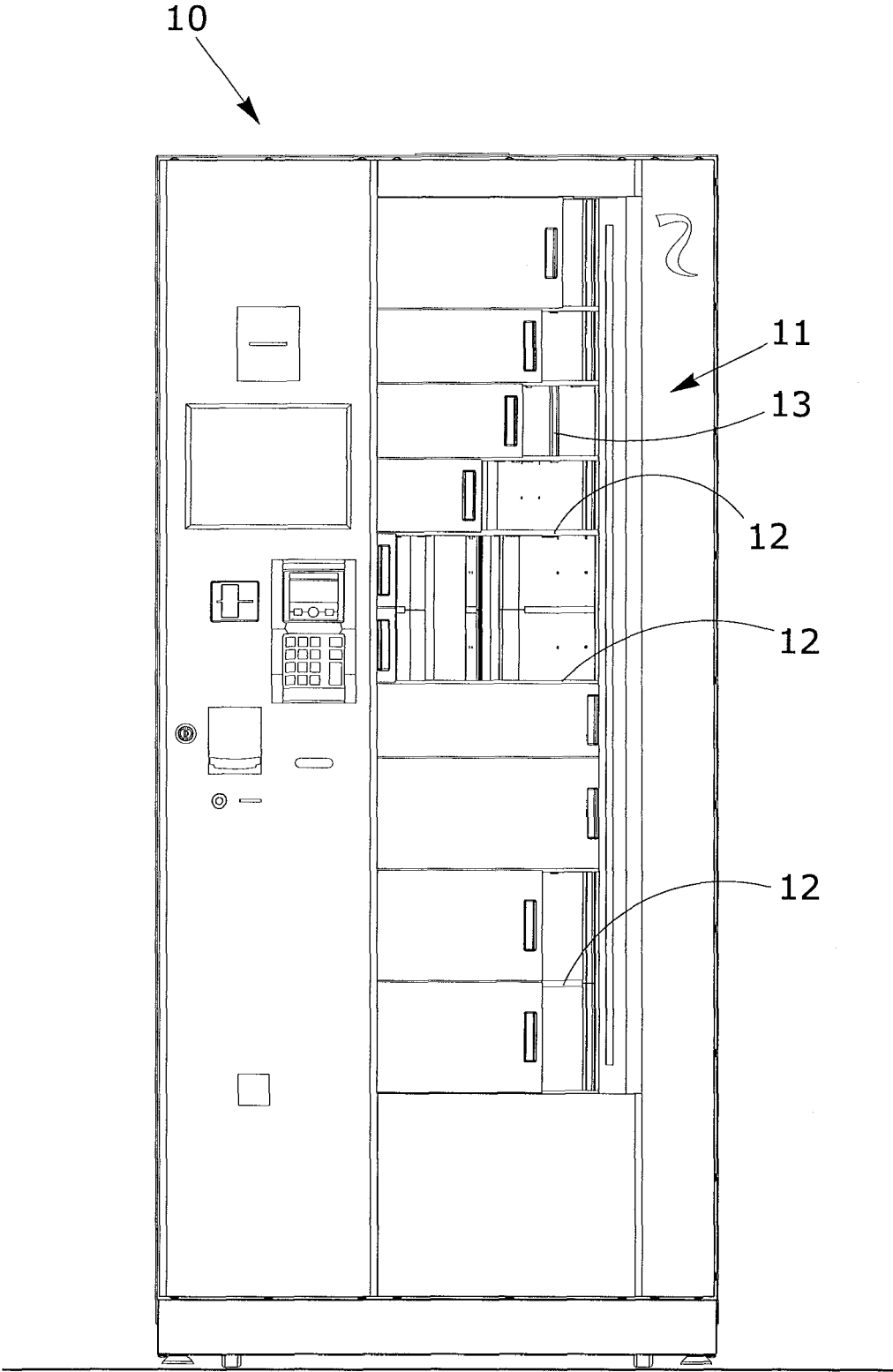


Fig. 1

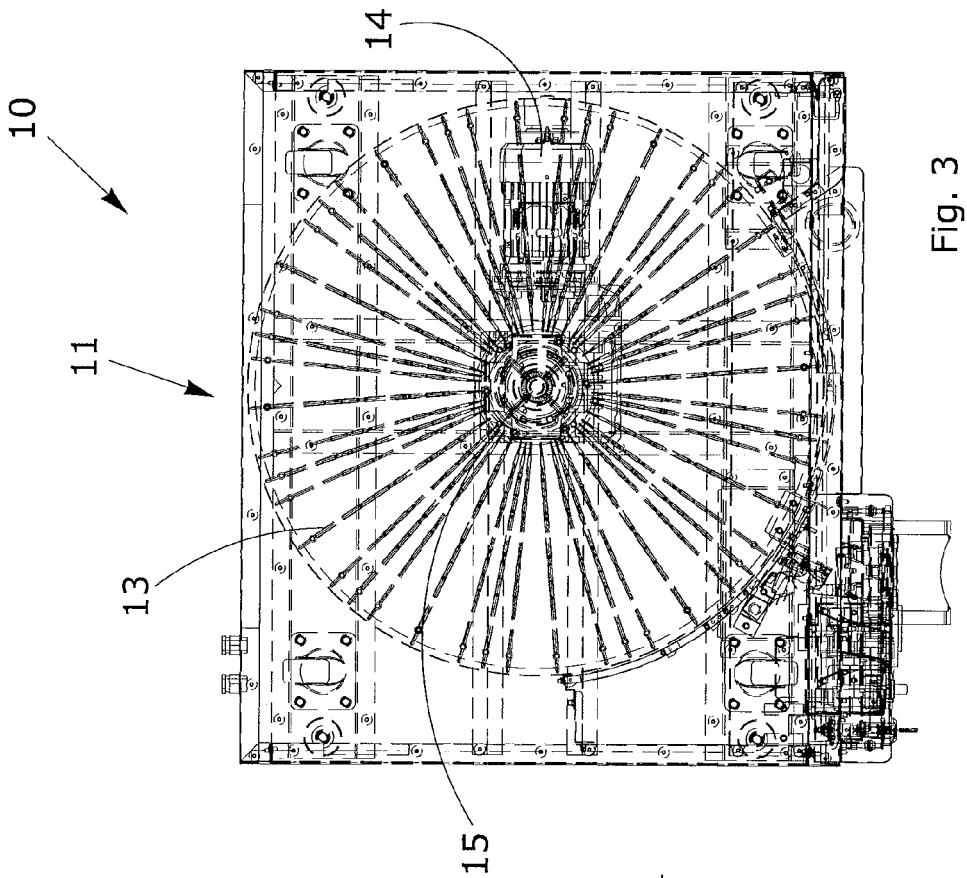


Fig. 3

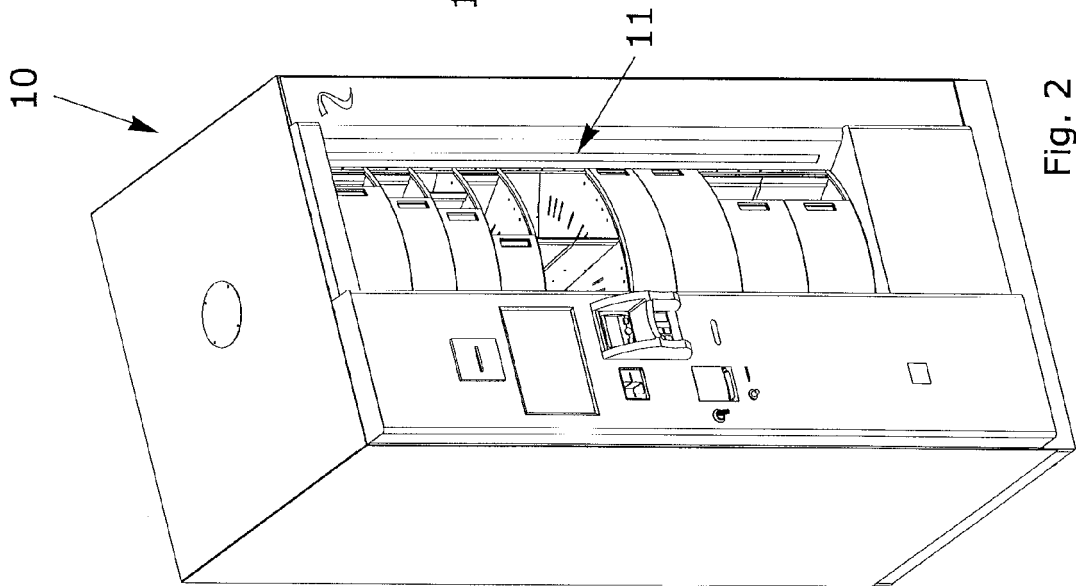
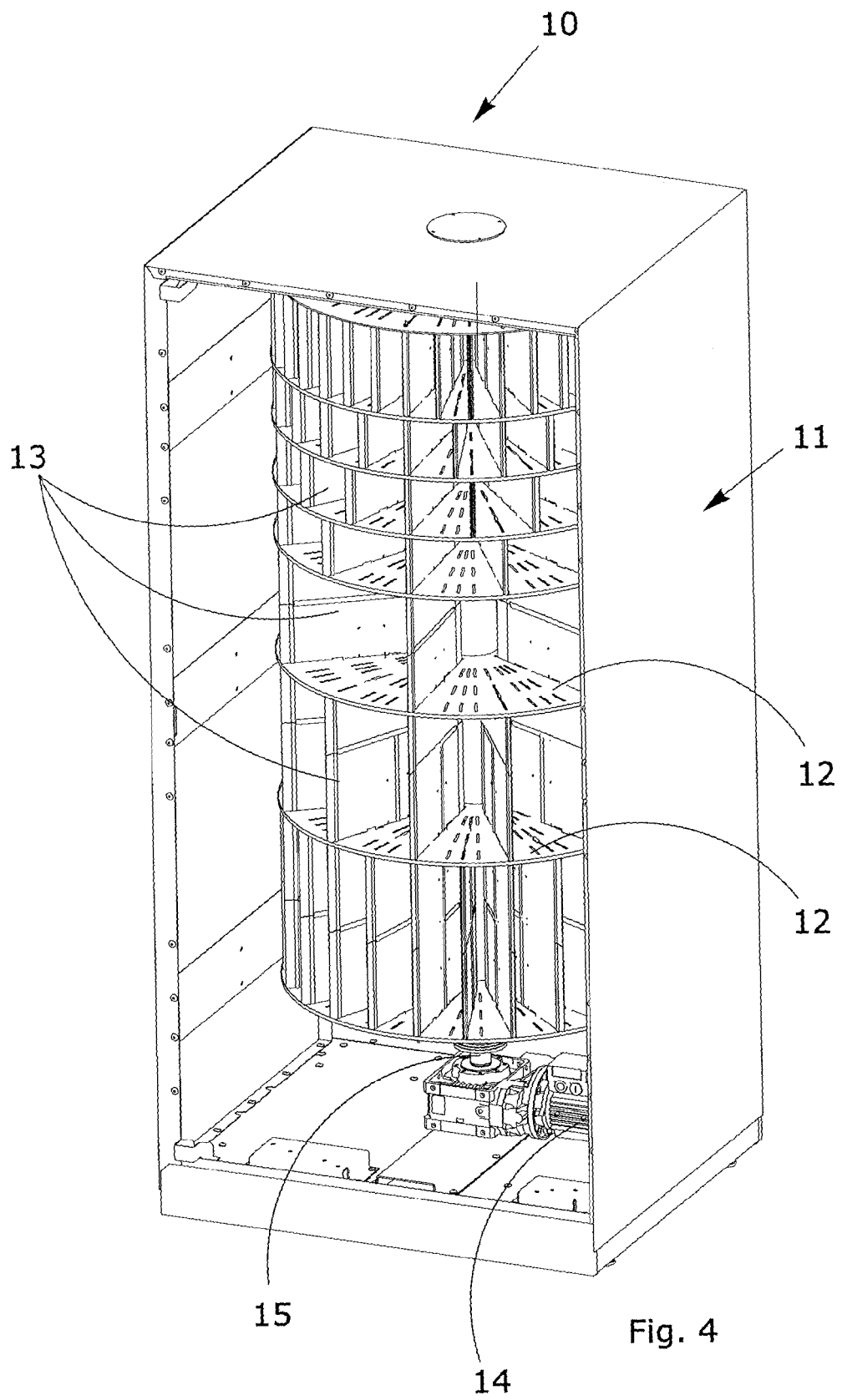


Fig. 2



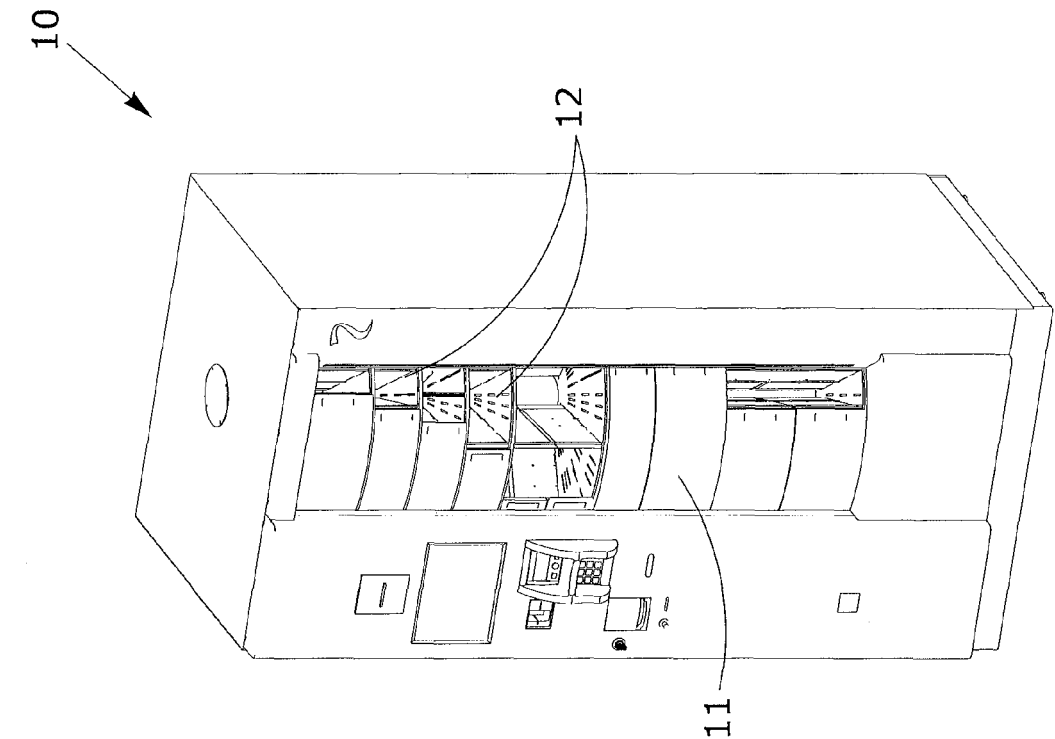


Fig. 6

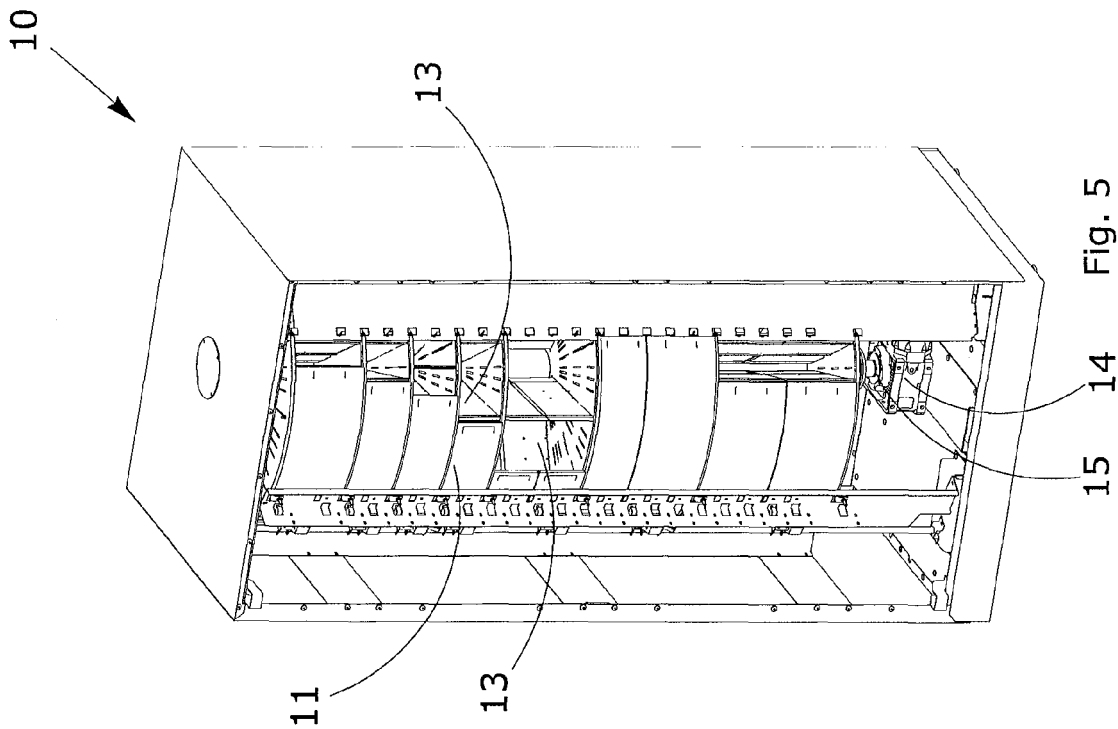


Fig. 5