

VENDING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001]

The present invention relates to a vending machine enabling visually recognizing commodities stored therein from outside and including columns arranged in a plurality of rows in a left and right direction and in a plurality of stages in a vertical direction.

2. Description of the Background Art

[0002]

There are known vending machines enabling visually recognizing commodities stored therein from outside. Such vending machines include a box-shaped body cabinet with a front thereof opened and an external door that closes the front opening of the body cabinet. An interior of the body cabinet is compartmented by a partition plate into an upper region, which accounts for about 80 percent of the whole volume, and a lower region, which accounts for about 20 percent of the whole volume, the upper region, which accounts for about 80 percent of the whole volume, defining a commodity storage chamber, and the lower region, which accounts for about 20 percent, defining a machine room. Commodity storage racks are stored in the commodity storage chamber. The commodity storage racks are

constructed by arranging columns in a plurality of rows in a left and right direction and in a plurality of stages in a vertical direction, and the columns, respectively, can be drawn out forward. The columns store commodities aligned in a longitudinal row and in the case where commodities should be stored (replenished), the columns are drawn out forward.

[0003]

Arranged in the region in front of the commodity storage racks is a bucket device that moves a bucket in a left and right direction (X-direction) and in a vertical direction (Y-direction) to receive a commodity from a column as indicated to convey the same to a commodity conveyance position. An internal door is provided in front of the bucket device. The internal door includes a door body, which closes the front opening of the commodity storage chamber, and is structured by fitting a glass plate into a frame body so as to enable visually recognizing commodities stored in the columns from outside. A commodity carrying-out port is provided on the internal door and a commodity is carried out toward the commodity carrying-out port from the bucket moved to a carried-out position. The commodity carrying-out port is closed by a carrying-out port flapper, and a commodity carried to the commodity carrying-out port from the bucket pushes the carrying-out port flapper open whereby the commodity carrying-out port is opened.

[0004]

A glass plate is fitted into the external door, so that commodities stored in the columns can be visually recognized through the glass plate and the internal door (the glass plate) from outside. Also, a commodity take-out port is provided on the external door. The commodity take-out port permits a commodity carried out from the commodity carrying-out port to be taken out, and is provided in a position below the commodity carrying-out port. The commodity take-out port is closed by a take-out port flapper, and a user pushes the take-out port flapper open whereby the commodity take-out port is opened (see, for example, JP-A-10-302140).

[0006]

By the way, with the vending machine described above, every column can be drawn out forward, so that the columns positioned in the eye level of an operator who replenishes the columns with commodities will not go out at a time and so it is hard to think that the operator gets hurt.

[0007]

When every column can be drawn out forward, however, the construction enabling the columns to be drawn out costs a great deal, which becomes an obstacle in attaining cost reduction.

SUMMARY OF THE INVENTION

[0008]

In view of the situation, the invention has its object to provide a vending machine enabling columns in the same level to be drawn out all together without having an operator, who replenishes the columns with commodities, getting into danger.

[0009]

In order to attain the above object, a first aspect of the invention is directed to a vending machine, in which columns arranged in a left and right direction, out of columns arranged in a plurality of rows in the left and right direction and in a plurality of stages in a vertical direction are mounted on a rack and columns in the same level can be drawn out all together to predetermined taken-out positions from stored positions, and which includes a halt unit that engages with the rack to thereby stop the same temporarily in the case where the rack is drawn out to a predetermined halt position, and a stoppage unit that separates the rack from the halt unit and engages with the rack to thereby stop the same in the case where the rack is drawn out to a drawn-out position.

[0010]

Also, a second aspect of the invention is directed to the vending machine according to the first aspect of the invention, wherein in the case where the rack is drawn out to the drawn-out position, the stoppage unit inclines much in a manner to lower this side, thus stopping the rack.

[0011]

Also, a third aspect of the invention is directed to the vending machine according to the first or second aspect of the invention, wherein in the case where the rack is drawn out to the halt position, the halt unit inclines down a little at the front, thus stopping the rack.

[0012]

Also, a fourth aspect of the invention is directed to the vending machine according to any one of the first to third aspect of the invention, wherein the rack is provided to enable receiving a handle protruding forwardly of a front edge thereof.

[0013]

With the vending machine according to the invention, in the case where the rack is drawn out to the predetermined halt position, the rack is caused to stop temporarily and thereafter in the case where the rack is drawn out to the predetermined drawn-out position, the rack is caused to stop, so that the rack is drawn out separately in two stages. Accordingly, when the rack is drawn out, columns in the same level are drawn out all together but since the rack is drawn out separately in two stages, an operator can adequately pay attention and will not get into danger.

[0014]

Also, since the rack inclines down a little at the front in the case where the rack is drawn out to the halt position,

and inclines down greatly at the front in the case where the rack is drawn out to the drawn-out position, it is possible for an operator to visually see commodities stored in columns positioned above the level of his/her eyes.

[0015]

Further, when the handle is caused to protrude forwardly of a front edge, it is possible to lift up the rack with a small force and to store the rack in the stored position with a small force.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view showing the outward appearance of a vending machine according to an embodiment of the invention;

Fig. 2 is a perspective view showing a state, in which an external door of the vending machine shown in Fig. 1 is opened;

Fig. 3 is a perspective view showing a commodity storage rack mounted in an uppermost stage;

Fig. 4 is a perspective view showing a state, in which the commodity storage rack shown in Fig. 3 is drawn out;

Fig. 5 is a perspective view showing a state, in which the commodity storage rack shown in Fig. 3 is further drawn out; and

Fig. 6 is a perspective view showing the commodity

storage rack in an uppermost stage with a handle being drawn out.

DETAILED DESCRIPTION OF THE INVENTION

[0016]

A preferred embodiment of a vending machine according to the invention will be described below in detail with reference to the drawings. In addition, the invention is not limited to the embodiment.

[0017]

Fig. 1 is a front view showing the outward appearance of the vending machine according to the embodiment of the invention and Fig. 2 is a perspective view showing a state, in which an external door of the vending machine shown in Fig. 1 is opened. As shown in Fig. 1, the vending machine described herein is one enabling commodities stored therein to be visually recognized from outside and including a box-shaped body cabinet 1 with a front thereof opened and an external door 2 that closes the front opening of the body cabinet 1.

[0018]

As shown in Fig. 2, an interior of the body cabinet 1 is compartmented by a partition plate 11 into an upper region, which accounts for about 80 percent of the whole volume, and a lower region, which accounts for about 20 percent of the whole volume, the upper region, which accounts for about 80 percent

of the whole volume, defining a commodity storage chamber 12, and the lower region, which accounts for about 20 percent, defining a machine room 13.

[0019]

Commodity storage racks 3 are stored in the commodity storage chamber 12. The commodity storage racks 3 are constructed by arranging columns 31 in a plurality of rows (for example, seven rows in an example shown in Fig. 2) in a left and right direction and in a plurality of stages (for example, eight stages in the example shown in Fig. 2) in a vertical direction, and as shown in Fig. 3, the commodity storage racks 3 according to the embodiment are constructed such that the columns 31 arranged every stage in a left and right direction are mounted on one rack 32 and the columns 31 in the same level can be drawn out all together to predetermined drawn-out positions from stored positions (positions shown in Fig. 3).

[0020]

The rack 32 includes a bottom plate portion (not shown), on which the columns 31 arranged left and right are mounted, and side plate portions 322 extending upward from both side edges of the bottom plate portion. A step 323 bent in a stepwise manner is formed in a portion, which accounts for 2/3 of a forward section of a lower portion of the side plate portion 322. Also, a guide roller 33 is mounted rotatably above a rear end of the side plate portion 322.

[0021]

On the other hand, guide rails 14 and guide rollers 15 are mounted to an inner wall portion of the commodity storage chamber 12. The guide rail 14 stores the guide roller 33 mounted to the side plate portion 322 of the rack 32 to guide the stored guide roller 33 and is mounted so as to incline down at the front by 2 degrees. The guide rollers 15 guide the steps 323 formed on the side plate portions 322 of the rack 32 and are mounted rotatably. Accordingly, the rack 32 is guided by the guide rails 14 and the guide rollers 15 and drawn out in front of the commodity storage chamber 12 with a slope of 2 degrees.

[0022]

Further, the rack 32 in an uppermost stage above the level of operator's eyes stops temporarily as shown in Fig. 4 when drawn out to a predetermined halt position and thereafter stops as shown in Fig. 5 when drawn out to a predetermined drawn-out position.

[0023]

Specifically, guide plates 16R, 16L are mounted to the inner wall portion of the commodity storage chamber 12 to correspond to the rack 32 in the uppermost stage. The guide plates 16R, 16L are mounted in a manner to be made contiguous to the guide rails 14, so that when the rack 32 is drawn out, the guide rollers 33 are transferred to the guide plates 16R,

16L from the guide rails 14, and when the rack 32 is pushed in, the guide rollers 33 are transferred to the guide rails 14 from the guide plates 16R, 16L. Protrusive pieces are provided on the guide plates 16R, 16L to guide the guide rollers 33 and formed with halt recesses (halt unit) 161, with which the guide rollers 33 engage in the halt positions, and stoppage recesses (stoppage unit) 162, with which the guide rollers 33 engage in the drawn-out positions. Accordingly, when the rack 32 is drawn out to the predetermined halt position, the guide rollers 33 engage with the halt recesses 161 whereby the rack 32 is halted temporarily as shown in Fig. 4. At this time, the rack 32 stops while inclining down a little (about 5 degrees) at the front with the steps 323 supported on the guide rollers 15 and with the guide rollers 33 supported on the halt recesses 161. Thereafter, when the guide rollers 33 are caused to separate from the halt recesses 161 to draw the rack 32 to the predetermined drawn-out position, the guide rollers 33 engage with the stoppage recesses 162, thereby stopping the rack 32. At this time, the rack 32 stops while inclining down greatly (about 25 degrees) at the front with the steps 323 supported on the guide rollers 15 and with the guide rollers 33 supported on the stoppage recesses 162.

[0024]

Also, the rack 32 in the uppermost stage mounts thereto a handle 34, which protrudes forwardly of a front edge thereof,

as shown in Fig. 6. The handle 34 serves to lift up the rack 32, which stops inclining much in a drawn-out position, with a small force, and is mounted to the bottom plate of the rack 32 to be able to turn. When the handle 34 is turned at the front in a drawn-out position, the handle 34 protrudes forwardly of the front edge of the rack 32, so that even the rack 32 with commodities fully loaded on the columns 31 arranged in a left and right direction can be lifted up with a small force (for example, 50 N).

[0025]

As shown in Fig. 2, arranged in a region forwardly of the commodity storage racks 3 is a bucket device (not shown) that moves a bucket 4 in a left and right direction (X-direction) and in a vertical direction (Y-direction) to receive a commodity from a column 31 as indicated to convey the same to a commodity conveyance position.

[0026]

As shown in Fig. 2, an internal door 5 is provided in front of the bucket device. The internal door 5 includes a door body, which closes the front opening of the commodity storage chamber 12, and is dual-structured to include the external door 2 and the internal door 5 to realize energy saving. The internal door 5 is structured by fitting a glass plate 51 into a frame body 52 so as to enable visually recognizing commodities stored in the columns 31 from outside.

[0027]

As shown in Fig. 2, a commodity carrying-out port 53 is provided in a position, which accounts for about 1/3 of the internal door 5 in a height direction, on the right thereof. The commodity carrying-out port 53 includes a rectangular-shaped hole, through which a commodity is carried out from an interior of the commodity storage chamber 12, and a commodity is carried out toward the commodity carrying-out port 53 from the bucket 4 moved to a carried-out position. The commodity carrying-out port 53 is closed by a carrying-out port flapper 54, and a commodity carried to the commodity carrying-out port 53 from the bucket 4 pushes the carrying-out port flapper 54 open whereby the commodity carrying-out port 53 is opened.

[0028]

As shown in Fig. 1, a glass plate 21 is fitted into the external door 2, so that commodities stored in the columns 31 can be visually recognized through the glass plate 21 and the internal door (the glass plate 51) 5 from outside.

[0029]

Also, as shown in Fig. 1, a commodity take-out port 22 is provided around the middle of the external door 2. The commodity take-out port 22 includes a rectangular-shaped hole, through which a commodity carried out from the commodity carrying-out port 53 is taken out, and is provided in a position

below the commodity carrying-out port 53. The commodity take-out port 22 is closed by a take-out port flapper 23, and a user pushes the take-out port flapper 23 open from outside whereby the commodity take-out port 22 is opened.

[0030]

In case of replenishing the vending machine according to the embodiment of the invention with commodities, the external door 2 and the internal door 5 are opened in this order to enable drawing the rack 32 out. Subsequently, the rack 32 mounting thereon a column 31, in which commodities being replenished are to be stored, is drawn out to a drawn-out position from a stored position and commodities are replenished.

[0031]

Hereupon, when the rack 32 in the uppermost stage is drawn out, the guide rollers 33 engage with the halt recesses 161 in a predetermined stoppage position as described above whereby the rack 32 is stopped temporarily. At this time, since the rack 32 stops inclining a little (about 5 degrees), commodities may be replenished in this state.

[0032]

On the other hand, in the case where a short operator replenishes the rack with commodities and in the case where commodities are replenished until the rack is fully loaded, it suffices to separate the guide rollers 33 from the halt

recesses 161 to further draw the rack 32 out. When the rack 32 is further drawn out, the guide rollers 33 engage with the stoppage recesses 162 in a predetermined stoppage position as described above whereby the rack 32 is stopped. At this time, the rack 32 stops inclining much (about 25 degrees). Therefore, even a short operator can replenish the columns 31 with commodities until the columns are fully loaded.

[0033]

After replenishment of commodities is terminated, the rack 32 is lifted up and the rack 32 is stored in a stored position from a drawn-out position. In the case where the columns 31 arranged in a left and right direction are fully loaded with commodities and the rack 32 is heavy, the rack 32 can be lifted up with a small force by turning the handle 34 to the front, protruding the handle 34 from the front edge of the rack 32, and lifting up the handle 34.

[0034]

After the rack 32 is stored in the stored position, the internal door 5 and the external door 2 are closed in this order.

[0035]

With the vending machine according to the embodiment of the invention, the rack 32 in the uppermost stage stops temporarily in case of being drawn out to a predetermined halt position and thereafter stops in case of being drawn out to a predetermined drawn-out position, so that the rack 32 is drawn

out separately in two stages. Accordingly, the columns 31 on the rack 32 in the uppermost stage are drawn out all together but are drawn out separately in two stages, so that an operator can adequately pay attention and will not get into danger.

[0036]

Also, since the rack 32 in the uppermost stage stops while inclining down a little at the front in case of being drawn out to a predetermined halt position and stops while inclining down greatly at the front in case of being drawn out to a drawn-out position, even a short operator can replenish the columns 31 with commodities until the columns are fully loaded.

[0037]

Further, the rack 32 can be lifted up with a small force by turning the handle 34 in front of the front edge of the rack 32 and lifting up the handle 34, so that it is possible to store the rack 32 with a small force.

What is claimed is:

1. A vending machine, in which columns arranged in a left and right direction, out of columns arranged in a plurality of rows in the left and right direction and in a plurality of stages in a vertical direction are mounted on a rack and columns in the same level can be drawn out all together to predetermined taken-out positions from stored positions, and which comprises:

a halt unit that engages with the rack to thereby stop the same temporarily in the case where the rack is drawn out to a predetermined halt position, and

a stoppage unit that separates the rack from the halt unit and engages with the rack to thereby stop the same in the case where the rack is drawn out to a drawn-out position.

2. The vending machine according to claim 1, wherein in the case where the rack is drawn out to the drawn-out position, the stoppage unit inclines down greatly at the front, thus stopping the rack.

3. The vending machine according to claim 1 or 2, wherein in the case where the rack is drawn out to the halt position, the halt unit inclines down a little at the front, thus stopping the rack.

4. The vending machine according to claim 1 or 2, wherein the rack is provided to enable storing a handle protruding in front of a front edge thereof.