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(54) **AUTOMATIC VENDING MACHINE**

(57) The present invention relates to an automatic vending machine which has a lift for transporting the products from the tray area to the collection bin, which increases the capacity of the product that can be dispensed, as well as increasing the capacity of the machine, enabling the latter to store a larger number of prod-

ucts for subsequent dispensing, since the lift includes a folding top lid which makes it possible to position the axis of rotation of the product collection door at a greater height than the top lid of the lift, thus increasing the capacity of the lift and hence that of the products that can be dispensed, as well as the number of rows of trays.

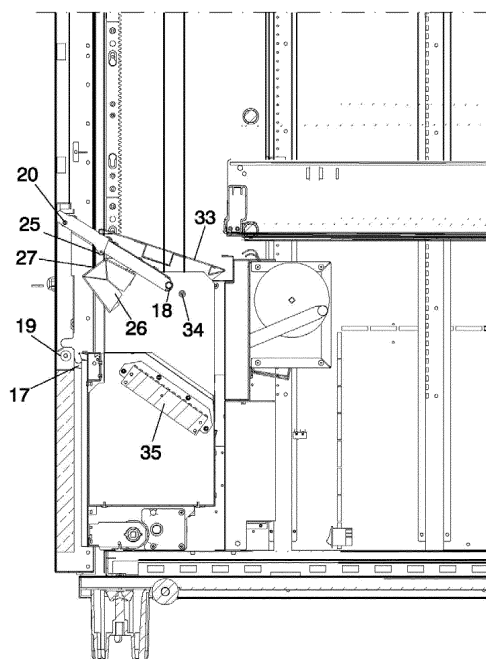


FIG. 4

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to an automatic dispensing machine having an elevator for transporting the products from the tray area to the collection box which, due to its special configuration, increases the capacity of the products that can be dispensed, as well as increasing the machine's capacity on being able to store a larger number of products for subsequent dispensing thereof.

[0002] The object of the invention consists of a dispensing machine having a system for blocking the elevator thereof, eliminating the possibility of accessing the tray area by moving the elevator vertically, which prevents stealing the products disposed on the trays through the dispensed product collection door.

[0003] Due to its special configuration, the elevator comprises the collection box wherefrom the user collects the products, which avoids the inclusion of additional elements for transporting the products from the elevator to the collection box, thereby increasing the useful space of the machine available for storing products.

BACKGROUND OF THE INVENTION

[0004] A wide range of coin-, banknote- or card-operated automatic dispensing machines are known to exist in the state of the art.

[0005] Said machines have a glazed front part displaying the different products, generally food products, which are disposed in several compartments of a plurality of storage trays, said product storage compartments being oriented towards the front of the machine so as to allow the user to see the variety of products to be dispensed by selecting the desired product from among these.

[0006] There are dispensing machines of this type where the selected product falls by gravity from the corresponding storage compartment towards a collection tray located on the lower part of the machine.

[0007] There are other dispensing machines, such as that described in Spanish patent application P200502097 relating to an "advertising device for dispensing machines" from the same applicant as the present patent application, which is based on a dispensing machine having a glazed front part and a plurality of trays wherein the products are stored in a series of compartments and a tray for receiving the dispensed product formed by an ascending/descending body by way of an elevator, with regard to the inner side of the glazed front part.

[0008] Therefore, when the user selects a product, the ascending/descending body is firstly positioned with regard to the corresponding tray in order to receive the respective product and be directed towards the collection box.

[0009] In the earlier machine, additional elements for

transporting the products from the elevator to the collection box must be included, thereby reducing the useful space of the machine available for storing products.

[0010] In earlier machines, even in the event that the box were disposed inside the elevator, the product collection door would be disposed at the same height as said box or front space in the front part of the elevator for extracting the products, due to which the height of the products to be extracted would be proportional to the height of the collection door.

[0011] In order to dispense products of greater height, the dimensions of both the collection door and the front space disposed in the front of the elevator to extract the products and, therefore, that of the elevator itself must be increased, thereby reducing the height of the machine that would be destined for housing trays containing products, decreasing the capacity thereof.

[0012] The dispensing machine of the present invention resolves all the aforementioned drawbacks, as it has a configuration wherein an increase in the height of the products to be dispensed does not represent a decrease in the height of the machine destined for housing trays containing products.

DESCRIPTION OF THE INVENTION

[0013] The present invention relates to an automatic dispensing machine, of the type that may or may not be cooled, which can include payment means or be controlled by another machine and which comprises an elevator which due to its special configuration increases the capacity of the products that can be dispensed, in addition to the fact that the capacity between tray rows increases.

[0014] The front part of the machine comprises a window wherethrough the products to be selected by the user can be observed, as well as a rotatable product collection door.

[0015] The elevator has operation means which allow the machine to move in a vertical direction, both upwards to collect a certain product disposed in a certain tray of the machine and downwards to transport the product to a collection box where the user can extract it from the machine.

[0016] The machine has one or several extractors associated with operation means that drag the product from a channel of a certain product from among those disposed in each tray towards the elevator, which has previously positioned itself in front of the tray that includes the channel wherefrom the product will be extracted.

[0017] The dispensing machine comprises a first device for positioning the elevator with regard to the machine frame, which determines the height of the elevator with regard to the frame at all times, and a second elevator positioning device, in this case with regard to the trays, which determines the relative position between the elevator and the trays at all times.

[0018] Additionally, the elevator comprises a product collection box by a user, having a detection device that

determines whether a product has fallen inside the collection box. When the detection device determines that a product has fallen inside the collection box, the operation means associated with the extractor stop the movement thereof, moving the elevator towards a first position described hereunder.

[0019] The elevator positioning device establishes two positions with respect to the machine frame: a first position wherein the elevator collection box is positioned opposite the product collection door and the product collection door can be opened from the exterior of the machine by a user; and a second position wherein the product collection door cannot be opened due to the presence of opening blocking means of said door, in such a way that it is not possible to gain access to the elevator from the exterior of the machine.

[0020] Passage to this second position is carried out when the detection device detects that the user has introduced his/her hand to collect the product. In said second position the machine activates a scanning device to determine the existence of any obstacle which has been introduced from the exterior that will prevent the normal operation of the elevator as it moves towards the product trays, whereupon it is ready to perform a new extraction.

[0021] The machine has elevator blocking means that prevent the vertical movement of the elevator through the collection door when said elevator is in the first position or product collection position, in such a way that it is not possible to manually move the elevator through the collection door to gain access to the products disposed on the trays.

[0022] The front part of the machine has a micro-controller that determines if said front part is in a use position or is positioned away from the machine in situations such as the maintenance or replenishment of the products disposed on the trays.

[0023] The elevator comprises an upper lid that prevents to gain access to the tray area from the product collection door in the first or collection position. Said upper lid is rotatable, which allows the rotation shaft of the product collection door to be disposed in a greater height than the upper lid, in such a way that the product collection box included in the elevator may house products of greater height, on increasing the height of said box by rotating the upper lid of the elevator.

[0024] The rotatable lid and, therefore, the increased height of the product collection box allows the configuration of a dispensing machine wherein the distance between the highest and the lowest tray is greater than if the lid were fixed, without varying the height of the machine or the height thereof destined to the trays, enabling the inclusion of a larger number of trays in the machine and, therefore, greater product dispensing capacity.

DESCRIPTION OF THE DRAWINGS

[0025] In order to complement the description being made and with the object of helping to better understand

the characteristics of the invention, according to a preferred embodiment thereof, a set of drawings has been included as an integral part of said description, wherein the following has been represented in an illustrative and non-limiting manner:

Figure 1 shows a perspective view of the dispensing machine of the present invention.

Figure 2 shows a perspective view of the dispensing machine of figure 1 when the front part thereof is open.

Figure 3 shows a cross-sectional view of the dispensing machine of figure 1 in the first position, wherein the elevator collection box is disposed opposite the product collection door and said product collection door can be opened from the exterior of the machine by a user, with said door closed. The upper lid of the elevator has been eliminated for greater clarity.

Figure 4 shows a cross-sectional view of the dispensing machine of figure 1 in the first position shown in figure 3, with the product collection door closed.

Figure 5 shows a side sectional view of the dispensing machine of figure 1 in the second position, wherein opening of the product collection door is not allowed due to the presence of opening blocking means of said door, in addition to the scanning device that operates in this position.

Figure 6 shows a side sectional view of the dispensing machine of figure 1, wherein the elevator has been represented both in the first position and in a product collection position.

Figure 7 shows a perspective view of the elevator of the dispensing machine of the present invention.

PREFERRED EMBODIMENT OF THE INVENTION

[0026] In light of the figures, a preferred embodiment of the automatic dispensing machine is described below having a front part (1) comprising a glazed window (2) wherethrough the user observes the products (40) to be selected, in addition to a product collection door (3).

[0027] The machine comprises an elevator (4) that moves along the vertical direction of the machine, in an upward direction to collect a certain product (40) disposed in a certain tray (5) of the machine and in a downward direction to move the product (40) disposed in a collection box (6) present in the elevator (4) to a position opposite to the product collection door (3) disposed in the front part of the machine (1).

[0028] The vertical movement of the elevator (4) is carried out using operation means that in this preferred embodiment comprise a motor (7) which, by means of a shaft (8), transmits the rotation to two toothed pinions (9) disposed on either lateral sides of the elevator (4), said toothed pinions (9) engaging with teeth (10) present in both racks (11) disposed one on either side of the machine frame (12).

[0029] The racks have a sliding surface (13) opposite the teeth (10), in such a way that at the same time that the toothed pinions (9) engage with said teeth (10), a slipper (14) disposed on the lateral sides of the elevator that slides along the sliding surface (13).

[0030] The rotation of the motor (7) in a first direction results in the upward movement of the elevator (4), while the rotation of the motor (7) in a second direction opposite the first results in the downward movement of the elevator (4).

[0031] The elevator (4) also comprises two counterweights (not shown) joined thereto by joining means that slide along pulleys, in such a way that the elevator is disposed on one side of the pulleys and the counterweights are disposed on the other side of the pulleys, whereupon the elevator (4) is balanced at all times, said counterweights being guided by guides that facilitate movement thereof.

[0032] The dispensing machine comprises a first device for positioning the elevator (4) with regard to the frame (12) of the machine, which in this preferred embodiment comprises an emitter photocell (15) disposed in the elevator and oriented toward the machine frame (12) where two receiver photocells (16) and a second elevator (4) positioning device with regard in this case to the trays are disposed, comprising an emitter photocell (15) disposed in the elevator (4) and oriented toward the product (40) trays (5), each of which (5) has a receiver photocell (16).

[0033] The machine has one or several extractors (not shown) between the trays (5) and the elevator (4) which drag the product (40) from a channel of a certain product (40) from among those disposed on each tray (5) wherefrom the product will be extracted (40).

[0034] The product (40) collection box (6) comprises a detection device to determine whether any product (40) has fallen inside the collection box (6) or not, which in this preferred embodiment is a photocell band (35) disposed on one of the lateral sides of the collection box (6) which is disposed opposite to another photocell band (35) disposed on the other lateral side of the box (6) which detect when a product (40) falls inside the collection box (6), moment in which the extractor is stopped.

[0035] The elevator (4) positioning device establishes two positions with regard to the machine frame (12), i.e. the emitter photocell (15) disposed in the elevator and oriented towards the two receiver photocells (16) of the machine frame (12).

[0036] In a first position wherein the elevator (4) collection box (6) is disposed opposite to the product collection door (3), said product collection door (3) can be opened from the exterior of the machine by a user but the elevator cannot be moved vertically along the collection door to access the products (40) disposed on the trays due to elevator blocking means which will be described in detail later. This first position of the elevator (4) with regard to the machine frame (12) is shown in figures 3 and 4.

[0037] In a second position wherein the elevator (4) collection box (6) is not disposed opposite to the product (40) collection door (3), opening of the product (40) collection door (3) is not permitted due to opening blocking means of said collection door (3) which are described in detail below. This second position of the elevator (4) with regard to the machine frame (12) is shown in figure 5.

[0038] The opening blocking means of the collection door (3) comprise latches (17) disposed in the interior of the front part (1) of the machine that retain the collection door (3), specifically stubs (18) that project sideways from the lower part of the collection door (3), by means of an elastic element (19) joined to the latches (17).

[0039] The collection door (3) has an upper rotating shaft (20) which allows closing thereof when the elevator (4) is in the first position.

[0040] The elevator comprises projections (21) disposed in antagonism to wheels (22) joined to the latches (17), in such a way that when the elevator (4) moves from the second position to the first position, the projections (21) push against the wheels (22) joined to the latches (17) and cause said latches (17) to rotate around their rotating shaft (23), which joins them to the interior of the front part (1) of the machine on overcoming the resistance of an elastic element (19) joined both to the latches (17) and to their rotating shaft (23), releasing the stubs (18) of the collection door (3) and thereby allowing the free movement thereof (3).

[0041] When the elevator (4) moves from the first position to the second position, the vertical movement of the elevator projections (21) releases the latches (17) that rotate around their rotating shaft (23) due to the restoring force of the elastic element (19) and are housed inside a cavity (24) in the interior of the front part (1) of the machine, retaining the stubs (18) of the collection door (3) and thereby blocking opening (3) thereof.

[0042] The machine has a micro-controller (not shown) disposed between the machine frame (12) and the front part (1) thereof which detects the position of the front part (1) with regard to the frame (12), i.e. it detects whether the front part (1) is closed with regard to the frame (12) or, in other words, if the machine is open or closed.

[0043] When the front part (1) is closed with regard to the frame (12), the elevator projections (21) are not in contact with the latches (17) and said latches (17) rotate around their rotating shaft (23) due to the restoring force of the elastic element (19), blocking the opening of the collection door (3).

[0044] When the micro-controller informs the machine that the front part (1) is open, the elevator moves from the second position to the first position so that the first tray (5) can be loaded without it (5) being blocked by the elevator (4) itself.

[0045] When the micro-controller informs the machine that the front part (1) is closed, the elevator (4) moves from the first position to the second position, where the projections (21) coupled with the elevator (4) come into contact with the latches (17) in the relative position op-

posite to the position adopted by both elements, latches (17) and projections (21) when the collection door (3) was released during movement from the second position to the first position.

[0046] In order to prevent the elevator (4) from becoming blocked by the latches (17), the projections (21) have an elastic element (19) which allows rotation thereof when they encounter an obstacle when moving from the first position to the second position.

[0047] The elevator blocking means comprise roller-type stoppers (25) that project from either side of the collection door (3) and rotate coupled with said door (3), in such a way that when the collection door (3) is opened to access the product (40) deposited inside the collection box (6), the rollers (25) are disposed on brackets (26) fixed to the elevator (4) having an upper section (27) that describes the path of travel followed by the rollers (25) during opening of the collection door (3), thereby preventing the elevator (4) from being manipulated from the exterior of the machine through the collection door (3), as the rollers (25) prevent the movement of the elevator and, therefore, passage from the first position to the second position, in order to access the products (40) disposed on the trays (5).

[0048] In the second position the machine activates a scanning device that determines the existence of an obstacle which has been introduced from the exterior that prevents normal operation of the elevator (4) before starting its movement towards the product (40) trays (5). This scanning device comprises a motor (not shown) that spins in a first direction and which transmits the movement through a shaft (28) joined to the centre of a circular strip (29), along the periphery of which a pivot (30) is disposed whereto a connecting rod (31) is fixed that transmits the movement to a disk (32) that describes a circle in such a way as to guarantee that there is no obstacle above the detection means, i.e. the photocell bands that determine whether a product has fallen inside the collection box (6).

[0049] When the disk (32) is not capable of completing the rotation, it would indicate the existence of an obstacle that interferes therewith (32), moment when the motor rotates in a second direction opposite to the first up to the standby position of the scanning device, said position being defined by a micro-controller with a roller that slides along a circular pinion having a recess where the micro-controller is released (not shown).

[0050] At that moment the elevator (4) passes to the first position, informing the machine that the obstacle must be removed.

[0051] The elevator (4) also comprises an upper lid (33) preventing to gain access to the tray area from the product collection door (3) in the first or collection position. This upper lid (33) is rotatable, allowing the rotating shaft (20) of the product collection door to be disposed at a greater height than the upper lid (33), which is movable by means of the collection door (3) during movement thereof due to the contact between the collection door

(3) and said upper lid (33). Additionally, in this preferred example, the rotating shaft (34) of the upper lid (33) is disposed below said upper lid (33) in the opening position of the collection door (3), reducing the resistance offered by the upper lid (33) to rotation on being operated by the collection door (3).

Claims

1. An automatic dispensing machine comprising a front part (1) having a rotatable collection door (3) for collecting the products (40) dispensed by the machine, a frame (12) and an elevator (4) which carries out both the collection of a certain product disposed on a certain tray (5) of the machine and the movement of the product (40) to a collection box (6) accessible through the rotatable collection door (3), the product collection door (3) having a rotational shaft (20), **characterised in that** the elevator (4) comprises a rotatable upper lid (33) allowing the rotational shaft (20) of the product collection door (3) to be disposed at a greater height than the upper lid (33) of the elevator (4).
2. An automatic dispensing machine, according to claim 1, **characterised in that** the upper lid (33) is movable by means of the collection door (3) during movement thereof, due to the contact between the collection door (3) and said upper lid (33).
3. An automatic dispensing machine, according to claim 2, **characterised in that** the rotational shaft (34) of the upper lid (33) is disposed below said upper lid (33) in the opening position of the collection door (3).
4. An automatic dispensing machine, according to any of the previous claims, **characterised in that** the collection box (6) is integrated in the elevator (4).
5. An automatic dispensing machine, according to claim 4, **characterised in that** it comprises opening blocking means of the product (40) collection door (3) which works when the elevator (4) collection box (6) is not disposed opposite to the product (40) collection door (3).
6. An automatic dispensing machine, according to claim 5, **characterised in that** the opening blocking means of the product (40) collection door (3) comprise latches (17) disposed in the interior of the front part (1) of the machine that retain stubs (18) projecting laterally from the lower part of the collection door (3) due to the action of an elastic element (19) joined to the latches (17).
7. An automatic dispensing machine, according to

- claim 6, **characterised in that** the elevator comprises antagonistically disposed projections (21) that push wheels (22) joined to the latches (17) and cause said latches (17) to rotate around their rotating shaft (23) which joins them to the interior of the front part (1) of the machine on overcoming the resistance of the elastic element (19) when the elevator (4) collection box (6) moves from a non-opposed position to an opposed position with regard to the product (40) collection door (3), releasing the stubs (18) of the collection door (3) and thereby allowing the free movement thereof (3).
8. An automatic dispensing machine, according to claim 7, **characterised in that** the projections (21) have an elastic element (19) allowing rotation thereof when they encounter an obstacle in their movement from an opposed position to a non-opposed position of the elevator (4) collection box (6) with regard to the product (40) collection door (3) in order to prevent the latches (17) from blocking the elevator (4).
 9. An automatic dispensing machine, according to claim 4, **characterised in that** it comprises elevator blocking means which become activated when the elevator (4) collection box (6) is disposed opposite to the product (40) collection door (3), said blocking means allowing opening of the product collection door (3) from the exterior of the machine by a user but preventing the elevator from moving through the collection door to access the products (40) disposed in the trays (5).
 10. An automatic dispensing machine, according to claim 9, **characterised in that** the elevator blocking means comprise roller-type stoppers (25) projecting from either side of the collection door (3) in such a way that, when the collection door (3) opens to access the product (40) deposited in the collection box (6), the rollers (25) are disposed on brackets (26) fixed to the elevator (4), thereby preventing the elevator (4) from being manipulated from the exterior of the machine through the collection door (3), as the rollers (25) prevent the elevator from moving.
 11. An automatic dispensing machine, according to claim 4, **characterised in that** it comprises a scanning device that determines the existence of an external obstacle introduced from the exterior that prevents normal operation of the elevator (4) before starting its movement towards the product (40) trays (5).
 12. An automatic dispensing machine, according to claim 4, **characterised in that** it comprises detection means that determine whether a product has fallen inside the collection box (3) or not.
 13. An automatic dispensing machine, according to claims 11 and 12, **characterised in that** the scanning device comprises a motor rotatable in a first direction, motor that transmits the movement through a shaft (28) joined to the centre of a circular strip (29), having a pivot (30) disposed on the periphery thereof where to a connection rod (31) is fixed which transmits the movement to a disk (32) which describes a circle that guarantees the absence of obstacles above the detection means.
 14. An automatic dispensing machine, according to claim 13, **characterised in that** the scanning device comprises a micro-controller having a roller that slides along a circular pinion having a recess, said micro-controller being released when said scanning device is on standby.
 15. An automatic dispensing machine, according to claim 14, **characterised in that** the motor (28) is rotatable in a second direction opposite to the first up to the standby position of the scanning device when the disk (32) is unable to complete the circle due to the existence of an obstacle that interferes with said disk (32).
 16. An automatic dispensing machine, according to claim 1, **characterised in that** it comprises one or several extractors disposed between the trays (5) and the elevator (4) that drag the product (40) from a channel of a certain product (40) from among those disposed in each tray (5) to the elevator (4), which has previously been positioned in front of the tray (5) that includes the row wherefrom the product (40) will be extracted.
 17. An automatic dispensing machine, according to claim 1, **characterised in that** it comprises a first device for positioning the elevator (5) with regard to the machine frame (12), which determines the height of the elevator (5) with regard to the frame (12) at all times, and a second device for positioning the elevator (4) with regard to the trays (5), which determines the relative position between the elevator (4) and the trays (5) at all times.

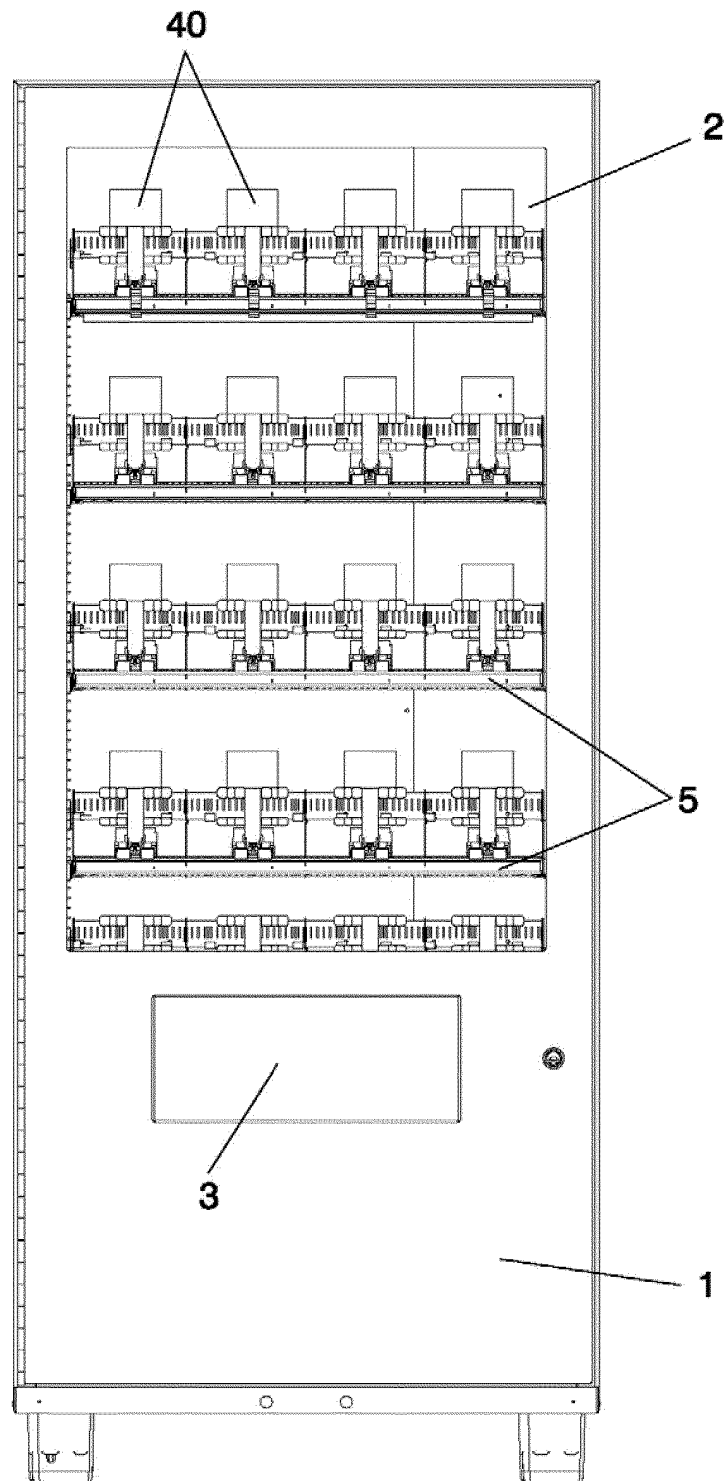


FIG. 1

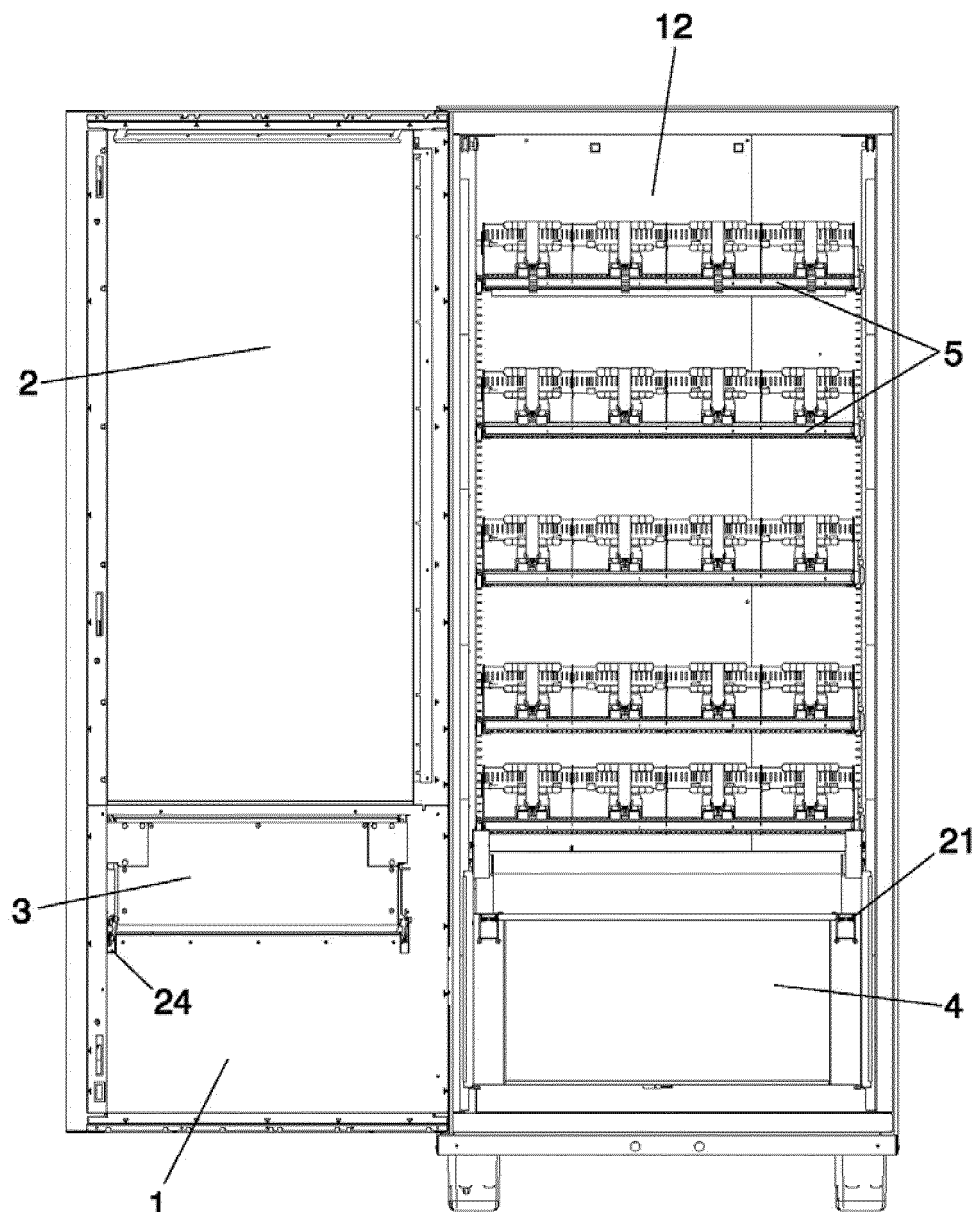
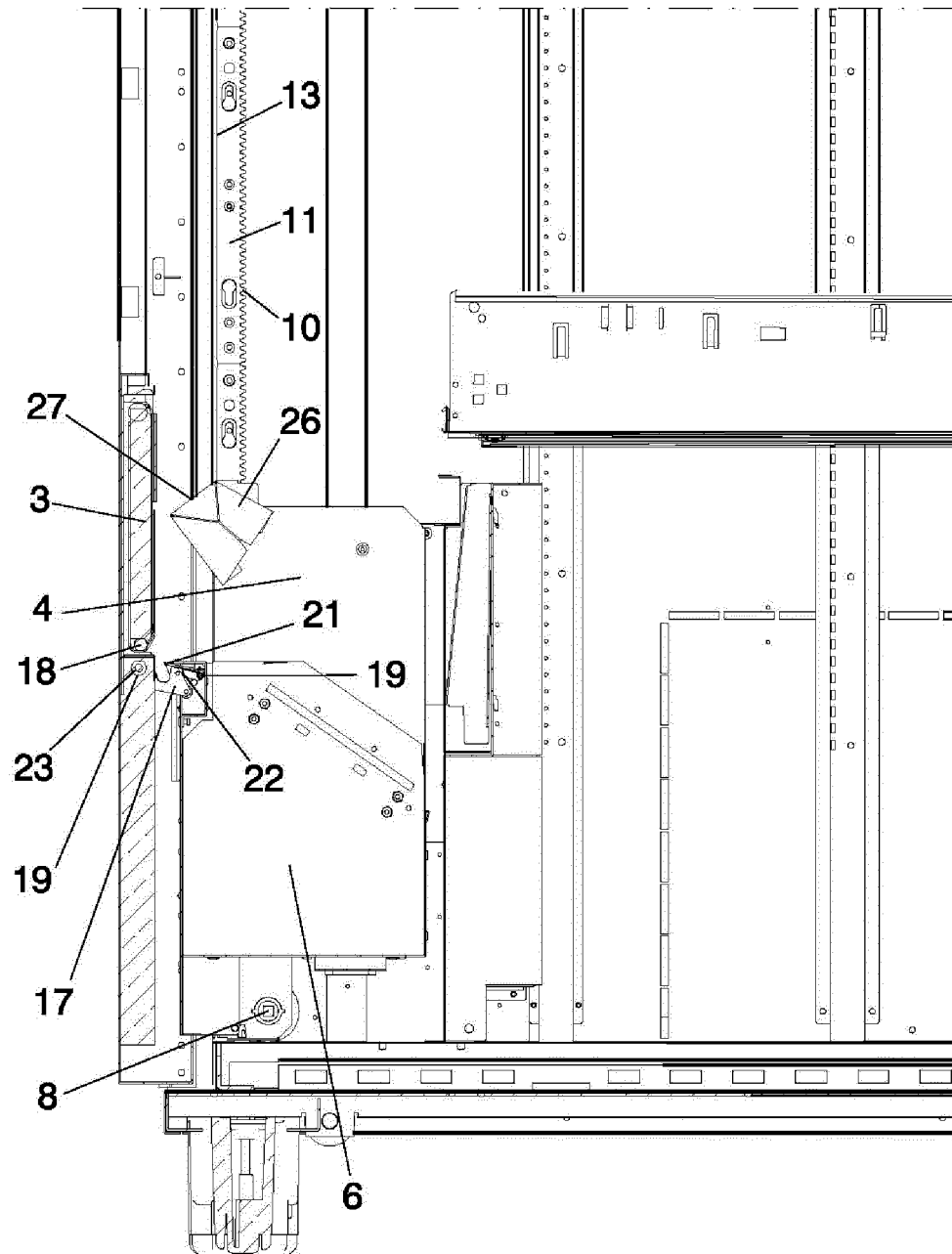


FIG. 2



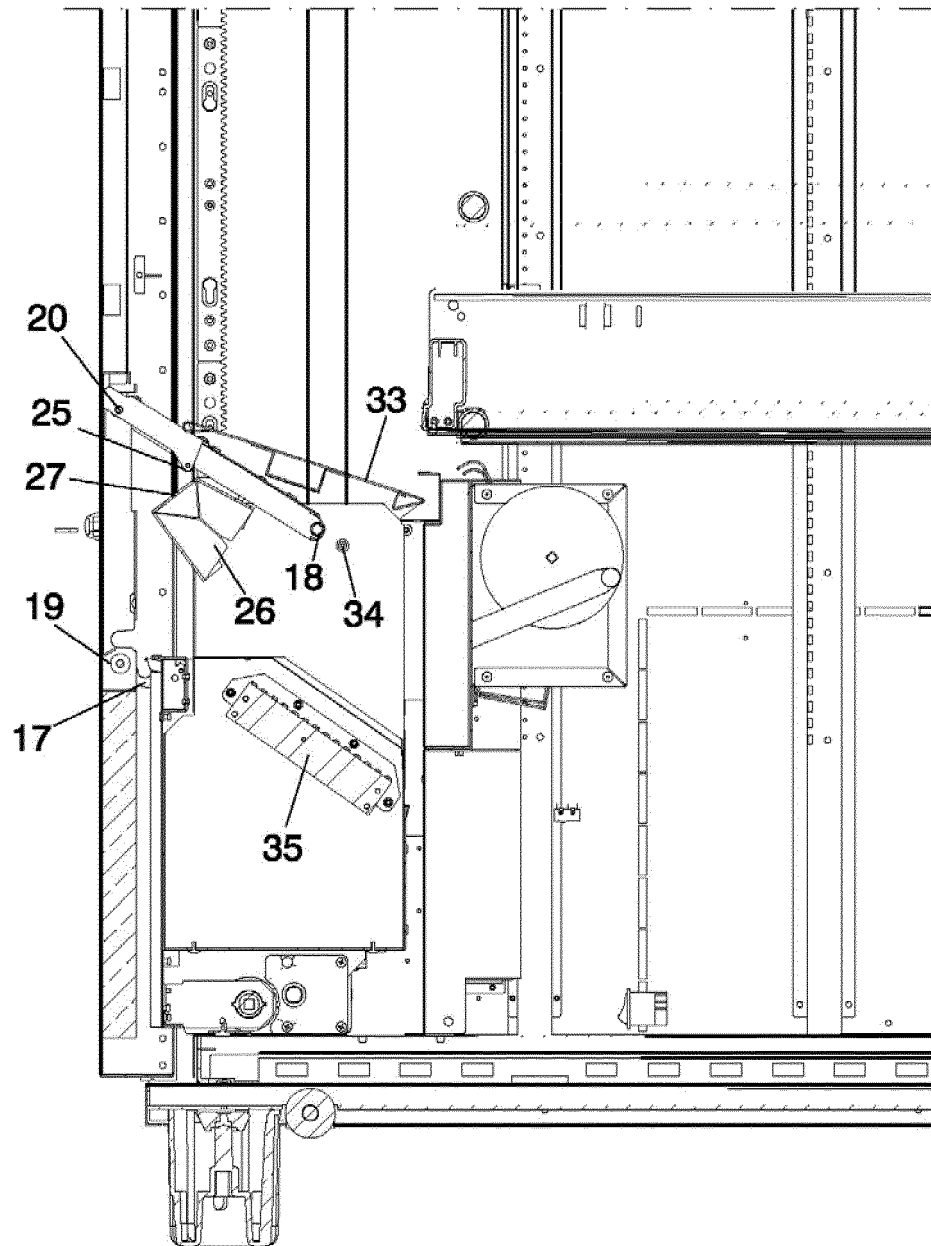


FIG. 4

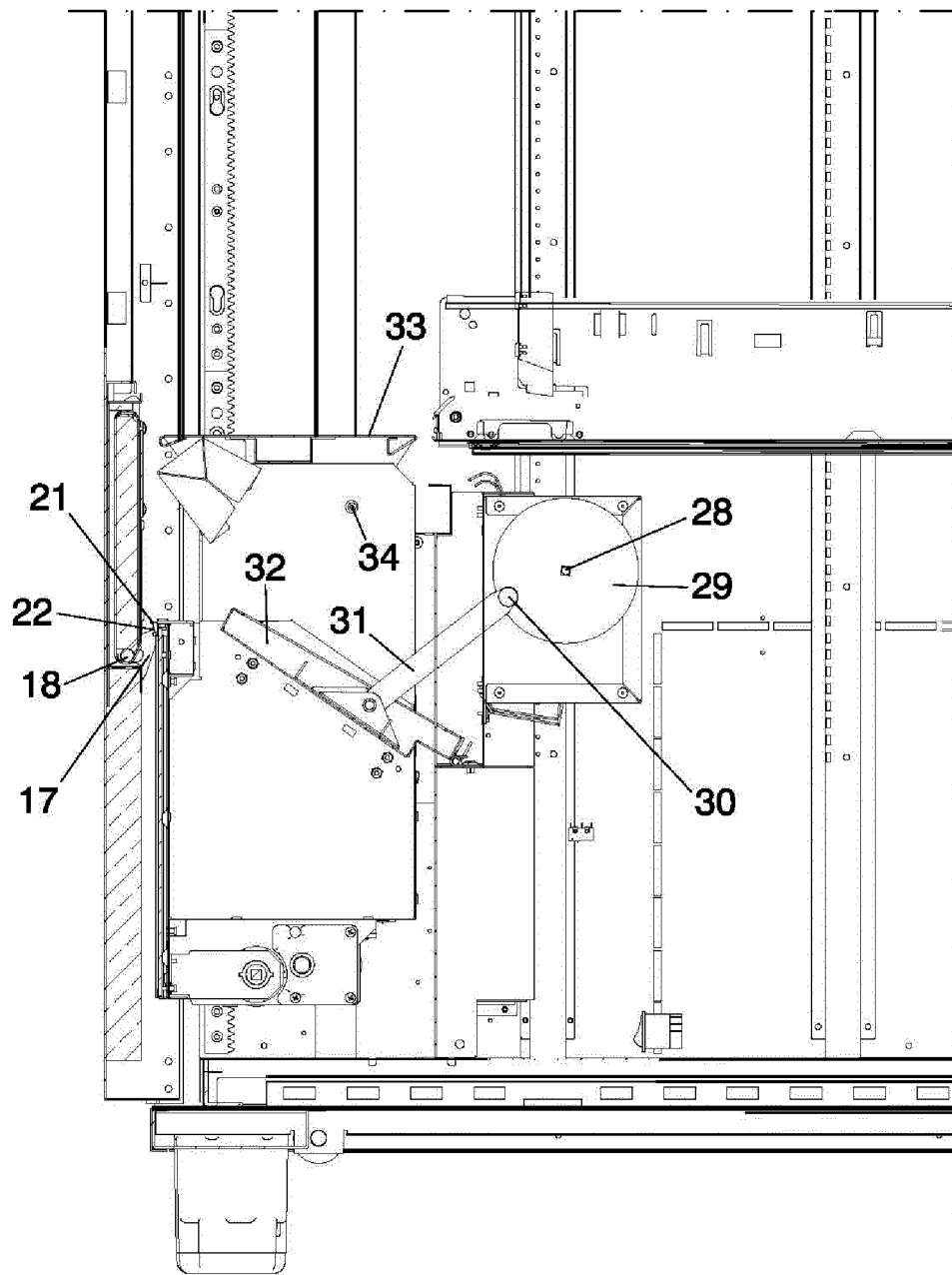


FIG. 5

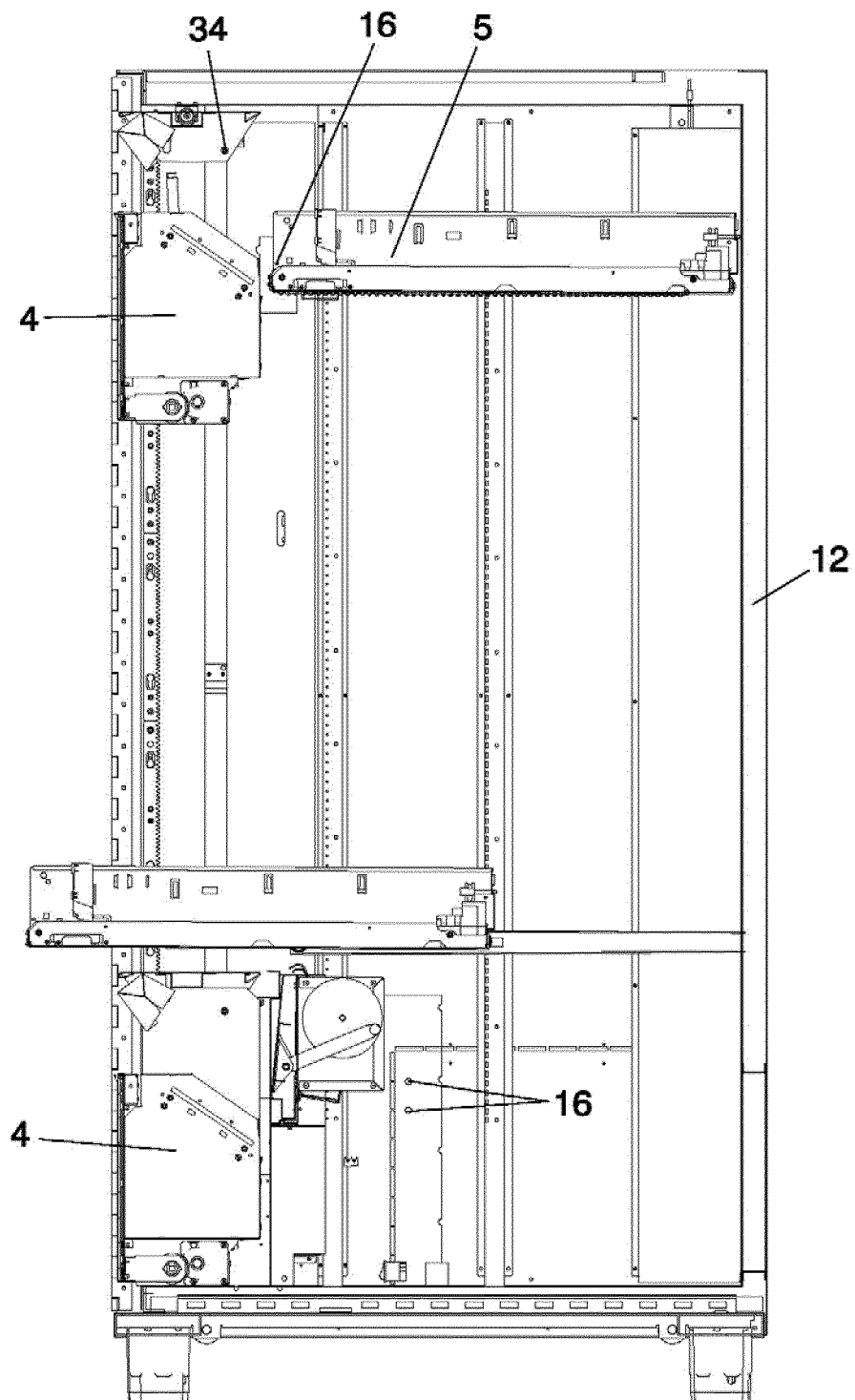
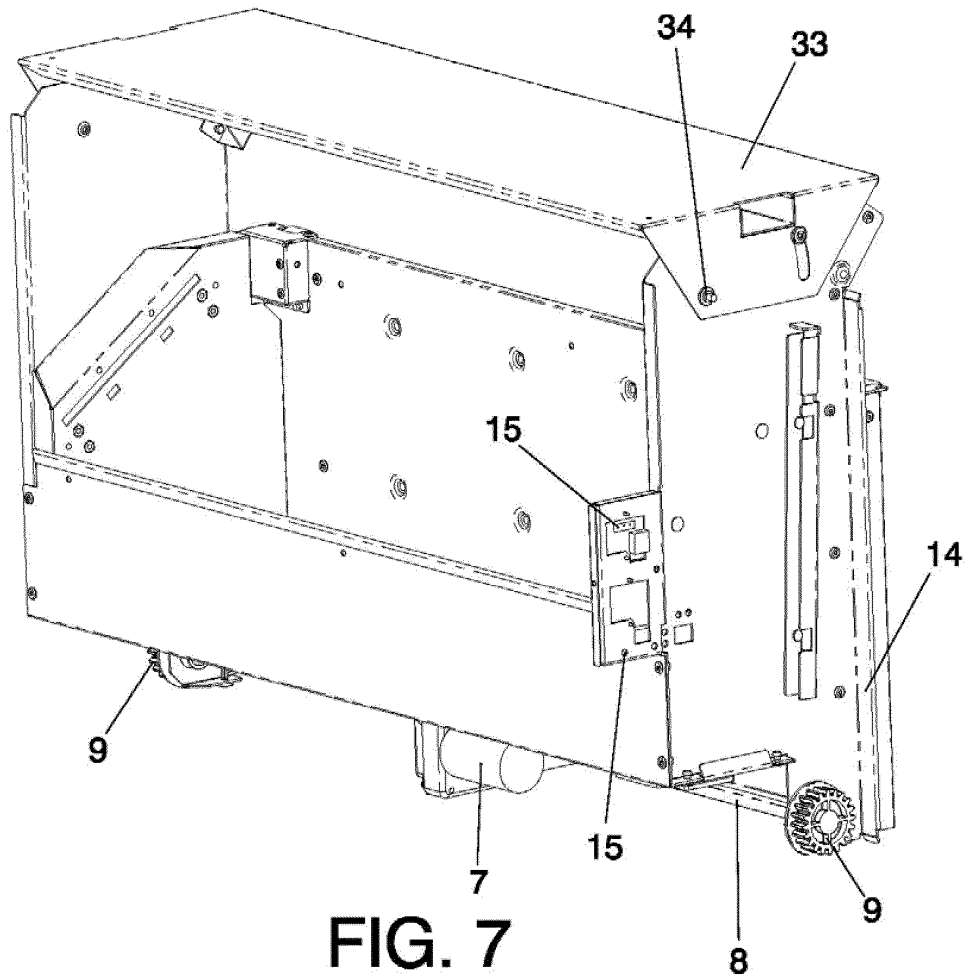


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No

PCT/ES2012/070278

A. CLASSIFICATION OF SUBJECT MATTER INV. G07F11/16 ADD.		
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) G07F		
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 practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 513 677 B1 (SORENSEN STEVEN W [US] ET AL) 4 February 2003 (2003-02-04) column 9 - column 23; figures 1-15 -----	1
X	WO 2009/138864 A1 (N&W GLOBAL VENDING SPA [IT]; SICHICH ROBERTO [IT]) 19 November 2009 (2009-11-19) page 4 - page 10; figures 1-2, 5-6 -----	1
X	US 2007/084876 A1 (ARDERN JOHN P [US] ET AL) 19 April 2007 (2007-04-19) paragraph [0021] - paragraph [0031]; figures 1-5 -----	1
X	US 2005/192705 A1 (PINNEY LINDA J [US] ET AL) 1 September 2005 (2005-09-01) paragraph [0086] - paragraph [0116]; figures 1-13 ----- -/--	1
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search		Date of mailing of the international search report
17 July 2012		31/07/2012
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		Lavin Liermo, Jesus

INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2012/070278

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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X	US 2005/067426 A1 (HOLDWAY JOHN BARRETT [US] ET AL HOLDWAY JOHN [US] ET AL) 31 March 2005 (2005-03-31) paragraph [0079] - paragraph [0094]; figures 19-23	1
A	----- EP 1 762 989 A1 (JOFEMAR SA [ES]) 14 March 2007 (2007-03-14) abstract -----	1

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/ES2012/070278

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