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(54) **AUTOMATIC VENDING MACHINE**

(57) The invention relates to an automatic vending machine (1) comprising a containment body (2) and a closing door (3) which closes the containment body (2) itself in which a plurality of products are housed in corre-

sponding compartments (20) to be dispensed following activation following a choice by a user; the vending machine (1) is equipped with a bulkhead (4) designed to define a barrier for said products.

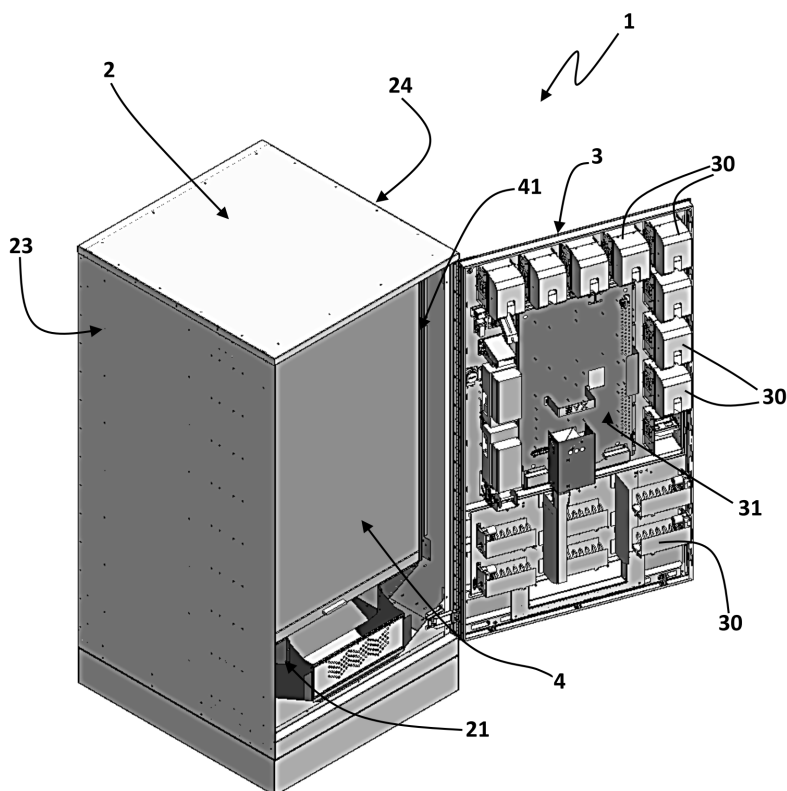


FIG. 4

Description

[0001] This invention concerns a vending machine.

[0002] As is well known, a vending machine is a machine that dispenses products and/or services upon request from a user, upon payment. Vending machines can dispense, for example, snacks, drinks, newspapers, cigarette packets, tobacco, smoking accessories, tickets, prepaid cards, coupons, parapharmaceutical products, etc.

[0003] In a common machine configuration, the products dispensed by the vending machine are arranged in dedicated compartments containing aligned rows of products. Each compartment is typically delimited by side walls and equipped with a motorized system that moves the products toward an exit area, typically containing a hopper that ends at a dispensing area from which the products can be retrieved by users.

[0004] A common drawback of vending machines is the potential for product dispensing problems, resulting in the product not reaching the outlet. These situations can occur when the product to be dispensed is pushed or pulled from its compartment and doesn't finish its journey in the outlet hopper, but can catch any protrusions inside the vending machine and be pushed into an area where it shouldn't be.

[0005] This type of problem can result in the failure to dispense the purchased product, interference with internal movement components, potentially blocking the machine and making it impossible to dispense the same product or products contained in other compartments of the machine, as well as interference with other devices inside the vending machine, for example near the door.

[0006] In practice, in vending machines that use a pusher or other dispensing device that causes the product to fall into the output hopper, the product being dispensed can be projected, for example, against the door where there are other devices that protrude inward. This means that the product is not dispensed and, when it ends up in an area where it interferes with other devices, it can block one or more operating functions of the vending machine.

[0007] WO2015/019475 and WO2020/043138 describe machines equipped with a rigid internal door that cannot be used to dampen any impacts from the products being dispensed.

[0008] CN104282085A describes a rigid internal door used for isolation of electronic components.

[0009] US2022/0058907 A1 describes control logic and sensors for opening the door of a vending machine.

[0010] Among the purposes of this patent application is to create a vending machine capable of solving the aforementioned drawbacks; among the purposes of the invention is therefore to allow the correct dispensing of products by eliminating or at least severely limiting the possibility that a product selected by the user will not be able to reach the dispensing outlet.

[0011] This result was achieved in accordance with the

innovation by adopting the idea of creating a vending machine presenting the characteristics described in claim 1. Other characteristics are the subject of the dependent claims.

[0012] The advantages of this invention include the following: the vending machine allows for safe and precise dispensing of products, with virtually no chance of failure due to interference with devices or internal parts of the vending machine; the vending machine is essentially free from machine downtime due to the problems highlighted above; the solution proposed by this patent application is easy to implement and requires very low costs, in terms of human and economic resources, when compared to the benefits provided; the proposed solution can also be used on vending machines already in production, thus also constituting an improvement through updating of existing machines; the solution covered by this patent application is unlikely to be damaged by wear; the construction of this vending machine is easily implemented by the same operators who build traditional machines, without requiring any particular investments.

[0013] These and further advantages and characteristics of the present innovation will be more and better understood by anyone skilled in the art from the following description and with the aid of the attached drawings, given as a practical example of the invention, but not to be considered in a limiting sense, in which:

- Figs. 1 and 2 represent a possible example of an embodiment of a vending machine according to the present invention, shown in a front view with the door open, in a first configuration in which a movable bulkhead is raised (Fig. 1) and in a second configuration in which the bulkhead is lowered (Fig. 2);
- Figs. 3 and 4 represent the example of the implementation of the previous figures in a perspective view with the door open, in a first configuration with the mobile bulkhead raised (Fig. 3) and in a second configuration with the bulkhead lowered (Fig. 4);
- Figs. 5 and 6 represent the example of the implementation of the previous figures in a sectional view with the door closed and with enlarged details, in a first configuration with the mobile bulkhead raised (Fig. 5) and in a second configuration with the bulkhead lowered (Fig. 6).

[0014] The possible example of implementation of a vending machine (1) according to the invention shown in the attached figures comprises a box-shaped containment body (2) having a parallelepiped shape. The containment body (2) is provided with a plurality of compartments (20) in which the products to be dispensed are stored, usually aligned in parallel rows, in each of which the product to be dispensed first is placed furthest out, or in correspondence with a position from which it can be moved to end up in an underlying output hopper (21) whose output opening ends in a collection compartment (22).

[0015] In the example, the vending machine (1) is provided with a front door (3) provided with selection and payment means that allow users to choose the products to be dispensed by the vending machine. In the lower area of the door (3) there is an access opening (32) located in correspondence with the dispensing compartment (22). The door (3) can support a plurality of dispensing devices (30) intended, for example, for instant lottery coupons, rolled tobacco in pouches, various types of tickets, etc., as well as a touch screen (31) that allows users to make choices; the screen (31) is combined with suitable means of payment. The dispensing devices (30), the screen (31) and the related means of payment are not described in detail because they do not constitute the subject of the patent application. It is important to highlight, however, that these components define a plurality of protrusions that project from the internal face of the door (3) towards the inside of the vending machine (1) occupying, in practice, corresponding areas of the containment body (2) arranged opposite the compartments (20) in which the products to be dispensed are housed. In a conventional vending machine, i.e. one not equipped with the innovative characteristics of the present patent application, these protrusions can be intercepted by the product that is pushed towards the hopper, diverting its path and not allowing its correct dispensing by the vending machine.

[0016] Advantageously, a vending machine (1) made according to the present invention is provided with a bulkhead (4) which delimits the area of the containment body (2) intended for the dispensing of the products housed in the compartments (20) preventing interaction with the door (3) and with all the devices (30, 31) supported by the same door.

[0017] In the example of the attached drawings, the bulkhead (4) is made up of a roll-up mat which can be arranged in an active configuration in which it defines a barrier between the inside of the containment body (2) and the door (3) or in a non-active configuration, in which the bulkhead (4) is rolled up at the top and allows access to the inside of the body (2), for example for refilling operations of the products in the compartments (20). In the drawings, the containment element of the bulkhead (4) is indicated with (42) when it is rolled up at the top; the bulkhead (4) can be wrapped around a roller equipped with a spring which automatically determines its rolling up when the bulkhead is not held. In practice, the operation of the bulkhead (4) represented in the drawings is similar to that of the movement of mosquito nets of a known type which equip doors and windows.

[0018] In particular, the bulkhead (4) is formed by a sort of shutter, sliding along two vertical guides (41) placed on the internal faces of the two lateral walls (23, 24) of the containment body (2), in correspondence with the front edge of the same body (2). The bulkhead (4) can be provided with a handle (40) which allows it to be gripped. The handle (40) can be provided with locking means consisting, for example, of two buttons placed to the right

and left of the handle (40) and connected to means for constraining the sliding of the bulkhead (4) in the guides (41). The details in Figs. 5 and 6 show how the handle (40) is positioned at the upper end of the vertical guide (41) when the bulkhead (4) is in the inactive configuration and at the lower end of the vertical guide (41) when the bulkhead (4) is in the active configuration.

[0019] In practice, to access the compartments (20) where the products to be dispensed are stored, the operator who has to load the vending machine (1), after opening the door (3), lifts the bulkhead (4), unlocking it via the two buttons located to the left and right of the handle; the bulkhead, rolling up, "opens" the compartment space (20). After loading the products into the compartments (20), the operator lowers the bulkhead (4) bringing it to the active configuration, i.e. the one in which it prevents the products from ending up against the internal face of the door (3), allowing the same products to correctly finish their path in the hopper (21).

[0020] The movement of the bulkhead (4) can also be motorised, for example with a motor acting on the roller around which the bulkhead is wrapped. In practice, the roller can be equipped with a spring that makes it rotate naturally in the winding direction or be equipped with a motor that determines the bidirectional rotation for winding and, respectively, unwinding.

[0021] The bulkhead (4) can be made of a suitable material, preferably flexible so that it can be rolled up. For example, one or more of the following materials can be used: PVC-coated fibreglass, polyester, aluminium, steel. In particular, the structure of the bulkhead (4) can be reticular, so as to form a roll-up net.

[0022] In the attached example drawings, the bulkhead (4) has been positioned inside the containment body (2); in another possible embodiment, not illustrated in the drawings, the bulkhead could be arranged in association with the door (3).

[0023] Furthermore, in the attached example drawings the bulkhead (4) is made so as to be flexible to be rolled up; in another embodiment, not illustrated in the drawings, the bulkhead (4) can be formed by a hinged panel which closes the compartment of the compartments (2) while still defining a screen which cannot be penetrated by the dispensed products in order to convey them correctly towards the hopper (21).

[0024] Advantageously, sensors can also be provided to signal to the operators the configuration assumed by the bulkhead (4). For example, sensors can be provided on the guides (41) to emit an acoustic and/or visual signal to indicate to the operator that the bulkhead (4) must be lowered after loading the products into the compartments (20).

[0025] A further advantage of the invention is determined by the construction of the bulkhead (4) in such a way that it is elastically yielding; thanks to the elasticity of the bulkhead (4), this dampens the impact force of the dispensed product, reducing the possibility of rebounds which could allow the dispensed product to get stuck

between the compartments (20).

[0026] In other words, in addition to constituting a dividing element that prevents the dispensed products from being pushed towards the internal face of the door (3) interfering with the devices (30, 31) supported by it the bulkhead (4) also has the important function of dampening the impact that the products may have, for example due to the energy received from the pushing means or due to falling downwards.

[0027] In practice, the present invention relates to a vending machine equipped with a technical solution that improves the reliability of product dispensing. The primary objective is to prevent failed dispensing and machine blockages caused by interference between the falling products and the devices inside the vending machine, particularly on the inside of the front door.

[0028] This solution eliminates the drawbacks of traditional vending machines, in which products, once pushed or released toward an output hopper, may not follow the intended path correctly and cause abnormal situations such as hitting internal protrusions, deviating from the intended path, failing to reach the hopper, or interfering with mechanical parts or devices installed on the door. These situations can result in the failure to deliver the purchased product and/or the blocking of one or more operating functions and/or machine downtime, making it impossible to dispense other products.

[0029] One of the purposes of the invention is therefore to eliminate or drastically reduce the possibility that a selected product will not reach the dispensing outlet correctly. The proposed solution therefore aims to:

- ensure safe, precise and reliable delivery,
- prevent interference between products and internal devices,
- reduce the risk of blockages and failures,
- to offer a simple, economical solution that is easily applicable even to existing vending machines.

[0030] The inventive solution consists in the introduction of a partition that acts as a physical barrier between the product dispensing area and the vending machine door.

[0031] The bulkhead:

- delimits the internal area intended for the fall of the products,
- prevents products from interacting with the door and the devices it supports (such as additional dispensers and screens),
- correctly conveys the products towards the output hopper.

[0032] Accordingly, a vending machine made in accordance with the invention comprises:

- a containment body of parallelepiped shape,
- a plurality of compartments for products,

- an output hopper connected to a collection compartment,
- a front door equipped with selection devices, payment, touch screen and any other dispensers.

[0033] In the principal embodiment described the bulkhead:

- is a roll-up carpet, similar to the mechanism of mosquito nets for doors and windows;
- it slides along two vertical guides placed on the internal side walls of the dispenser;

and can take:

- an active configuration, in which it closes the compartments and protects the path of the products;
- a non-active configuration, in which it is wrapped at the top to allow access to the compartments during charging operations.

[0034] Furthermore, the bulkhead can be:

- operated manually via a handle,
- equipped with release buttons,
- or motorized, with spring roller or with bidirectional motor.

[0035] The bulkhead can be made of different materials, including:

- PVC coated fiberglass,
- polyester,
- aluminum,
- steel.

[0036] It is preferably flexible and can have a reticular structure, so that it can be easily wrapped.

[0037] The document provides for several equivalent variants, including:

- bulkhead installed on the body of the dispenser or directly on the door;
- flexible roll-up bulkhead or rigid hinged panel;
- integration of sensors to signal the position of the bulkhead (e.g. with acoustic or visual signals).

[0038] It is highlighted that the bulkhead, being elastic, is able to:

- cushion the impact of the falling product,
- reduce rebounds,
- reduce the risk of the product getting stuck between compartments or in unintended areas.

[0039] From the preceding description it is evident that a vending machine in accordance with the present invention is of the type comprising a containment body (2)

and a closing door (3) which closes the same containment body (2) in which a plurality of products are housed in corresponding compartments (20) to be dispensed following activation following a choice by a user; the vending machine (1) is characterized in that it is provided with a bulkhead (4) consisting of a roll-up carpet and suitable for defining a barrier for said products.

[0040] From the preceding description it is also evident that a device in accordance with the present invention may also present one or more of the following characteristics, even combined with each other:

- said bulkhead (4) is arranged and acts between the said containment body (2) and the said door (3) and can be positioned in a first active configuration in which it defines the barrier for the products and a second non-active configuration in which it does not define the barrier for the products;
- said bulkhead (4) is made up of a roller carpet sliding in two vertical guides (41) provided on the internal faces of the side walls (23, 24) of the said containment body (2);
- said bulkhead (4) is wrapped around a roller provided with a preload suitable for wrapping the said bulkhead (4) when it is not held;
- said bulkhead (4) is wrapped around a motorized roller;
- said bulkhead (4) is made of a material from the set which includes: PVC coated fibreglass, polyester, aluminium, steel;
- said bulkhead (4) has a reticular structure;
- said door (3) supports a plurality of devices (30, 31) and said bulkhead (2) separates said compartments (20) from said devices (30, 31);
- said door (3) supports a plurality of devices (30, 31) and in which the products are destined for an output hopper (21) and said bulkhead (2) separates the said devices (30, 31) from the product compartments and from said hopper (21);
- the vending machine includes sensor means capable of signalling a status relating to the positioning of said bulkhead (4);
- the bulkhead (4) is elastically yielding in order to dampen the impact force of the products intercepted by it.

[0041] In practice, the details of execution may however vary in an equivalent manner in shape, dimensions, arrangement of the elements, nature of the materials used, without however departing from the scope of the idea of the solution adopted or of the inventive concept and therefore remaining within the limits of the protection granted by this patent.

Claims

1. Vending machine comprising a containment body (2)

and a closing door (3) which closes the same containment body (2) in which a plurality of products are housed in corresponding compartments (20) to be dispensed following activation following a choice by a user, vending machine (1) **characterised in that** it is equipped with a bulkhead (4) consisting of a roll-up carpet and suitable for defining a barrier for said products.

2. Vending machine according to claim 1, **characterised in that** said bulkhead (4) is arranged and acts between said containment body (2) and said door (3) and that said bulkhead (4) can be positioned in a first active configuration in which it defines the barrier for the products and a second non-active configuration in which it does not define the barrier for the products.
3. Vending machine according to one of the previous claims, **characterised in that** said bulkhead (4) is made up of a roller carpet sliding in two vertical guides (41) provided on the internal faces of the side walls (23, 24) of said containment body (2).
4. Vending machine according to claim 3, **characterised in that** said bulkhead (4) is wrapped around a roller provided with a preload suitable for wrapping said bulkhead (4) when it is not held.
5. Vending machine according to claim 3, **characterised in that** said bulkhead (4) is wrapped around a motorised roller.
6. Vending machine according to one of the preceding claims, **characterised in that** said bulkhead (4) is made of a material among those of the set which includes: PVC-coated fibreglass, polyester, aluminium, steel.
7. Vending machine according to one of the preceding claims, **characterised in that** said bulkhead (4) has a reticular structure.
8. Vending machine according to one of the preceding claims, wherein said door (3) supports a plurality of devices (30, 31), **characterised in that** said bulkhead (2) separates said compartments (20) from said devices (30, 31).
9. Vending machine according to one of the preceding claims, wherein said door (3) supports a plurality of devices (30, 31) and wherein the products are destined for an output hopper (21), **characterised in that** said bulkhead (2) separates said devices (30, 31) from the product compartments and from said hopper (21).
10. Vending machine according to one of the preceding

claims, **characterised in that** it comprises sensor means suitable for signalling a status relating to the positioning of said bulkhead (4).

11. Vending machine according to one of the preceding claims, **characterised in that** the bulkhead (4) is elastically yielding so as to dampen the impact force of the products intercepted by it.

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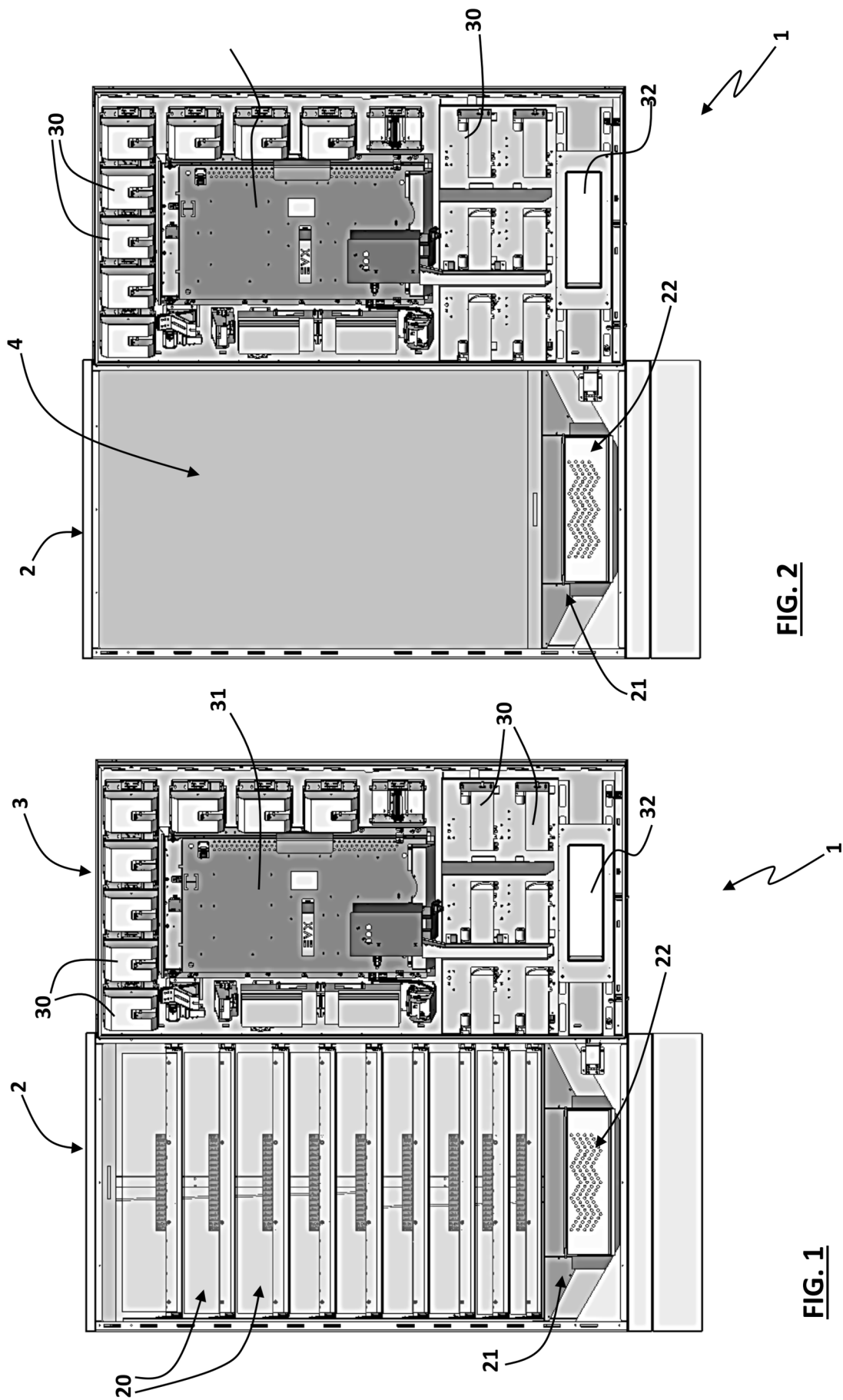
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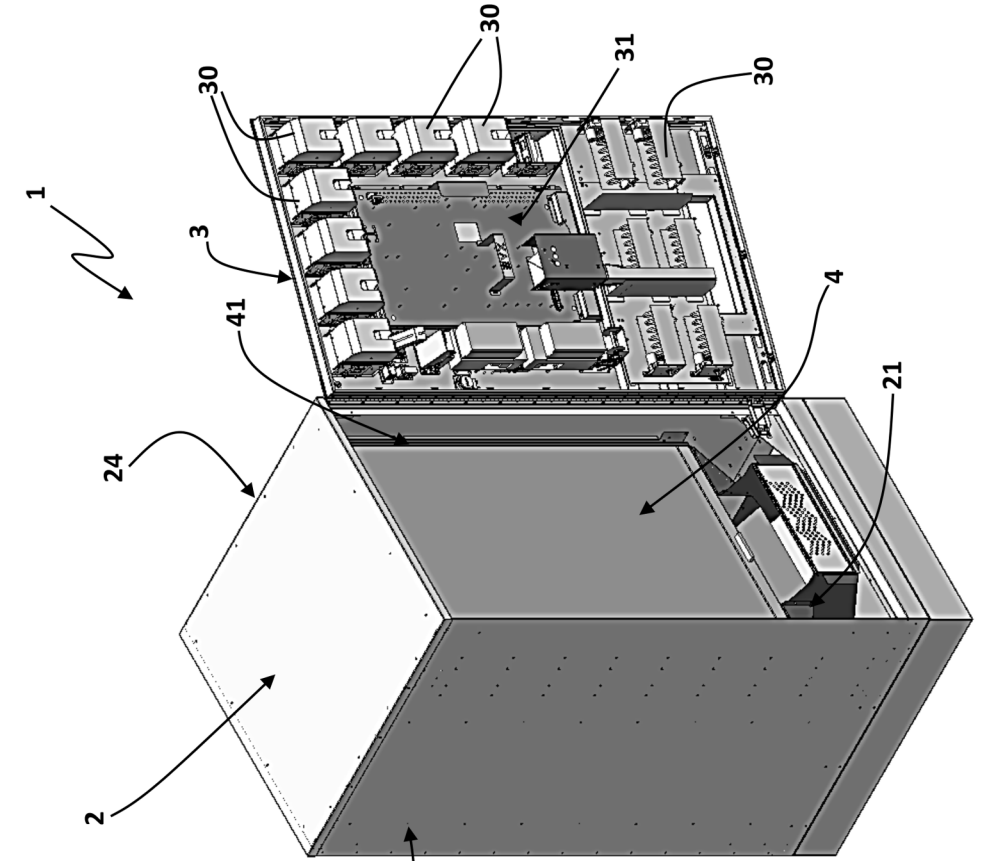


FIG. 4

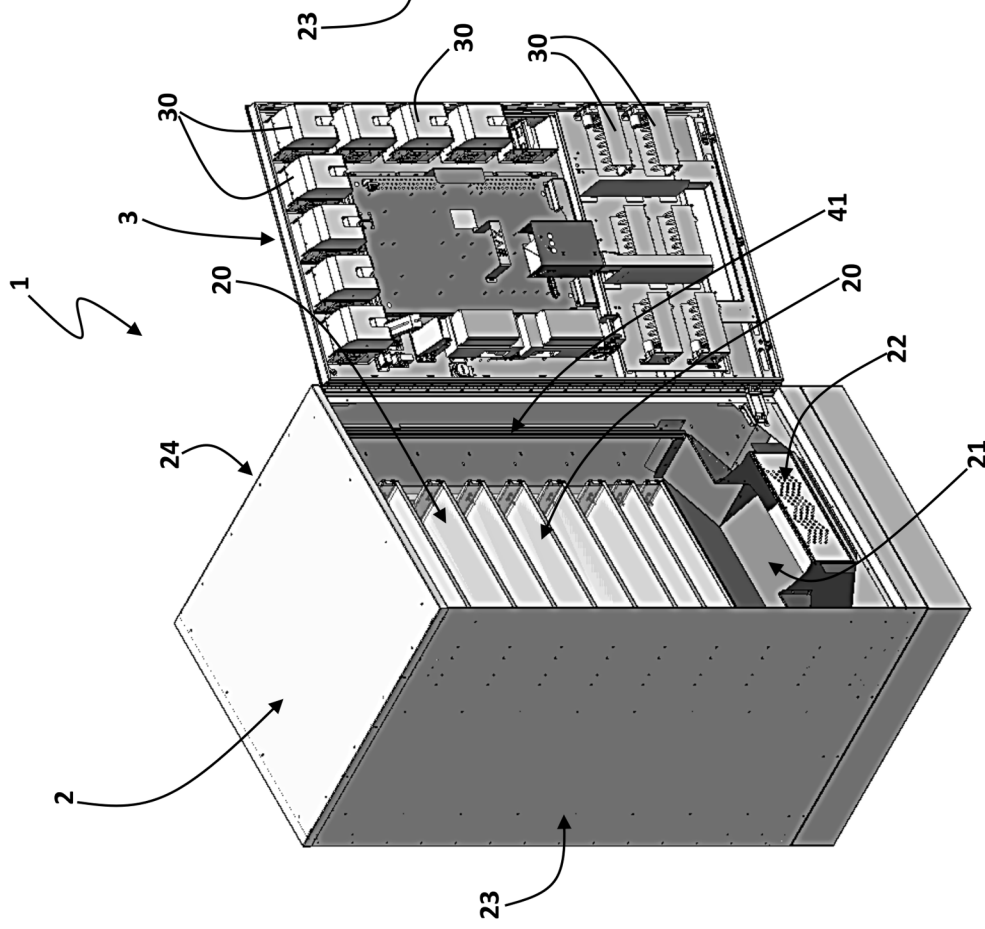


FIG. 3

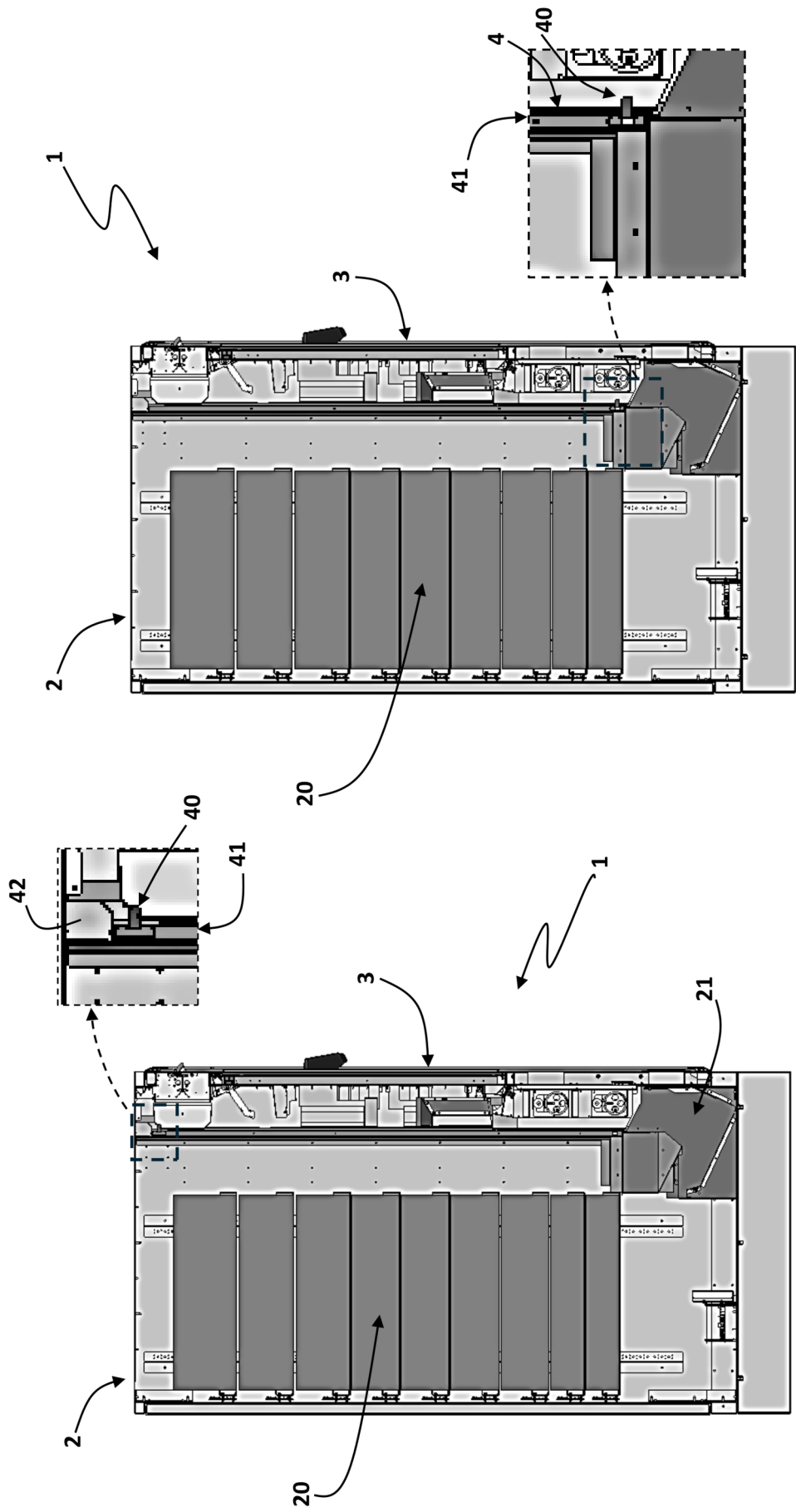


FIG. 6

FIG. 5



EUROPEAN SEARCH REPORT

Application Number

EP 26 16 9321

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Place of search The Hague		Date of completion of the search 14 April 2026	Examiner Diepstraten, Marc
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P24C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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