

Automatic Vending Machine

Technical scope

This invention generally relates to a type of Automatic Vending Machine. More particularly, this invention relates to an automatic vending machine used for selling fresh flowers.

Background

Currently, as vending machine technology develops and matures, the application of vending machine is becoming wider and wider, be it at subway stations, shopping centers, offices, we can see many vending machines in operation, which is also a huge business opportunity. Accordingly, the research on vending machines never ceased to expand, and the type of vending machines too has become varied. The type of merchandize available in market by automatic selling, led by drinks and foods automatic vending machines, is multiplying which makes it more convenient in daily life. As such, it forms a mindset that automatic vending machine is only used to sell drinks, foods, sanitary products, but not used for other purposes.

At the same time, currently the demand for fresh flowers is very high, for instance during Valentine's Day, almost each person may have one flower in his/her hand, however the sale of fresh flower is normally carried out manually or via the Internet, and this process is not prompt, for instance during midnight, flower shop is normally closed; and if fresh flower is required during such time, it is impossible.

Up to date, there is still no machine in market that sells fresh flowers automatically, and invention of this automatic flower selling machine can fill up the market vacancy beautifully, and is considered an enormous innovation in this field.

Brief Description of Invention

Targeting at the non-existence in current technology for automatic vending machine to sell fresh flowers, this invention aims to provide a type of automatic vending machine which can be used in selling fresh flowers or silk flowers.

Based on one aspect of this invention, providing a type of automatic vending machine that has vending box, automatic vending machine rotating product channel, electronic control device, automatic vending machine cooler, and the automatic vending machine rotating product channel and cooler installed in the box of the vending machine, and automatic vending machine rotating product channel that can rotate and is equipped

with multiple display platforms; the electronic control device is used to control the product channel rotation of the automatic vending machine; with features like automatic vending machine cooler and moisturizer.

The automatic vending machine should preferably have automatic vending machine rotating product channel detection device, which is connected to and control the automatic vending machine rotating product channel to stop rotation.

Preferably, the automatic vending machine rotating product channel detection device should have product channel fixed shaft, product channel detection board, product channel electronic lock and detection device, among which, the product channel fixed shaft 1 is installed perpendicularly on the upper surface of the product channel detection board, and when pulled by external force, the product channel fixed shaft 1 will rotate the product channel detection board; the product channel electronic lock should have a movable part; the detection device is connected to product channel electronic lock by cable, and the detection device controls the product channel electronic lock to open/close, and when the electronic lock is open, the movable part will retract, and when the electronic lock is closed, the movable part will extend; and one or more key holes suitable for the movable part is provided on the product channel detection board, and when the part extends it will go into one of the holes.

Preferably, the detection device should have one or more detection posts and at least one micro-switch, which is connected to the product channel electronic lock, and the detection post is placed on the product channel detection board, protruding on the surface of the product channel detection board. When the product channel detection board rotates to the micro-switch designated position, at least one detection post will make contact with the micro-switch.

Preferably, the vending machine box should have one or more auto-closing type product door installed, and equipped with product door, electronic lock, button spring, detection switch, and the button spring should have upper/lower extension edge, among which, the lower edge should be fixed on the product door, and the upper edge fixed on top of the door; the door should have a hole that matches the size of product door, which is fixed on the door, and goes partially or entirely into the door hole; the electronic lock should have an extendable part, and when the part extends, it controls product door locking, and when it retracts, the product door will open; the detection switch is installed at one side of the door hole, detecting the opening of the product door.

Preferably, the auto open/close product door should also have a spring-loaded shaft, and the shaft should penetrate the spring.

Preferably, the shaft's top edge should penetrate one side of the product door and connect to the door, and the shaft's lower edge should be fixed on the top of the product door.

Preferably, the shaft's lower edge should be fixed on the top of the door by means of an insert.

Preferably, the detection switch of the automatic open/close product door should be a micro-switch, and when the door closes, it should touch the micro-switch.

Preferably, the extendable part of the electronic lock of the automatic open/close product door should be installed on the door, and at the point where the product door and extendable part meet, a matching hole should be provided to accommodate the extendable part, and when the extendable part is extended, it inserts into the hole.

Preferably, the extendable part of the electronic lock of the automatic open/close product door should be installed on the door, and at the point where the product door and extendable part meet, a matching hole should be provided to accommodate the extendable part, and when the extendable part retracts, it withdraws from the hole.

Preferably, the front surface of the door should have a door-open indication light, and the indication light is connected to the automatic open/close product door by cable, and when the electronic lock is open, the door-open indicator light will be ON.

Preferably, the front surface of the product door should have a door-opening handle.

Preferably, the automatic vending machine rotating product channel should have a product channel and a drive mechanism, which will drive the product channel to rotate around its axle. Preferably, the drive mechanism should have an electric motor and transmission mechanism, where the electric motor will be driven by the transmission mechanism to spin around the product channel. Preferably, the rotating motor mechanism should have first pulley, second pulley and transmission belt, the first pulley should be connected to the output side of the electric motor, the second pulley to the product channel, and the first pulley is connected to the second pulley through the transmission belt.

Preferably, the automatic vending machine rotating product channel should also have: rotating shaft and shaft seat, and one end of the rotating shaft is connected to the seat that allows it to rotate, and the product channel and the rotating shaft are connected and secured. Preferably, the product channel should have shaft hole, the shaft is installed inside the shaft hole, and the rotating shaft and shaft hole are fixed and connected.

Preferably, the product channel should have partition board component and multiple support plates, and between two support plates there is a partition board component to connect. Preferably, the partition board component should have conduit and multiple partition boards, the partition board should be arranged along the shaft of the conduit, and the upper/lower edge of the partition board are connected to the partition board.

Preferably, the automatic vending machine rotating product channel should also have: rotating shaft and shaft bearing. One end of the rotating shaft is connected to the bearing seat that allows it to rotate, and the rotating shaft penetrates partition board component to be fixed and connected to the partition board component. 6a, the partition board component, including conduit and multiple partition boards, should be installed along the shaft of the conduit, the upper/lower edges of the partition board should be connected to the partition board, and the rotating shaft sleeve should be installed in the conduit by means of screws and connected to the conduit. 6a, transmission belt 3c is a synchronous pulley.

Preferably, the automatic vending machine cooling device and moisturizer should be installed together in the external frame of the automatic vending machine with the following features:

The cooler of the automatic vending machine has air outlet installed in the external frame, and the cooler device's air blower is installed in air outlet 1, and the moisturizer is connected by at least one air pipe, and the other end of the air pipe is installed in the air outlet.

Preferably, the automatic vending machine should have a box installed in the external frame and used to display goods, the air outlet is connected to the box, and the air outlet channel has a first entry to the box. Preferably, the first entry should be installed below the air outlet, on the top of air outlet a second entry should also be installed, and the second entry is connected to the box. At the first entry, a first fan assembly should be installed, and the fan assembly should match the evaporator, which can actually be considered as a unit of evaporator/fan assembly.

The automatic vending machine cooling device should at least have: a compressor, and a condenser which is connected to the compressor by means of pipe; the evaporator connected to the compressor by means of pipe, and also the fan assembly. The condenser and compressor should be secured to the bottom plate of the box, the evaporator installed on top of the fan assembly, the moisturizer secured on the bottom plate of the compressor, and the bottom plate of the compressor secured to the bottom plate of the box. On the bottom plate of compressor, the compressor is fixed. And at the bottom of the moisturizer there should be an evaporator bottom plate installed, and there should be at least one platform connecting the evaporator bottom plate and the

compressor bottom plate. The space on the evaporator bottom plate should be the air outlet channel. And on the bottom plate of the evaporator there should be a water-holding box.

Preferably, the electronic control device should have central processor unit and product selection button, the product selection button is connected to the central processor unit, the central processor unit is used in receiving product selection button input, and control the rotation of the rotating product channel.

Preferably, the electronic control device should have payment collection device used to collect payment which will be connected to the central processor.

Preferably, the payment collection device should have one or more types of the followings: banknote receiver, card reader, and also wireless communication device, which will be used to receive incoming payment command.

Preferably, the automatic vending machine should have screen display which is connected to the central processor unit and should at least display the result of customer selection.

Preferably, the automatic vending machine should have a wireless communication device, which is connected to the central processor unit and will be used for receiving/sending various commands/data.

Preferably, the automatic vending machine should have heat insulation board which is installed in the box cover.

Through specific structure setting, the automatic vending machine from this invention can sell fresh flowers, especially it could guarantee appropriate temperature and humidity for fresh flowers to survive, at the same time, it can scientifically display fresh flowers, and accurately provide fresh flowers to consumer after payment is made.

Description of drawings

These and other features, objectives, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings, wherein:

Fig. 1 shows the structural drawings of the automatic vending machine - the first sample of this invention.

Fig. 2 shows the external appearance of the automatic vending machine - the first sample of this invention.

Fig. 3 shows the rotating product channel detection device 6 of the automatic vending machine - the first sample of this invention.

Fig. 4 shows the rotating product channel detection device 6 after removing the product channel detection board 62 of the automatic vending machine - the first sample of this invention.

Fig. 5 shows the plane view of the rotating product channel detection device 6 of the automatic vending machine - the first sample of this invention.

Fig. 6 shows the automatic open/close product door 7 assembly up to the door top of the automatic vending machine - the first sample of this invention

Fig. 7 shows the entire view of the automatic open/close product door ssembly up to the door top of the automatic vending machine - the first sample of this invention

Fig. 8 shows the entire view of the automatic open/close product door's detailed structure of the automatic vending machine - the first sample of this invention.

Fig. 9 shows the enlarged spring of the automatic open/close product door of the automatic vending machine - the first sample of this invention.

Fig. 10 shows the rear view of the automatic open/close product door assembly up to the door top of the automatic vending machine - the first sample of this invention.

Fig. 11 shows the rotating product channel 2 mechanism of the automatic vending machine, based on this invention.

Fig. 12 shows the rotating product channel 2 drive mechanism structure of the automatic vending machine, based on this invention.

Fig. 13 shows the structure of the automatic vending machine, based on this invention.

Fig. 14 shows the main view of cooler 1 of the automatic vending machine, based on this invention.

Fig. 15 shows the side view of cooler 1 of the automatic vending machine, based on this invention.

Fig. 16 shows the first three-dimensional drawing of cooler 1 of the automatic vending machine, based on this invention.

Fig. 17 shows the second three-dimensional drawing of cooler 1 of the automatic vending machine, based on this invention.

Detailed Descriptions

The automatic vending machine provided by this invention can store taller products, for instance flowers already packed, and it has the space to display the features of product such as flowers in three perspectives which makes it easier for the customer to make selection. At the same time, the automatic vending machine of this invention is especially suitable for commodities with certain requirement for humidity and temperature control, such as flowers already packed.

In detail, Fig. 1 shows structure diagram of first sample of the automatic vending machine based on this invention, which comprises the box body 92, the rotating product channel 2, electronic control device (not displayed in the drawing), the cooler 1, whereby the rotating product channel 2 and the cooler 1 are installed inside the box body 92, and the product channel 2 can rotate, which is also equipped with multiple display platforms; and the electronic control device can control the rotation of the product channel 2.

Further, our engineers in this field understand that in the sample, cooler 1 in the automatic vending machine includes moisturizer 11. Moisturizer 11 is designed to ensure optimal humidity inside the box, so that products requiring constant humidity control will be stored in good condition, the details of which will be explained hereinafter.

Further, our engineers in this field understand that Fig. 1 displays the rotating product detection mechanism 6, and this mechanism 6 is connected to rotating product channel 2, and controls for rotating product channel 2 to stop rotation. Our engineers in this field understand that in different samples, the product channel detection mechanism 6 is realized in different ways, for instance, there will be a realizing method of automatic vending machine rotating product channel detection mechanism 6 in following samples. In certain variation samples, the rotating product detection mechanism 6 may not even exist, nonetheless, it will not affect the technical description, which will not be elaborated here.

Further, in Fig.1, our engineers in this field understand that if fresh flowers were displayed on the platform of the rotating product channel 2, which has many layers and

many types of platform, once the customer completes his/her purchase, for instance, the consumer has selected the product, and inserted coins, the electronic control device will then rotate the product channel 2, and rotate the product to the appropriate product door, then control for the product door to open for the customer to take the product, and automatically close it again. In the process, the detection mechanism 6 would detect the rotation of the product channel 2, and stop the rotation at appropriate timing. Through the abovementioned process, the automatic vending machine provided by this invention will achieve its goal of selling product, especially the fresh flowers.

Fig.2 shows the external appearance of the first sample of this invention. Based on Fig.1, Fig.2 has added the front board of the automatic vending machine. Our engineers in this field understand that on Fig.1 the front board internal structure has not been installed, and accordingly, a few items have been installed on the front board.

In detail, the sample shows the automatic vending machine including display area 99, which should preferably be transparent, is like a piece of glass or transparent plastic, and through this display area, various types of products can be seen on the rotary product channel 2. Further, our engineers in this field understand that in other samples, the position of the display area may not be the same. It may be on the left or the rear of the automatic vending machine to install the display area 99, or in even another sample, it may just be on the front or the left side to display the area and so on, but this will not affect the technical description of the invention, which will not be elaborated further here.

Further, our engineers in this field understand that in order to fulfill the objective of selling products, the electronic control device should preferably have central processor unit (not displayed in Fig.2) and product selection button 961, the selection button 961 is connected to the central processor unit, and the central processor unit will be used in receiving product selection button 961 input and control the rotation of the rotary product channel.

Further, our engineers in this field understand that in a varied sample, the product selection button 961 can be replaced by touch screen, for instance, the screen display 97 shown in Fig.2 is a touch screen to fulfill touch-screen product selection purpose.

Preferably, the electronic control device should also include payment receiving device 98, which can be used to collect payment and is connected to the central processor unit. Preferably, the payment receiving device should have one or more banknote receiver, card-reader and wireless communication device, which receives external payment command. Our engineers in this field understand that once the wireless communication device receives payment command from the service device, the payment command will

be sent to the central processor unit, which will make assessment based on the payment command if payment has been made, and then control the rotating product channel 2 of the machine to rotate. Similarly, our engineers in this field understand that after the customer has made payment through the banknote receiver or the card reader, and after the central processor unit has received the payment description, and has made assessment that the payment has been completed, it will then control the machine to rotate the product channel 2 to open product door, and so forth.

Further, as shown in the sample, the automatic vending machine also includes display screen 97 that is connected to the central processor unit, and it is at least used to display the selection result of the customer. Further, our engineers in this field understand that the central processor unit can control the display screen 97 to show advertisement too, which will not be elaborated further here.

Further, preferably, the automatic vending machine should include wireless communication device, which is connected to the central processor unit, and is used to receive/send various commands/data. Preferably, each time a product is sold, the central processor unit will send the sales information to the background server to allow the server to collect accurate information on sales condition of the automatic vending machine. In a varied sample, a specific time can also be set to send sales information of the automatic vending machine to the background server, but as this will not affect the technical description of this invention, the details will not be elaborated here.

Further, our engineers in this field understand that when in a varied sample, the wireless communication device may receive data from server including advertisement and display the corresponding advertisement information on display screen under control of the central processor unit.

In combination of the samples shown in above Fig. 1 and Fig.2, our engineers in this field understand that in a varied sample, the automatic vending machine may also include heat insulation board (not indicated in Fig.1), and this board is installed under the cover of box 92 to maintain the insulation effect, and together with the cooler system it keeps the temperature in box 92 within certain range. Our engineers in this field can incorporate the current technology to realize this type of structure, which will not be elaborated further here.

Based on Fig.1 and Fig.2, in the first sample of this invention, Fig.3 shows the structural drawing of the rotary product channel mechanism 6 of the automatic vending machine. Our engineers in this field understand that similar to Fig.3, the following Fig.4 and Fig.5 both describe the details of the mechanism of the rotary product channel, and the description in the sample shown in Fig.3, Fig.4 and Fig.5 will be the component of rotary

product channel mechanism 6 of the automatic vending machine, unless specified otherwise.

In detail, mechanism 6 of the rotary product channel has product channel securing shaft 61, product channel detection board 62, product channel electronic lock 63 and detection device, among which, shaft 61 is secured perpendicularly on top of detection board 62, and when shaft 61 is rotated by external force, it will in turn rotate detection board 62; and electronic lock 63 has an extendable part 631; and detection device 66 is connected to electronic lock 63, and the detection device controls electronic lock 63 to open/close. When lock 63 is open, the extendable part 631 will retract, when the lock is closed, the extendable part will extend; detection board 62 has one or more lock hole 67 fitting with extension part 631, and when extendable part 631 extends it will go into one of the holes in lock hole 67.

In detail, the sample in Fig.3 shows a total of 4 pieces of lock holes 67 installed and arranged in 90° angle, and in a varied sample, the lock holes can be more or less, like 3, 5 pieces or more. In detail, our engineers in this field understand that the number of lock holes 67 depends on the structure of product channel, i.e. if the product is small, more slots will be required, and more holes will be installed, which will not affect the technical description of this invention, the details of which will not be elaborated here.

Further, in Fig.3 the extendable part 631 of electronic lock 63 cannot be displayed, but in Fig.5 it can be clearly shown. Preferably, the sample should have a spring-loaded extendable part 631, and by spring control, the part can be extended or retracted, the details of which will not be elaborated here.

Further, our engineers in this field understand that the position of the extendable part 631 and the position of lock hole 67 should match, and their height should be equal so that when the part 631 extends it will get stuck into the hole 67 to block the rotation of detection board 62. Further, our engineers in this field understand that when shaft 61 is rotated by external force, it will in turn rotate detection board 62, and the extended part 631 of lock 63 will be retracted under control signal which will then allow detection board 62 to rotate freely. Accordingly, after external force has caused shaft 61 to rotate detection board 62 one quarter of a circle (90°), the extended part 631 of electronic lock 63 will be extended under control signal, and accordingly, extended part 631 will go into lock hole 67. More specifically, the figure below shows the process how external control signal and product channel electronic lock 63 are engaged.

Based on the first sample of this invention, Fig.4 shows the structural drawing of the automatic vending machine after mechanism 6 has removed of detection board 62.

Based on Fig.3, in order to understand clearly electronic lock 63 and the structure of detection device, we manually remove detection board 62. In the sample, extension part 631 of electronic lock 63 can be clearly seen, the details of which will not be elaborated here.

Further, in the sample, the detection device has one or more detection post 64 and at least one micro-switch 65, which is connected to electronic lock 63, and post 64 is placed on detection board 62 and protruding on the surface of detection board 62, and when detection board 62 rotates to corresponding position of micro-switch 65, at least one detection post 64 will come in contact with micro-switch 65.

Further, our engineers in this field understand that in this sample, detection post 64 protrudes on the bottom surface of detection board 62, and when the rotation reaches the position of micro-switch 65 it will come into contact with micro-switch 65, and the contact will cause micro-switch 65 to transmit a control signal to product channel electronic lock 63, and the extension part of lock 63 will extend out.

Further, our engineers in this field understand that in a preferred sample, when shaft 61 rotates product channel detection board 62 through external force, the extension part 631 of electronic lock 63 will retract, and after detection board 62 has rotated one quarter of a circle, detection post 64 will come into contact with micro-switch 65, and thus causing the extended part 631 of lock 63 to extend out and block product channel detection board 62.

In a varied sample, the detection device can be equipped an optical component, and on detection board 62 there is an optical hole. In combination with the sample shown in Fig.4, it can be comprehended that, preferably, the position of the optical hole identifies with the detection post 64, therefore, when the optical component detects optical light via detection hole, the detection device will emit a control signal to lock 63 so as to control the extension part 631 to extend out. Further, our engineers in this field can materialize this kind of variation, the details of which will not be elaborated here.

Fig.5 shows plane view of the first sample based on this invention, the rotation product channel detection mechanism 6. Fig.5 shows another aspect of the sample shown in Fig.3; in detail, detection post 64 and micro-switch 65 can be seen in the plane view. In combination with description of the above sample, our engineers in this field can understand the description of Fig.5, the details of which will not be elaborated here.

Further, combining above Fig.3 and Fig.5, our engineers in this field understand that in order to enable the product channel to dispense product more accurately, the micro-

switch and electronic lock should be installed at the bottom fixed position of the box's product channel for detection purpose, and round shape product channel detection board should also be installed on the fixed shaft, and a hole should be punched at the suitable position on the detection board to fix the detection post adjustable up and down to be used as contact point during detection. And when the rotation product channel rotates at selling, the detection post fixed on the detection board will rotate to the micro-switch position, touch the micro-switch and perform the detection function. It will stop rotation after the product channel has been detected, the electronic lock will cut off power and spring out, and the lock will block the product channel detection board, preventing it from being rotated by force and realizing anti-theft function.

The detection posts should have a certain degree of interval each, and detection board should be installed at certain interval to be used against the switch, and for each position it rotates it realizes detection of product sale, and the electronic lock keeps the product channel locked to detect and prevent theft at the same time.

Above detection mechanism 6 of the production channel can do control of the product channel through combination of electronic lock and detection device to allow the product channel to be locked after each rotation, until the rotation starts again. This type of mechanism would be simple, and it costs less to make, and thus makes it suitable for wide commercial application.

Fig.6 is a sample based on this invention that shows automatic open/close type product door 7 assembly up to the door top. Our engineers in this field understand that Fig.6 to Fig.10 describes the details of the automatic open/close type product door 7, therefore the content described for Fig.6 to Fig. 10, unless otherwise specified, refers to the automatic open/close type product door 7.

In detail, our engineers in this field understand that in a preferred sample, the automatic open/close type product door 7 includes door 74, electronic lock 77, spring 72 (not shown in Fig.6), detection switch 79 (not shown in Fig.6), with the following features: Spring 72 has upper extension edge and lower one, and the lower one is fixed to the top of product door 74, and the upper one to the top of door frame 75; and door 75 has door hole 751 whose size matches door 74, and product door 74 is secured to the top of door frame 75, and partially or entirely covered by door hole 751; electronic lock 77 has an extended part, which when extended, will lock the product door 74, and when retracted will open the product door 74; and detection switch 79 is installed on one side of door hole 751 to detect the opening/closing of product door 74.

Further, in Fig. 10 after assembly will show, our engineers in this field understand that preferably the extended part of electronic lock 77 is installed on door frame 75, and a

hole of corresponding size is installed at the position of the extended part of product door 74, and the extended part will go into the hole.

Further, in Fig.6 of a varied sample, the extended part of electronic lock 77 is installed on door frame 75, a hole of corresponding size is installed at the position of the extended part of product door 74, and when the part is retracted, it will leave the hole. Our engineers in this field can make more variation samples incorporating current technology, the details of which will not be elaborated here.

Further, our engineers in this field understand that once the electronic lock 77 receives external signal, it will open/close. For instance, an external control chip sends a signal to electronic lock 77 based on actual condition and opens/closes it. After receiving the signal, electronic lock 77 will extend/retract the extendable part, which will not be elaborated here. Further, our engineers in this field understand that the auto open/close product door 7 is used in the sample of the automatic vending machine, and after the customer inserts banknote or IC payment card, the central processor unit of the automatic vending machine will assess if the customer has already made payment or not, and will then open electronic lock 77 of product door 7. Further, our engineers in this field understand that normally there will be many products to be sold, so corresponding multiple auto-closing product door 7 (as shown in Fig.7) will exist, and the central processor unit will check in accordance with the choice of customer to control the corresponding auto-closing product door 7 of electronic lock 77, which will not be elaborated here.

In detail, in combination with the Fig. 6 of the sample, our engineers in this field understand that on the front of door frame 75 of auto closing product door 7, a door opening indicator light 76 as well as a door handle 78 are installed. In concrete terms, our engineers in this field understand that indicator light 76 is connected to electronic lock 77, so when lock 77 is open, it lights up indicator light 76. Further, when electronic lock 77 is open, it will send a signal to indicator light 76, and after indicator light 76 receives the signal, it will be electrically connected and light up; correspondingly when electronic lock 77 is closed, it will send a signal to indicator light 76, and after indicator light 76 receives the signal, it will cut off electric connection and stop operation. In another varied sample, when electronic lock 77 is open, it will send a signal to indicator light 76, and after indicator light 76 receives the signal, it will be electrically connected and light up, and after maintaining the light up for a certain period of time, it will cut off electric connection and turn off. In detail, our engineers in this field understand that door indicator light 76 can be controlled by means of current technology, and it will not affect the technical description of this invention, which will not be elaborated here.

Further, our engineers in this field understand that in Fig. 6 of a varied sample, indicator light 76 can be omitted, which means when auto close product door 7 opens, there will be no indicator light display. In another varied sample, door open indicator light is replaced by buzzer sound, which means when auto door 7 opens, there will be three buzzer sounds. In yet another sample variation, the buzzer sound would be installed on indicator light 76, and 3-time buzzer will sound when door 7 opens, and indicator light 76 will be on too, a double notice.

Referring to Fig.6, our engineers in this field understand that the door handle 78 is a recess-shaped handle, i.e. a recess is set on door frame 75 (not shown in Fig.6), and a recess-shaped handle is installed to fit into door recess. Further, our engineers in this field understand that in a varied sample, the recess of handle 78 can be changed into another shape, which does not affect the description of this invention. And in yet another sample, the shape of handle can be semi-rounded, and fixed on door frame 75 with two screws, and this too will not affect the description of this invention, which will not be elaborated here.

Further, our engineers in this field understand that in another varied sample, door handle 78 can be omitted, and in this kind of variation, other door accessories do not have to be added, yet auto-door device can be added. For example, auto-spring out device can be added, i.e. when electronic lock 77 opens, as the door 7 opens, it will touch another spring installed at the rear of door 7, and the spring will push open door 7 outward. Our engineers in this field are able to make such varied sample, which will not be elaborated here.

Fig.7 shows overall view of the first sample based on this invention, the entire auto-closing door assembly up to the door frame of the automatic vending machine. Fig. 7 based on Fig.6 displays several overall pictures on auto-closing product door 7 provided in this invention. Further, in the sample, three auto-closing doors 7 are installed on door frame 75. Our engineers in this field understand that in the sample, on each auto-closing door 7 a handle 78 and indicator light 76 are installed, and in one varied sample, one or more handle 78 or indicator light 76 of door 7 are omitted, and it will not affect the description of this invention, which will not be elaborated here.

Fig.8 shows the detailed structural drawings of the first sample based on this invention, the auto-closing product door of the automatic vending machine. Fig.8 shows the rear view of the picture shown in Fig.6, the internal structure from the rear angle. Our engineers in this field understand that when auto-closing product door 7 is assembled to the automatic vending machine, Fig.8 shows the view that can be seen from inside. Our

engineers in this field understand that in this sample, auto-closing product door 7 has a spring-loaded shaft 71, that penetrates spring 72, the detailed structure of which is shown in Fig.9.

Fig.9 shows the enlarged version of the spring of the auto-closing product door of the automatic vending machine in the first sample based on this invention. Fig.9 shows the detailed structure of the connection between door 74 and door frame 75 through spring 72. In detail, the upper edge 711 of spring-loaded shaft 71 penetrates one side of door 74 and is connected to door frame 75, and the lower edge 712 of spring-loaded shaft 71 secured to door 74.

Further, our engineers in this field understand that in the sample the spring secured to lower edge 712 of shaft 71 is secured to door 74 through insert lock 73.

Fig.10 shows the rear view of the auto-closing product door of the automatic vending machine up to the door frame top in the first sample based on this invention. In the sample, there is further description of the detailed structure of detection switch 79. In detail, door 7 of the auto-closing product door of the automatic vending machine requires auto-closing, after electronic lock 77 opens, and based on the sample in Fig.10, lock 77 does not have auto-closing, instead it requires a contact signal to close. In detail, the signal should be sent from detection switch 79, i.e. when detection switch 79 detects that the door has been closed, then lock 77 would send the signal to close lock 77 for the extendable part to extend out.

To be more specific, in the sample, detection switch 79 is a micro-switch, and when door 74 closes, it will touch the micro-switch, and after the micro-switch is touched, it will send out touch signal. In detail, our engineers in this field can materialize the micro-switch based on current technology, which will not be elaborated here.

In combination with the sample in the above Fig.6 to Fig.10, our engineers in this field understand that in order to have a perfect match between product outlet and display door, the space of door frame of the automatic vending machine should be effectively utilized. This invention provides an auto-closing product door structure of vending machine which can do internal display and at the same time, be used to dispense and sell product. The following method can be materialized through this invention: While the spring penetrates the spring-loaded shaft, the upper edge and lower edge of the spring-load shaft secured together on the product door are secured on the top of the door by means of inserting lock to allow the spring-loaded shaft to follow the door to rotate for each piece, and the spring extension is divided into top and bottom edge, of which, one

is secured to the top of the door, and the other to the door frame. Once the product door passes through the spring-loaded shaft that is secured on the door frame, and after the product purchase flow is completed, the electronic lock will operate, the door-opening indicator light will be ON, and now the door-opening handle will open the door and take the product. When the door is open, the spring-loaded shaft will follow the rotation through the micro-switch to do door-opening detection, and after the product is taken, the force of spring will be released to automatically close the door to complete the entire sales flow.

Fig.11 shows the structural drawing of rotating product channel 2 of the automatic vending machine based on the invention. Our engineers in this field understand that Fig.11 to Fig.13 below provides detailed description of rotating product channel 2 of the automatic vending machine, and the contents regarding the pictures shown in Fig.11 to Fig.13, unless otherwise specified, refer to the components of rotating product channel 2 of the automatic vending machine.

In detail, as shown in Fig.11 and Fig.12, rotating product channel 2 of the automatic vending machine includes product channel 20. Further, rotating product channel 2 of the automatic vending machine also includes drive mechanism 21, which drives product channel 20 to rotate around its axle.

When in operation, drive mechanism 21 rotates drive product channel 20, whereby, the product in product channel 20 will rotate along with product channel 20 to materialize product sales, as well as to display the product. Adoption of this structure simplifies the structure, reducing the breakdown rate of the automatic vending machine, which in turn reduces the cost of operation.

In an actual sample, refer to Fig.12, where drive mechanism 21 comprises electric motor 22 and rotating mechanism, and motor 22 will rotate product channel 20 through transmission device 23. When motor 22 starts moving, the drive will be transferred to product channel 20 through transmission device 23, and this will in turn drive product channel 20. Of course, motor 22 can also be replaced by other equipment recognized in this field.

Preferably, please refer to Fig.12: transmission device 23 comprises first pulley 23a, second pulley 23b and transmission belt 23c; first pulley 23a is connected to output end of motor 22, second pulley 23b to product channel 20; first pulley 23a is connected to second pulley 23b through transmission belt 23c. Preferably, transmission belt 23c is a synchronous pulley, and apparently other types of transmission belt can also be used, as long as it allows for the first pulley 23a to drive second pulley 23b to turn. When

motor 22 starts turning, its output end will rotate first pulley 23a, and since first pulley 23a and second pulley 23b are connected by transmission belt 23c, second pulley 23b will also turn following the turn of first pulley 23a, and the turning will be transmitted to product channel 20 and rotate product channel 20.

Of course, drive mechanism 23 is not restricted to the belt transmission as in the above sample - it can also make use of other turning mechanism; for example drive mechanism 23 can be a sprocket.

Preferably, please refer to Fig.12: rotating product channel 2 of the automatic vending machine also comprises rotating shaft 24 and shaft seat 25, one end of rotating shaft 24 flexibly coupled with shaft seat 25, whereas coupling between product channel 20 and rotating shaft 24 is fixed. Rotating shaft 24 and shaft seat 25 can be flexibly coupled, and drive device 21 and rotating shaft 24 can be drive-coupled, and also can drive shaft 24. In this manner, while shaft 24 is driven by device 21 to turn, product channel 20 that has fixed coupling to shaft 24 will follow and turn.

In one actual sample, product channel 20 has shaft hole, rotating shaft 24 is installed in shaft hole, and rotating shaft 24 and shaft hole have fixed coupling. To enhance installation efficiency, during installation, rotating shaft 24 can be inserted into the shaft hole of product channel 20, then rotating shaft 24 and shaft hole can be connected.

Please refer to Fig.11: in the actual sample, product channel 20 comprises partition board component 26 and multiple support plates 27, and two neighboring support plates 27 are connected by one partition board 26. Support plates 27 are installed on the top/bottom end of partition board component 26 to form product channel 20. Inside product channel 20 many partition boards 26 can be installed, thus forming multi-layer spaces to store products.

Preferably, partition board component 26 and support plate 27 are connected by pins. Of course, other methods can be employed too to connect partition board component 26 and support plate 27, such as inserting, welding, gluing etc., especially inserting may enhance fabrication efficiency and reduce cost.

Preferably, partition board component 26 comprises pipe 26a and many partition panels 26b, and 26b is installed along the shaft of pipe 26a, and one end of partition board 26b is connected to pipe 26a. For example, support plate 27 can be designed as round shape with multiple edges, and support plate 27 can have hole at the center.

In a sample that is not shown in drawing, it can also use only one partition board component 26, and the support plate 27 can be designed as a patchwork of many fan

shapes, and between two neighboring partition boards 26b, a support plate 27 can be inserted, and multiple support plates 27 can be installed facing a same direction, which can also form multi-layer structure. Of course, partition board 26 can also take other structural form, for example a molded piece.

In the actual sample, rotating product channel of the automatic vending machine can also include: rotating shaft 24 and shaft seat 25, one end of rotating shaft 24 and shaft seat 25 can be flexibly coupled, rotating shaft 24 penetrates partition board 26 and have fixed coupling with partition board component 26. Rotating shaft 24 and shaft seat 25 can be flexibly coupled, and drive mechanism 21 and rotating shaft 24 can be flexibly coupled, as well as drive rotating shaft 24 to spin. In this manner, while rotating shaft 24 is driven by drive mechanism 21 to turn, partition board component 26 which is fixedly coupled with rotating shaft 24 will follow to rotate

Further, partition board component 26 includes pipe 26a and many partition plates 26b, partition plate 26b is installed along pipe 26a in shaft direction, one end of partition plate 26b is connected to pipe 26a, and rotating shaft 24 penetrates the pipe 26a and is connected to pipe 26a by means of screws.

Refer to Fig. 13 for the second aspect of this invention that provides a type of automatic vending machine, including box 10 and rotating product channel 2, which is the rotating product channel in several samples above-mentioned, and revolving product channel 20 can be installed in box 10.

Refer to Fig.13: Shaft seat 25 is secured to box 10 bottom by means of screws, rotating shaft 24 is secured on the spherical bearing in bearing seat 25, and secured by screws. Second pulley 23b is secured to rotating shaft 24 by screws, and bearing seat 25, second pulley 23b and rotating shaft 24 have the same center.

Electric motor 22 is secured inside box 10, first pulley 23a is secured to rotating shaft of motor 22 by screws, and first pulley 23a and second pulley 23b are connected by transmission belt 23c (for instance synchronized pulley) to move.

Refer to Fig.12: partition board component 26 is attached to support plate 27 by pins, and each layer of support plate 27 is connected through partition plate component 26 to form a complete product channel display shelf, partition board component 26 is inserted to rotating shaft 24 by means of installation holes, and it can be secured on rotating shaft 24 by means of tap screws, and become one piece with rotating shaft 24, by securing to each other.

When motor 22 is running, first pulley 23a will drive second pulley 23b through transmission belt 23c to materialize product channel turning.

Fig.14 shows main view of cooler 1 in the automatic vending machine based on this invention. Our engineers in this field understand that Fig.14 to Fig.17 below describe in details the structure of cooler 1 of the automatic vending machine provided by this invention, so the contents of the description of the actual sample in Fig.14 to Fig.17, unless specified otherwise, refers to the component of cooler 1 of the automatic vending machine.

As shown in Fig.16 and Fig.17, the cooler of the automatic vending machine has at least one set of cooling unit, which can be a cooler device already known and suitable to be used in the automatic vending machine, and in addition to the cooler, at least one moisturizer 11 is installed, and both the cooler and moisturizer 11 are installed at the outer most in the box (for clearer indication, the outer shell was not drawn).

In combined with Fig.14 and Fig. 15, this invention provides a type of preferable system, which is to combine the cooler and the moisturizer to provide air-conditioning in box 10 for keeping product in the vending machine. In order to meet the requirement in terms of temperature and humidity, the cooler in this invention has also air outlet 13, which is installed inside the outer shell, and the air outlet of cooler is installed inside the air outlet 13, and air outlet 13 and box 10 are inter-connected, box 10 is installed inside the outer shell and used for displaying products, and to do display, product shelves are installed in box 10 (not shown clearly in the drawing), and box 10 has sufficient sealed space volume.

Air outlet 13 is at least connected by first inlet 15 to box 10, first inlet 15 is installed at the bottom of air outlet 13, that generates conditioned air at certain humidity in air outlet and directed to box 10 channel, at the same time at the top of air outlet second blower 16 is installed, and second air inlet 16 is also connected to box 10, besides that at first blower 15, fan assembly 17 is installed, which is used to draw in moisturized chilled air into box 10, and at second air blower 16, evaporator 18c is installed, which is used for generating chilled air at preset temperature. In the sample, air outlet 13 is rectangle box in shape, and it can also be a shape that accommodates the air from evaporator 18c and generates preset air flow, such as cylindrical shape, pillar shape etc. Our engineers in this field understand that preferably, air fan assembly 17 and evaporator are matching, and they can actually be considered as one unit of evaporator/fan assembly.

Moisturizer 11 can be any kind of moisturizer, as long as it can perform the function of providing moisture of air, moisturizer 11 is connected to at least one air vent 14, which functions to channel the moisturized air generated to air outlet 13, and two air vents are installed in this system, one end of which is connected to moisturizer 11, and the other installed inside air outlet 13.

As shown in Fig.14, the cooler equipment in this invention should have at least air compressor 18a, cooler 18b which is connected to the compressor 18a by a pipe; evaporator 18c connected to compressor 18a by a pipe, and condenser fan 18d. When in operation, evaporator 18c generates cool air, and the cool air will mix with moisturized air generated by moisturizer 11 and channeled thru air outlet 13, after which it will be sucked by fan assembly 17 into box 10. Our engineers in this field understand that preferably condenser fan 18d and condenser 18b should be combined and treated as a condenser fan unit, which will not be elaborated here.

Fig.14 shows that condenser 18b and compressor 18a are secured to the bottom plate 10a of box 10, compressor 18a and condenser 18b are secured to the bottom plate of compressor (not shown in drawing), and compressor bottom plate is secured to bottom plate 10a of the box, and between compressor 18a and condenser 18b there is condenser fan 18d. Evaporator 18c is located on the side wall of box 10, and secured by screws to the wall, moisturizer 11 is secured to the top of condenser 18b and compressor 18a. At the bottom of moisturizer 11 there is bottom plate 11a, and this plate and the bottom plate of compressor are connected by two common support frames 19, and on the top of the bottom plate 11a of evaporator the space is sealed to become air outlet 13. Besides, between fan assembly 17 on bottom plate 11a of evaporator and moisturizer 11 there is a water-holding box 11b, which is used to accumulate the water generated by evaporator 18c.

As shown in Fig.17, air outlet 13 seals evaporator 18c and condenser fan 18d inside air outlet 13, and is connected to moisturizer 11. After the door closes, box 10 and air outlet 13 can form a circulating channel, and while the compressor 18a and moisturizer 11 are running, the system performs air-conditioning and moisturizing function.

Referring to the above Fig.1 to Fig 17 in the sample - our engineers in this field understand that the proposals used to resolve the technical problem that arises in this invention are: to design cooling system and heat insulation board that have temperature holding box to allow the equipment to maintain constant humidity and certain temperature range for the fresh flowers, the box control room should have moisturizer and cooling system that work together to provide the moisture required by the fresh flowers. Product sales and display area comprise rotating product channel and auto-

closing product door as well as control mechanism, the rotating product channel and door will display and sell flowers during the process of rotating by the product channel, and the control area comprises screen, banknote receiver, card reader, product selection button and others to allow purchase using cards or cash, at the same time the screen can display advertisement and sales flow guide. The machine in this invention also has backroom GPRS control function that allows the supplier to check machine operation condition. The proposal provided by this invention resolves completely the problems that may be encountered in automatic sales of fresh flower or similar products, which has a huge technical value.

The above describes the actual sample of this invention. It should be understood that, this invention is not limited to the version already described, but also other versions that can be provided by our engineers in this field within the scope of the patent, however, the modifications will not affect the substance of this invention.

CLAIMS

What is claimed is:

1. An automatic vending machine comprising a vending machine body (92), automatic vending machine rotary product channel (2), electronic control device, automatic vending machine cooler (1), wherein, the automatic vending machine rotary product channel (2) and automatic vending machine cooler (1) are installed in the vending machine body (92), and the automatic vending machine rotary product channel (2) is arranged to rotate and is equipped with several platforms; and the electronic control device controls the rotation of the automatic vending machine rotary product channel (2); and the automatic vending machine cooler (1) has cooling device (11).
2. The automatic vending machine according to Claim 1, further comprising an automatic vending machine rotary product channel detection device (6), wherein the detection device is connected to and also controls the automatic vending machine rotary product channel (2) to stop rotation.

3. The automatic vending machine according to Claim 2,

wherein the automatic vending machine rotary product channel detection device (6) has a product channel fixing shaft (61), a channel detection board (62), a channel electronic lock (63) and a detection device; whereby the channel fixing shaft (61) is perpendicular and fixed to the channel detection board (62), and the channel fixing shaft (61) is rotated by channel detection board (62), when pulled by external force;

wherein the channel electronic lock (63) has a movable part (631);

wherein the detection device (66) is connected to the channel electronic lock (63) by cable, and the detection device controls the Open/Close of the channel electronic lock (63), and the movable part (631) is extended when the channel electronic lock (63) is Open; and

wherein one or more lock slot (67) that corresponds with movable part (631) are provided on top of channel detection board (62), and when the movable part (631) extends, it goes into one of the lock slots (67).

4. The automatic vending machine according to any one of Claims 1 to 3,

wherein on the vending machine body (92), one or more Automatic Open/Close product collection door (7), which comprises product collection door (74), electronic lock (77), lock spring (72), and detection switch (79); of which, the lock spring (72) has upper and lower extension edges, and the lower edge is fixed to product collection door (74), and the upper edge to a door (75);

wherein the door (75) has a door hole (751) the size of which matches the product collection door (74), and the product collection door (74) is fixed to the top of door (75), and fits into the door hole (751) partially or entirely;

wherein the electronic lock (77) has an extendable part, and when the extendable part is extending, it locks the product collection door (74), and when the extended part retracts, it opens the door of the product collection door (74); and

wherein the detection switch (79) is installed on one side of the door hole (751) and detects the opening and closing of the product collection door (74).

5. The automatic vending machine according to any one of Claims 1 to 4,

wherein the automatic vending machine rotary product channel has product channel (20) and push device (21), which pushes the said product channel (20) to spin around its axle.

6. The automatic vending machine according to any one of Claims 1 to 5,

wherein the cooler and moisturizer (11) installed on the external frame (12) of the automatic vending machine wherein the automatic vending machine cooler (1) also has air outlet (13), and the air outlet (13) is installed inside the outer frame (11), and the cooler blower is installed in the air outlet (13), and the moisturizer (11) is connected to at least one air vent (14), and the other edge of the air vent (14) is installed in the air outlet (13).

7. The automatic vending machine according to any one of Claims 1 to 6,

wherein the electronic control device has a central processor unit and product selection button, which is connected to the central processor unit, and the central processor unit is used to receive product selection button input and to control the rotary product channel (2)'s rotation.

8. The automatic vending machine according to Claim 7,

wherein the electronic control device has payment receiving device (98), wherein the payment receiving device is used to receive payment and connected to the central processor unit.

9. The automatic vending machine according to any one of Claims 1 to 8,

wherein a wireless communication device is connected to the central processor unit, and used in receiving/sending various commands, information or data.

10. The automatic vending machine according to any one of Claims 1 to 9, having a heat insulation board installed inside the cover of the body (92).