

COMMODITY STORAGE APPARATUS OF VENDING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001]

The present invention relates to a commodity storage apparatus, and more particular, to a commodity storage apparatus, which delivers a commodity through a bucket between it and a commodity rack, on which a plurality of commodity storage columns are aligned in a left and right direction.

2. Description of the Background Art

[0002]

Some vending machines include a commodity storage column, in which commodities are received, and a bucket for conveyance of a commodity. While the commodity storage column receives therein a plurality of commodities in an aligned state, it discharges the commodities one by one from a front end thereof in the case where a vend mechanism is driven. With general vending machines, a plurality of commodity storage columns are arranged on a commodity rack in a left and right direction and the commodity racks are provided in plural stages in a vertical direction between a pair of left and right rack support side plates. A bucket serves to deliver a commodity between it and a commodity storage column and is arranged movably in a region in front of commodity racks. More specifically, the bucket

is arranged to be enabled by bucket moving means to move up and down and left and right in the region in front of commodity racks.

[0003]

The bucket moving means includes a X-axis conveyance mechanism capable of moving a bucket in a left and right direction, and Y-axis conveyance mechanisms, which cause the bucket including the X-axis conveyance mechanism to move in a vertical direction. The Y-axis conveyance mechanisms are provided on opposite sides to mutually facing surfaces of a pair of rack support side plates, which support the commodity racks.

[0004]

With such vending machine, it is general that a translucent panel is provided on an external door, which defines a front thereof, and an interior thereof can be visually recognized through the translucent panel from the front. There is known a vending machine provided on a front of a bucket with a light source, which lights up when the bucket moves, as a stage effect for a user at the time of selling commodity (see, for example, JP-A-2008-262249).

[0006]

By the way, it is general that the vending machine described above is mounted in an indoor facility and provided with a fluorescent lamp, which illuminates an interior of a

vending machine body, that is, commodities received in commodity storage columns. Also, meeting the needs of energy saving in recent years, commodities are sold in a state, in which a fluorescent lamp is put off, in a predetermined time zone in some cases. In such case, an interior of a vending machine body is also illuminated owing to illumination in an indoor facility but illumination in an indoor facility is occasionally inadequate according to a location, in which a vending machine is mounted. With the vending machine proposed in JP-A-2008-262249, a light source is arranged on the front of a bucket, so that light can be emitted to a user presented in front of the vending machine but a commodity or the like received in the bucket cannot be illuminated and so it cannot be said that visibleness is adequate.

SUMMARY OF THE INVENTION

[0007]

The invention has been thought of in view of the situation and has its object to provide a commodity storage apparatus capable of illuminating a commodity received in a bucket to achieve an improvement in visibleness while making presentation at the time of selling commodity favorable.

[0008]

In order to attain the object, a commodity storage apparatus of a vending machine according to a first aspect of

the invention includes commodity racks each arranging thereon a plurality of commodity storage columns in a left and right direction and provided in plural stages in a vertical direction between a pair of left and right rack support side plates, a bucket arranged movably in the region in front of the commodity racks to be able to deliver a commodity between the bucket and an optional commodity storage column in case of being arranged in opposition to the commodity storage column, and a bucket moving unit that drives a bucket to thereby arrange the bucket in opposition to a commodity storage column, for which delivery is indicated, in the case where the commodity storage column is indicated, wherein the bucket includes light sources provided on sides, which are arranged in a mutually opposed manner to define a receiving region intended for receiving a commodity, to illuminate the receiving region and forward and rearward regions thereof.

[0009]

Also, a second aspect of the invention is directed to the commodity storage apparatus of a vending machine according to the first aspect, wherein the bucket includes recesses on the sides to have the light sources embedded therein and inner surfaces of the recesses are defined as reflection surfaces of the light sources.

[0010]

According to the aspects of the invention, since the

light sources arranged on the sides, which define the bucket, illuminate the receiving region defined by the sides and forward and rearward regions of the receiving region, it is possible to illuminate a selected commodity stored in a commodity storage column in the case where the bucket is arranged in opposition to the commodity storage column and to illuminate the commodity, that is, the commodity presented in the receiving region in the case where a commodity is received from the commodity storage column. Further, since the region in front of the bucket is illuminated, a user presented on a front side can also visually recognize light from the light sources, so that an excellent stage effect is produced. Accordingly, there is produced an effect of illuminating a commodity received in a bucket to enable achieving an improvement in visibleness while making presentation at the time of selling commodity favorable.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view showing a vending machine, in which a commodity storage apparatus according to an embodiment of the invention is embodied;

Fig. 2 is a perspective view showing an internal construction of the vending machine, in which the commodity storage apparatus according to an embodiment of the invention is embodied;

Fig. 3 is a perspective view showing an internal construction of a commodity storage housing shown in Figs. 1 and 2;

Fig. 4 is a perspective view showing the case where a bucket is seen from the front;

Fig. 5 is a perspective view showing the case where the bucket is seen from the rear;

Fig. 6 is a view schematically illustrating the case where a light source embedded in the side of the bucket is seen from above; and

Fig. 7 is a view illustrating a modification of a recess on the side of a bucket.

DETAILED DESCRIPTION OF THE INVENTION

[0011]

Referring to the accompanying drawings, a preferred embodiment of a commodity storage apparatus according to the invention will be described below in detail. In the following, a commodity storage apparatus of a vending machine will be described as an embodiment of the invention.

[0012]

Figs. 1 and 2, respectively, show a vending machine, in which the commodity storage apparatus according to an embodiment of the invention is embodied, Fig. 1 being a front view, and Fig. 2 being a perspective view showing an internal

construction. The vending machine illustrated herein sells commodities, such as canned beverage, beverage packed in PET bottles, beverage packed in paper packs, etc. in a cooled or heated state, and includes a body cabinet 1.

[0013]

The body cabinet 1 includes a rectangular parallelepiped housing, a front opening of which is opened and closed by an external door 2. Here, the external door 2 is structured by appropriately using a heat insulating material and includes a window 3, in which a transparent plate material such as insulating glass, etc. is fitted. Accordingly, the commodity storage apparatus is of a view type, an interior of which can be visually recognized through the window 3 of the external door 2. Also, arranged on the front of the external door 2 are selection switches 4 intended for selection of a sales commodity, a money inlet slot 5 for charging of money, etc., which elements are necessary at the time of automatic vending of a commodity.

[0014]

An interior of the body cabinet 1 is compartmented into two sections, the upper section defining a commodity storage housing 10, and the lower section defining a machine room 11. The commodity storage housing 10 includes a chamber, an interior of which is maintained in a state of a preset temperature, and wall members, which define the commodity

storage housing 10, are made of a heat insulating material. Also, while not shown clearly in the figure, there are provided a cooling unit that cools an internal atmosphere, such as an evaporator, which constitutes a refrigerating cycle, a heating unit that heats an internal atmosphere, such as electric heater, etc. On the other hand, a refrigerator (compressor, condenser) 12, which constitutes a refrigerating cycle together with the evaporator, and various control equipment, etc. are provided in the machine room 11.

[0015]

In the specification of the present application, a left direction indicates a leftward direction in the case where the commodity storage apparatus is seen from the front, and a right direction indicates a rightward direction in the case where the commodity storage apparatus is seen from the front.

[0016]

Fig. 3 is a perspective view showing an internal construction of the commodity storage housing 10. In the following, the commodity storage housing 10 will be described appropriately with reference to Fig. 3. Commodity racks 20 and a bucket moving unit 30 are provided in the commodity storage housing 10. The commodity racks 20 are formed by aligning a plurality of commodity storage columns 21 in a left and right direction, and can receive a plurality of commodities in a state of being aligned in a longitudinal direction in a

commodity storage passage 22 defined in each of the commodity storage columns 21. The commodity racks 20 are provided in plural stages in a vertical direction in a manner to bridge a pair of left and right rack support side plates 23 mounted in the commodity storage housing 10.

[0017]

The rack support side plates 23, which support the commodity racks 20, include a lengthy plate-shaped body formed by appropriately working, for example, a sheet metal or the like and are provided in a manner to have mutual surfaces (inner surfaces) thereof facing each other. Specifically, the rack support side plates are provided being mounted to a roof plate, a bottom plate, etc., which constitute the commodity storage housing 10, by means of mounting members such as screws or the like.

[0018]

The respective commodity storage columns 21 on the commodity rack 20 supported by the rack support side plates 23 include a conveyance mechanism with an endless belt 24 stretched around rollers (not shown) arranged in parallel fore and aft and commodities are put and received on an upper surface of the conveyance belt 24. A vend mechanism is provided at a front end of each of the commodity storage columns 21 to control discharge of a commodity. The vend mechanism does not include a drive unit separated from a power source such as drive

motor, solenoid, or the like and is driven upon transmission of power from an electrically-driven drive mechanism housed on a base, on which a bucket 40 described later is put, in the case where the bucket 40 is arranged in opposition to a commodity storage column 21 as indicated. Here, the reference numeral 25 denotes a gate member that constitutes the vend mechanism.

[0019]

The bucket moving unit 30 includes a X-axis conveyance mechanism 31 and a Y-axis conveyance mechanisms (not shown). The X-axis conveyance mechanism 31 include a rail member disposed in the body cabinet 1 and extending in a region in front of the commodity racks 20 in a left and right direction and moves the bucket 40 put thereon in a direction (a left and right direction), in which the rail member extends. The construction itself of the X-axis conveyance mechanism 31 is well known and so a detailed explanation therefor is omitted herein.

[0020]

The Y-axis conveyance mechanisms are provided on a pair of left and right conveyance and support side plates to include a drive device. The Y-axis conveyance mechanisms serve to move the X-axis conveyance mechanism 31 and the bucket 40 in a vertical direction. The construction itself of the Y-axis conveyance mechanisms is well known and so a detailed

explanation therefor is omitted herein.

[0021]

Figs. 4 and 5, respectively, show the bucket 40, Fig. 4 being a perspective view as viewed from the front, and Fig. 5 being a perspective view as viewed from the rear. The bucket 40 illustrated herein includes a pair of left and right sides 41, a support member 42, and a mounting member 43.

[0022]

The sides 41 are provided in a manner to have mutual inner surfaces 41a facing each other. The sides 41 stores various equipment in a housing made of a resin, and an electrically-driven drive mechanism (not shown) as an example is stored therein. In the case where the bucket 40 is arranged in opposition to a commodity storage column 21 as indicated, the electrically-driven drive mechanism transmits and provides a driving force to the vend mechanism at a front end of the commodity storage column 21. Also, a region interposed by the sides 41 makes a receiving region 44, which receives a commodity and details of which are described later, whereby the sides 41 define the receiving region 44.

[0023]

The support member 42 is formed from a metallic material and arranged between the pair of sides 41. The support member 42 includes a flat plate like base 421 and rear extensions 422, respectively, extending rearward from both ends of the base

421. Ends, that is, rear ends of the rear extensions 422 are journaled by the sides 41 with the result that the support member 42 is arranged to be able to swing relative to the sides 41.

[0024]

The mounting member 43 is arranged between the pair of sides 41 to be able to swing. The mounting member 43 includes a front portion 431, side wall portions 432, and a mounting portion 433. The front portion 431 has a rectangular-shaped opening 431a. A pin member 423 arranged on the support member 42 protrudes forward through the opening 431a. The side wall portions 432 extend rearward from both ends of the front portion 431 in a manner to have mutual inner surfaces thereof facing each other. While not shown clearly in the figure, the side wall portions 432 are journaled coaxially with the rear extensions 422 of the support member 42 to be supported on the sides 41 to be able to swing relative thereto. The mounting portion 433 is arranged between lower portions of rear ends of the pair of left and right side wall portions 432 through shaft-like portions (not shown) to be able to swing relative thereto, and has its front end (free end) supported by a housing of the bucket 40 to mount thereon a commodity. The mounting portion 433 are inclined forward while protruding forward interlocking with the swinging movement of the side wall portions 432.

[0025]

With the bucket 40, the pair of left and right sides 41, the mounting portion 433 of the mounting member 43, and the base 421 of the support member 42 define the receiving region 44, in which a commodity from the commodity storage column 21 is received. A plurality of light sources 45 are embedded in the sides 41 in a manner to face the receiving region 44.

[0026]

Fig. 6 is a view schematically illustrating the light sources 45 embedded in the sides 41 as viewed from above. The light sources 45 includes a rectangular parallelepiped-shaped housing with, for example, LED built therein, and at least a front surface 451, a rear surface 452, and a side (referred below to as a receiving surface) 453 opposed to the receiving region 44, of the housing are formed from a translucent material. The light sources 45 are provided in a state of being fitted into recesses 41b formed on the sides 41. That is, the inner surface 41a of the side 41 is on the same level as that of the receiving surface 453 of the light source 45, or protrudes toward the receiving region 44. An inner surface 41c of the recess 41b forms a reflection surface that reflects light emitted from the light source 45. Here, the inner surface 41c of the recess 41b defines a flat plane.

[0027]

With the commodity storage apparatus constructed in the

above manner, a cooling unit or a heating unit is driven in a sales standby state whereby commodities received in the commodity storage housing 10 are maintained in a state of desired temperature.

[0028]

In the sales standby state, when information of selection of a commodity through the selection switches 4 and receipt information of money charged through the money inlet slot 5, respectively, meet a predetermined sales condition, the bucket moving unit 30 is driven to have the bucket 40 arranged in opposition to the commodity storage column 21, in which a selected commodity is received. When the bucket 40 is arranged in opposition to the commodity storage column, the electrically-driven drive mechanism received on the sides 41 of the bucket 40 drives the vend mechanism of the commodity storage column 21. Thereby, only one commodity is moved onto the bucket 40 to be received in the receiving region 44 while being mounted on the mounting portion 433. The bucket 40 with the commodity received therein is driven by the bucket moving unit 30 to move to a predetermined commodity taking-out chamber. Consequently, a user can take out the commodity having been moved into the commodity taking-out chamber (not shown).

[0029]

With the commodity storage apparatus described above, the light sources 45 are lighted up, for example, when the

bucket 40 is driven by the bucket moving unit 30 to move, with the result that light from LED is emitted to the receiving region 44 and forward and rearward regions of the receiving region 44 directly through the front surface 451, the rear surface 452, and the receiving surface 453, or after being reflected by the inner surface 41c of the recess 41b to be emitted thereto. Thereby, the receiving region 44 of the bucket 40, and forward and rearward regions thereof are illuminated.

[0030]

Therefore, in the case where the bucket 40 is arranged in opposition to the commodity storage column 21, in which a selected commodity is stored, it is possible to illuminate the commodity on the commodity storage column 21, and in the case where a commodity is received from the commodity storage column 21, it is possible to illuminate the commodity, that is, the commodity in the receiving region 44. Further, since the region in front of the bucket 40 is also illuminated, a user presented in front of the vending machine can visually recognize light from the light source 45, so that there is produced an excellent stage effect. Accordingly, while making presentation at the time of selling commodity favorable, it is possible to illuminate a commodity received in the bucket 40 to achieve an improvement in visibleness.

[0031]

Also, with the commodity storage apparatus described above, the light sources 45 embedded in the sides 41 of the bucket 40 are lighted up to thereby enable illuminating the receiving region 44 of the bucket 40, and forward and rearward regions thereof, so that a user can visually recognize a commodity even after a fluorescent lamp arranged in the body cabinet 1 is put out, and while promoting energy saving, presentation at the time of selling commodity is made favorable to enable achieving an improvement in visibleness of a commodity.

[0032]

In particular, when the bucket moving unit 30 is driven to move the bucket 40 in a standby position to the commodity storage column 21, in which a selected commodity is stored, the light sources 45 are lighted up in a state of flashing, and when the commodity is received from the commodity storage column 21 to move to the commodity taking-out chamber, the light sources 45 are normally lighted up, whereby it is possible to achieve a further improvement in stage effect at the time of selling commodity.

[0033]

In addition, while the embodiment described above illustrates the case where the inner surfaces 41c of the recesses 41b on the sides 41 of the bucket 40 are planar, an inner surface 41e of a recess 41d is not specifically limited in shape as shown

in Fig. 7 but may be curved as shown in Fig. 7.

What is claimed is:

1. A commodity storage apparatus of a vending machine comprising:

commodity racks each arranging thereon a plurality of commodity storage columns in a left and right direction and provided in plural stages in a vertical direction between a pair of left and right rack support side plates;

a bucket arranged movably in the region in front of the commodity racks to be able to deliver a commodity between the bucket and an optional commodity storage column in case of being arranged in opposition to the commodity storage column; and

a bucket moving unit that drives a bucket to thereby arrange the bucket in opposition to a commodity storage column, for which delivery is indicated, in the case where the commodity storage column is indicated, wherein

the bucket includes light sources provided on sides, which are arranged in a mutually opposed manner to define a receiving region intended for receiving a commodity, to illuminate the receiving region and forward and rearward regions thereof.

2. The commodity storage apparatus of the vending machine according to claim 1, wherein the bucket includes recesses on the sides to have the light sources embedded therein and inner surfaces of the recesses are defined as reflection surfaces of the light sources.