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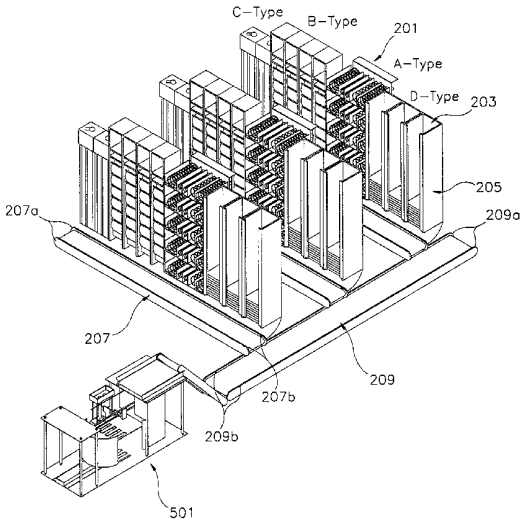
(54) Title: AUTOMATIC VENDING APPARATUS



(57) Abstract: An automatic vending apparatus having a product ordering window to input pruchaser's orders of various goods for automatic purchasing processes, a payment approving window to approve the payment for the ordered goods, a product discharging outlet to discharge the ordered goods and a controller to control all the processes of discharging the ordered products out of the product discharging outlet, the apparatus comprising: a product storage rack having a plurality of column assemblies arranged in rows, each of the column assemblies including more than one display column in a predetermined shape thereof according to that of various products which will be loaded and discharged out; more than one sub-conveyors respectively installed in front of the corresponding column assemblies for transporting the product discharged out of the display columns; and a main conveyor installed at an end of more than one sub-conveyors for transporting the product previously transported by the sub-conveyors to the product discharging outlet.

WO 01/69552 A1

TITLE OF THE INVENTION

AUTOMATIC VENDING APPARATUS

FIELD OF THE INVENTION

The present invention relates to an automatic vending apparatus and more particularly to an automatic vending apparatus, which automatically sells not only uniformly sized goods but also non-uniformly shaped goods like groceries or industrial products.

DESCRIPTION OF THE RELATED ART

In general, an automatic vending machine is identified as an apparatus for automatically selling specific products without a sales person in presence. However, such a conventional automatic vending machine has a certain limitation in the type of goods to sell, in other words, only to be restrictively used for a small number of uniformly sized products like cupped beverages, canned drinks or packed cigarettes. Therefore, there is a problem in the conventional automatic vending machine in that the vending machine cannot be used for selling non-uniformly sized products like vegetables, fruits and so on.

DETAILED DESCRIPTION OF THE INVENTION

Therefore, the present invention is disclosed to solve the aforementioned problems and it is an object of the invention to provide an automatic vending apparatus to sell not only uniformly sized but also non-uniformly shaped products with no sales person present on the spot.

In order to accomplish the aforementioned object of the present invention, there is provided an automatic vending apparatus having a product ordering window to input purchasers' orders of various goods for automatic purchasing processes, a payment approving window to approve the payment for the ordered

goods, a product discharging outlet to discharge the ordered goods and a controller to control all the processes of discharging the ordered products out of the product discharging outlet, the apparatus comprising: a product storage rack having a plurality of column assemblies arranged in rows, each of the column assemblies including more than one display column in a predetermined shape thereof according to that of various products which will be loaded and discharged out; more than one sub-conveyors respectively installed in front of the corresponding column assemblies for transporting the product discharged out of the display columns; and a main conveyor installed at an end of more than one sub-conveyors for transporting the product previously transported by the sub-conveyors to the product discharging outlet.

In addition, in order to accomplish the aforementioned object of the invention, there is provided an automatic vending apparatus having a product ordering window to input purchasers' orders of various goods for automatic purchasing processes, a payment approving window to approve the payment for the ordered goods, a product discharging outlet to discharge the ordered goods and a controller to control all the processes of discharging the ordered products out of the product discharging outlet, the apparatus comprising: a product storage rack having a plurality of column assemblies arranged in rows, each of the column assemblies including more than one display column in a predetermined shape thereof according to that of various products which will be loaded and discharged out; more than one sub-conveyors having a first terminal and a second terminal respectively installed in front of the corresponding column assemblies for transporting the product discharged out of the display columns; a first main conveyor installed at the first terminal of one of the sub-conveyors for transporting the product previously transported by the sub-conveyors to a first product discharging outlet; and a second main conveyor installed at the second terminal of one of the sub-conveyors for transporting the product previously

transported by the sub-conveyors to a second product discharging outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and aspects of the invention will become apparent from the following description of preferred embodiments with reference to accompanying drawings in which:

FIG. 1 is a perspective view for illustrating an automatic vending apparatus in accordance with a first embodiment of the present invention;

FIG. 2 is a perspective view for illustrating a product supply unit in accordance with the first embodiment of the present invention;

FIG. 3 is a perspective view for illustrating an E-Type display column, a display column exclusively used for heavy weight products;

FIG.4 is a control block diagram in accordance with the first embodiment of the present invention;

FIG. 5 is a perspective view for illustrating a product supply unit in accordance with a second embodiment of the present invention;

FIG. 6 is a perspective view for illustrating a product supply unit in accordance with a third embodiment of the present invention;

FIG. 7 is a perspective view for illustrating a product supply unit in accordance with a fourth embodiment of the present invention;

FIG. 8 is a perspective view for illustrating a product supply unit in accordance with a fifth embodiment of the present invention; and

FIG. 9 is a perspective view for illustrating a product supply unit in accordance with a six embodiment of the present invention.

FIG. 10 is a timing chart for illustrating the sequential processes of discharging, transporting and packing products in accordance with the sixth embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Now, preferred embodiments of the present invention will be described in detail with reference to accompanying drawings.

1) The first embodiment of the present invention

FIG. 1 schematically illustrates an automatic vending apparatus 10 of the present invention, comprising: a product ordering window 101 to show and get purchasers' orders of various goods inputted for automatic purchasing processes, a payment approving window 102 to approve the payment for the ordered goods, a front panel having a product discharging outlet 103 to discharge the ordered goods and a product supply unit 104 to pick out and transport the ordered product to the product discharging outlet 103. In addition, the product supply unit 104 includes a product storage rack, sub-conveyors and a main conveyer. On the other hand, there is a controller provided for controlling all the processes of picking out, transporting and finally discharging out goods to the product discharging outlet 103 according to a purchaser's order.

The product ordering window 101 is made of a liquid crystal display type of a touch screen, but a general liquid crystal displayer or a Braun-tube can be used for the product ordering window. With the general liquid crystal displayer or Braun-tube is used for the window 101, a mouse or other pointing tool or simplified keyboard should be provided as an data inputting tool. In the product ordering window 101, a variety of goods can be displayed in matrix as shown in FIG. 1. Each columns of the product ordering window 101 relate to the products classified in large scale. However, besides the matrix type of the product ordering window, there may be other methods for displaying goods, for instance, horizontally or vertically replacing goods or displaying an initial screen of generally classified groups of goods and then goods of a group selected by a purchaser. Furthermore, the un-specified columns of the product ordering window 101 can be manipulated for featuring advertisements of other specific

goods. The purchaser also inputs the number of goods to make an order, using the product ordering window 101.

On the other hand, the payment approving window 102 is provided as a method for a purchaser's approving the payment for the ordered goods by using coin, bill or credit card. After a purchaser inputs goods to order using the product ordering window 101, payment will be made by using the payment approving window 102. At this time, the controller is to control operations of picking the ordered goods out of the product supply unit 104 and transporting them to the product discharging outlet 103 by getting control data signals related to the number of ordered goods transmitted from the product ordering window 101 and the payment approving window 102.

As shown in FIG. 1, the product discharging outlet 103 includes a vertically opening or closing door 106 installed at the front side of the product discharging outlet and a product placement sensor 105 to check the stand-by status of the transported goods. When an ordered goods is transported by the main conveyor to the front part of the product discharging outlet, the product placement sensor 105 operates to open the door 106. When the purchaser takes out all the ordered goods, the product placement sensor 105 operates to close the door 106. The drive part and product placement sensor 105 is connected with a single chip microprocessor (hereinafter referred to as 'MIC') installed at a predetermined position of the product discharging outlet 103, so that the opening and closing operations of the door will be controlled by the controller via MIC. Furthermore, it is preferable that the door of the product discharging outlet 103 is transparent for purchasers to check whether the ordered goods is packed and discharged out to the product discharging outlet 103.

FIG. 2 is a perspective view for illustrating the product supply unit 104

shown in FIG. 1. As shown in FIG. 2, the product supply unit 104 includes: display columns 203 differently shaped according to the types of goods to be displayed; column assemblies 205 made of a plurality of display columns 203; product storage racks 201 having the column assemblies 205 arranged in rows with a predetermined interval; sub-conveyors 207 closely installed at the front, bottom part of the column assemblies 205; and a main conveyor 209 extended in perpendicular to the longitudinal direction of the sub-conveyors 207, being positioned close to one end of the sub-conveyors.

Each of the display columns 203 relates to a minimum unit of the column assemblies 205 for storing goods, having corresponding control addresses that control the operations of discharging ordered goods. The shape of display columns 203 is varied according to the size of goods. As a result, the shape of display columns 203 can be determined in size or dimension according to the goods classified in physical property, weight or volume, for instance, glasses, paper packaged goods, steels, plastics or the like.

At this time, an A-type display column is adequate for displaying products difficult to display inconsistent, changeable shapes of products such as vinyl bags of cookies or light, thin, inseparable products such as stockings or chewing gums. The goods are deposited into a small gap between steel springs that rotate once to discharge the ordered goods. The aforementioned type display column has been in common use.

A B-type display column is good for circular products such PET bottled beverages as canned drinks in the conventional vending machine. There is a stopper on the bottom of the B-type display columns. The lower part of the stopper gets in, but the upper part of the stopper gets out to thereby discharge out one stand-by goods. Other goods deposited on the display columns are to be held by the stopper. Particularly, a curved panel effectively distributes the

vertical load of the goods deposited thereon.

A C-type display column is proper for such trapezoid products, hard to be accumulated due to a lid, or complicatedly shaped or fragile ones like a sprayer as shown in the conventional cupped quick noodle vending machine.

Finally, a D-type display column is suitable for such boxed cookies as shown in the conventional cigarette vending machine.

Also, even if there are not illustrated here, there may be other differently shaped display columns as well as the ones described above. For instance, an E-type display column is good for heavy or not uniformly shaped goods like packaged rice, other packaged crops and packaged vegetables. FIG. 3 is a perspective view for illustrating the E-type display column. Goods are deposited on plates 307 of the E-type display column and supported by supporting rods 301. A thin long hole is formed to get the supporting rods 301 inserted at the center of the part where the plates 307 are supported with the supporting rods 301. On the other hand, the belt 315 is rotated by a driving part 313 for a vertical movement of the plates 305, 307. At this time, the plate 305 positioned at the bottom is tilted forwards to discharge out a goods, sliding down with itself being inserted at holes 311a, 311b for collection.

The product storage rack 201 is an independent unit of column assemblies 205 having a combination of display columns 203, each of which is the minimum unit of the product displayer. The product storage rack 201 can be made of two, three or more levels of column assemblies 205, which are variably combined depending on size or characteristic of goods such as physical property, weight, volume. In the drawing, the display columns 203 are assembled in an order of types of goods for convenient descriptions. At this time, the product storage rack 201 is generally assembled with display columns 203 in an order of fragile goods, bulky goods, heavy goods from the foremost bottom

portion, but less-fragile goods, less deformable goods by an impact and light goods to the foremost upper portion. Also, the most frequently sold goods are to be displayed at the foremost front rows of display assemblies, closest to the product discharging outlet, but the least frequently sold goods are to be displayed at the foremost back rows of display assemblies, farthest from the product discharging outlet, so as to minimize the time to be taken for transportation of the ordered goods.

The sub-conveyors 207 and the main conveyor 209 are made of general belt type conveyors. In order to refrain the ordered goods from getting out of the conveyors 207, 209, guides 207a, 209a are installed at both sides of the conveyors 207, 209 in parallel to the route of the goods that is being transported to the product discharging outlet. Furthermore, there are driving parts (not shown) provided for the sub-conveyors 207 and the main conveyor 209. The driving parts are connected with the controller (not shown) that controls operations of the driving parts. On the other hand, as shown in the drawings, a sensor 207b is attached at the inner side of the guide 207a of the sub-conveyor 207 to make sure that all the ordered and selected goods are transported through the sub-conveyor 207 and further moved to the main conveyor 209. There are also provided sensors 209b, 209b' at inner sides of the guide 209a of the main conveyor 209, close to the product discharging outlet 103 to confirm that all the goods are moved to the product discharging outlet 103. At this time, the sensors 207b, 209b are connected with the controller, which stops operations of the conveyors 207, 209 if the ordered goods are not properly transported for a predetermined length of time. The predetermined period of time is determined by getting the total length of each of the conveyors 207, 209 divided by the speed.

FIG. 4 is a schematic block diagram for illustrating sequential processes of the all parts of the automatic vending apparatus in accordance with the present

invention. At first, a purchaser orders goods using a product ordering window 41 and a payment approving window 42. When the payment is approved for the ordered goods, a controller 40 transmits operation initiating signals to a driving part 43a of a display column 43 where the ordered goods is stored and to a driving parts 44a, 45a of the sub and main conveyors 44a, 45a at the same time. Next, the controller 40 confirms that the exact number of ordered goods is extracted out of the display column 43. The controller 40 confirms the exact number of ordered goods to be extracted out of the display column 43 and stops the operations of extracting the ordered goods out of the display column 43. In other words, the number of ordered goods to be extracted will be made sure by counting the number of turning on/off operations of the sensors 43b installed at the end of the display column. On the other hand, the controller 40 stops the operations of the sub-conveyors 44 if the sensor 44b of the sub-conveyor 44 does not detect the goods within a predetermined period of time after extraction of the ordered goods. In the same manner, the controller 40 stops the operations of the main conveyor 45 if the sensor 45b of the main conveyor 45 does not detect the ordered goods within a predetermined period of time after transportation of the extracted goods from the sub-conveyor 45. Furthermore, the controller 40 controls the door driving part 46a to close the door if it is confirmed by a product placement sensor 46b of the product discharging outlet 46 that the ordered goods is finally discharged and taken by the purchaser.

As shown in FIG. 4, the controller 40 communicates with driving parts 43a, 44a, 45a, 46a and sensors 43b, 44b, 45b, 46b via MICs mounted on predetermined portions of display columns 43, sub-conveyors 44, main conveyor 45 and product discharging outlet 46. At this time, the controller 40 can be made of personal computers combined in parallel or fieldbus type distributed input/output equipment connected to the communication port of personal computers. In the distributed input/output equipment, the MIC is connected

thereto.

2) The second embodiment of the present invention

FIG. 5 is a schematic view for illustrating a product supply unit of the first embodiment of the present invention, to which an auto-packaging unit 501 is added. The auto-packaging unit 501 is positioned at an identical line with the main conveyor 209. Packaging paper like a vinyl bag is hung under the main conveyor 209, discharged and moved up an elevating unit one by one whenever needed. When the discharged sheet of packaging paper is widely unfolded, the elevator goes up to prevent damage of goods and vinyl bag. As the goods is wrapped in the sheet of packaging paper, the elevator gets down to prevent excessive package of the product. Also, the controller is connected with the driving part of the auto-packaging unit to initiate operations of the auto-packaging unit 501 at the same time as the ordered goods is discharged out. The detailed operation of the auto-packaging unit 501 has been disclosed in patent application number 97-186.

On the other hand, MIC is also connected at the driving part of the auto-packaging unit 501, so that the controller 40 can control the driving part of the auto-packaging unit via MIC to initiate operations in extraction of the goods and finalize them in completion of the packaging process.

3) The third embodiment of the present invention

FIG. 6 is a schematic view for illustrating a product storage rack 201 of the first and second embodiment of the present invention, to which a horizontal transporting panel 601 is added. As shown in FIG. 6, the horizontal transportation panel 601 is a supplementary apparatus installed between the column assemblies 205 and the sub-conveyor 207 to smoothly and safely transport goods when the goods placed at the lowest portion of the column

assemblies 205 is moved to the sub-conveyor 207. The horizontal transportation panel 601 should be designed by taking into consideration a goods sliding angle and an impact to be made by the goods when it arrives at the conveyor, usually a sort of a bent flat plate. According to the embodiment of the present invention, it becomes possible to prevent the goods from being held in the middle of the transportation process from display columns to the sub-conveyors, thereby securing stable extraction of goods.

4) The fourth embodiment of the present invention

FIG. 7 illustrates a product supply unit having two levels of product storage racks. The other components are the same as those of the third embodiment described above. According to the fourth embodiment of the present invention, the route for transporting products is made shorter so that it takes less time for the purchaser to buy goods. In other words, it is preferable that the product storage racks 201 are installed in two levels having the same number of display columns 203.

As described in FIG. 7, the product storage rack 201 is constructed with horizontal and vertical transportation panels 601, 701. At this time, the horizontal transportation panel 601 is the same as that described in FIG. 6. The vertical transportation panel 701 is an auxiliary transportation apparatus attached at the end of the sub-conveyor 207 to help a goods safely drop to the main conveyor 209 when the goods is picked out of the second level of the product storage racks 201. Since no fragile goods are placed on the second level of the product storage rack 201, it is preferable to design the vertical transportation panel 701 in a bent housing structure.

5) The fifth embodiment of the present invention

The fifth embodiment may be an alternative for the fourth embodiment of

the present invention. FIG. 8 illustrates a product supply unit having vertical transportation panels 801 in accordance with the fifth embodiment of the present invention. The other components are the same as those of the third embodiment of the present invention. As shown in FIG. 8, the vertical transportation panels 801 are connected with the lower part of the second level of the column assemblies 205 so that a goods can be directly transported from the second level of the display columns to the first level of the sub-conveyor 207. Installation of the vertical transportation panel 801 described above do not require an additional sub-conveyor at the second level of the column assemblies, thereby making a reduction in installation cost.

6) The sixth embodiment of the present invention

FIG. 9 illustrates a product supply unit having first and second main conveyors 901a, 901b respectively extended close to both ends of the sub-conveyor, relatively in perpendicular to the longitudinal direction of the sub-conveyor 207, to further transport the goods to a product discharging outlet. On the other hand, there are first and second auto-packaging units 905a, 905b identically extended with the main conveyors. The other components are the same as those described in the previous embodiment of the present invention. As a result, the main conveyors installed at both sides of the sub-conveyors makes it possible to transport the goods to the purchaser more quickly.

FIG. 10 illustrates a sequential time-chart of the whole processes that the controller 40 operates to select, transport and finally deliver ordered goods through a product discharging outlet 103. A purchaser orders goods, which is selected out by an extraction signal. Driving parts of display column, sub-conveyor, right main conveyor and right auto-packaging unit initiates operations P1, ScR, McR, Pr. The ordered goods is extracted from the display column, passed by sub-conveyor, main conveyor and auto-packaging unit, and finally

delivered through the product discharging outlet. At this time, extraction time P1 indicates the time taken to get all of the ordered goods extracted out of display columns. The sub-conveyor is designed to enable the ordered goods to be transported to both sides thereof. In the embodiment of the present invention, all the goods ordered by the first purchaser are to be transported to the right side of the sub-conveyor 207 ScR. Therefore, all the goods ordered by the first purchaser and transported to the second main conveyor 901b are to be distinguished from those ordered by a second purchaser. As soon as the goods ordered by the first purchaser are all transported to the first main conveyor 901b, the sub-conveyor 207 starts to rotate to the left ScL. At the same time, the goods ordered by the second purchaser starts to be extracted, transported through sub-conveyor 207, the first main conveyor 901a and the first auto-packaging unit 905a and finally discharged out to the second purchaser. The processes described above will be repeated for other purchasers. On the other hand, the product ordering window 101 let purchasers know about information on which product discharging outlets will be used to deliver the goods ordered by them, so that the purchasers will check the designated product discharging outlets for their ordered goods.

On the other hand, the spirit of the art that main conveyors are provided at both sides of the product storage racks can be also applied to the first through fifth embodiments of the present invention.

7) The seventh embodiment of the present invention

In addition to an auto-packaging unit 1109, another transportation route is installed for packaging some goods too big or bulky to get packaged by the auto-packaging unit 1109. In other words, for the big or bulky goods or other goods not to be packaged by the auto-packaging unit 1109, a product separation panel 1103 is additionally installed at a predetermined distance prior to the inlet

of the auto-packaging unit 1109 and a heavy goods conveyor 1105 connected with the product separation panel 1103 is further extended to the main conveyor 1101 connected to the product discharging outlet 103.

Those large, bulky, heavy goods includes packed rice, packed flour, boxed goods, infants' diapers, large sized shampoo, vinyl bagged detergent, other vinyl bagged liquid goods, not uniformly shaped goods hard to be put on any type of display columns, kitchen utensils like cooking pan or foam generator and vinyl wrapped vegetables like cabbage, carrot, lettuce and so on.

Small sized, light goods including general industrially manufactured goods, snacks are to be placed on the column assemblies next to those for the large, heavy, bulky goods. At this time, the more frequently purchased the goods are, the closer they are placed to the product delivery panels. In other words, the ordered and extracted goods are to be transported to horizontal or vertical transportation panel, sub-conveyor and main conveyor and totally packaged by the auto-packaging unit.

FIG. 11 is a partial view for illustrating the area close to product separation panel 1103 and heavy goods conveyor 1105. In principle, the heavy goods are placed in the foremost front part of the product storage rack 201 loaded in the E-type display columns shown in FIG. 3. On the other hand, it is preferable that the controller is set to control to extract heavy, bulky goods prior to small, light goods when small/light and heavy/bulky goods are simultaneously ordered by a purchaser.

As shown in FIG. 11, the product separation panel 1103 is a member to connect main conveyor 1101, sloped conveyor 1107 and heavy goods conveyor 1105. Also, the product separation panel 1103 includes rotating rods 1111a, 1111b crossed in perpendicular. Therefore, when small/light goods are transported, the rotating rod 1111a rises higher than the other rotating rod

1111b to get the goods transported to the sloped conveyor 1107. In contrast, when large/heavy goods are transported, the rotating rod 111b rises higher than the other rotating rod 111a to get the goods transported to the heavy goods conveyor 1105. The product separation panel thus constructed has been used to change directions of transporting goods.

As described above, there is an advantage in the automatic vending apparatus in that uniformly sized and non-uniformly shaped goods can be automatically sold, with no clerk being hired to work in presence, regardless of time or place.

There is another advantage in the automatic vending apparatus in that uniformly sized and non-uniformly shaped goods can be automatically packaged and sold, with no clerk being hired to work in presence, regardless of time or place.

Furthermore, there is still another advantage in the automatic vending apparatus in that uniformly sized and non-uniformly shaped goods can be adequately distinguished into goods to be packaged or not to be packaged and, then, sold, with no clerk being hired to work in presence, regardless of time or place.

What is claimed is:

1. An automatic vending apparatus having a product ordering window to input purchasers' orders of various goods for automatic purchasing processes, a payment approving window to approve the payment for the ordered goods, a product discharging outlet to discharge the ordered goods and a controller to control all the processes of discharging the ordered products out of the product discharging outlet, the apparatus comprising:

a product storage rack having a plurality of column assemblies arranged in rows, each of the column assemblies including more than one display column in a predetermined shape thereof according to that of various products which will be loaded and discharged out;

more than one sub-conveyors respectively installed in front of the corresponding column assemblies for transporting the product discharged out of the display columns; and

a main conveyor installed at an end of more than one sub-conveyors for transporting the product previously transported by the sub-conveyors to the product discharging outlet.

2. The apparatus as defined in claim 1 comprising an auto-packaging unit which is installed between the main conveyor and the product discharging outlet to get the goods transported from the main conveyor to be automatically packaged and discharged out through the product discharging outlet.

3. The apparatus as defined in claim 2 comprising: a product separation panel which is installed at a predetermined distance prior to the auto-packaging unit to distinguish all the goods transported from the main conveyor into some goods to be packaged and the others not to be packaged; and a separation conveyor which is connected with the product separation panel, diverting from the auto-packaging unit and extended to the product discharging outlet, wherein the

product separation panel is formed for changing the direction of transporting goods toward the auto-packaging unit or the separation conveyor.

4. The apparatus as defined in any one claims 1 · 3, wherein the column assemblies additionally include horizontal transportation panels extended close to the sub-conveyors for easy extraction of goods.

5. The apparatus as defined in any one claims 1 · 3, wherein the product storage rack includes the second column assemblies deposited over the column assemblies, the rack further comprising:

a second sub-conveyor installed at the lower part of the second column assemblies for transporting the goods extracted from the second column assemblies; and

a vertical transportation panel extended from the end of the second sub-conveyor, close to the main conveyor for easily dropping the goods extracted from the second sub-conveyor to the main conveyor.

6. The apparatus as defined in claim 5, wherein the column assemblies comprises:

a first horizontal transportation panel extended close to the sub-conveyor for easy extraction of goods; and

a second horizontal transportation panel extended close to the second sub-conveyor for easy extraction of goods.

7. The apparatus as defined in any one claims 1 – 3, wherein the product storage rack comprises a second column assemblies deposited over the column assemblies, the second column assemblies further comprising a vertical transportation panel extended close to the sub-conveyor for easy drop of goods.

8. The apparatus, as defined in claim 7, wherein the column assemblies comprises a horizontal transportation panel installed between the column

assemblies and the sub-conveyor for easy extraction of goods from the display columns to the sub-conveyor.

9. An automatic vending apparatus having a product ordering window to input purchasers' orders of various goods for automatic purchasing processes, payment approving window to approve the payment for the ordered goods, a product discharging outlet to discharge the ordered goods and a controller to control all the processes of discharging the ordered products out of the product discharging outlet, the apparatus comprising:

a product storage rack having a plurality of column assemblies arranged in rows, each of the column assemblies including more than one display column in a predetermined shape thereof according to that of various products which will be loaded and discharged out;

more than one sub-conveyor having a first terminal and a second terminal respectively installed in front of the corresponding column assemblies for transporting the product discharged out of the display columns;

a first main conveyor installed at the first terminal of one of the sub-conveyors for transporting the product previously transported by the sub-conveyors to a first product discharging outlet; and

a second main conveyor installed at the second terminal of one of the sub-conveyors for transporting the product previously transported by the sub-conveyors to a second product discharging outlet.

10. The apparatus as define in claim 9, further comprising:

a first auto-packaging unit installed between the first main conveyor and the first product discharging outlet for automatically packaging the goods transported from the first main conveyor and discharging them out to the first product discharging outlet; and

a second auto-packaging unit installed between the second conveyor and the second product discharging outlet for automatically packaging the goods

transported from the second main conveyor and the discharging them out to the second product discharging outlet.

11. The apparatus as defined in claim 10, further comprising:

a first product separation panel installed at a predetermined distance prior to the first auto-packaging unit for distinguishing the goods not to be packaged from all the goods transported from the first main conveyor and separately discharging them out to the first product discharging outlet and a first separation conveyor connected with the first goods separation panel, diverted from the first auto-packaging unit and extended to the first product discharging outlet; and

a second product separation panel installed at a predetermined distance prior to the first auto-packaging unit for distinguishing the goods not to be packaged from all the goods transported from the second main conveyor and separately discharging them out to the second product discharging outlet and a second separation conveyor connected with the second goods separation panel, diverted from the second auto-packaging unit and extended to the second product discharging outlet,

wherein the first product separation panel is formed to respectively change the directions of transporting goods to the first auto-packaging unit and the first separation conveyor and the second product separation panel is formed to respectively change the directions of transporting goods to the first auto-packaging unit and the first separation conveyor.

12. The apparatus as defined in any one claims 9 - 11, wherein the product storage rack further comprises a horizontal transportation panel extended close to the sub-conveyor for easy extraction of goods from the display columns to the sub-conveyor.

13. The apparatus as defined in any one claims 9 - 11, wherein the product

storage rack comprises second column assemblies over the column assemblies, the second column assemblies further comprising:

a second sub-conveyor with first and second ends being installed at the front, lower part of the second column assemblies for transporting the goods extracted from the display columns of the second column assemblies;

a first vertical transportation panel extended from the first end of the second sub-conveyor, close to the first main conveyor for easily dropping the goods extracted from the second sub-conveyor to the first main conveyor; and

a second vertical transportation panel extended from the second end of the second sub-conveyor, close to the second main conveyor for easily dropping the goods extracted from the second sub-conveyor to the second main conveyor.

14. The apparatus, as defined in claim 13, wherein the product storage rack further comprises:

a first horizontal transportation panel extended close to the sub-conveyor for easy extraction of goods from the display columns of the column assemblies; and

a second horizontal transportation panel extended close to the second sub-conveyor for easy extraction of goods from the display columns of the second column assemblies.

15. The apparatus as defined in any one claims 9 – 11, wherein the product storage rack additionally includes:

a second column assemblies deposited over the column assemblies; and

a vertical transportation panel extended close to the sub-conveyor for easily dropping the goods extracted from the display columns of the second column assemblies to the sub-conveyor.

16. The apparatus, as defined in claim 15, wherein the product storage rack further comprises a horizontal transportation panel extended close to the sub-

conveyor for easily extracting goods from the display columns to the sub-conveyor.

FIG. 1

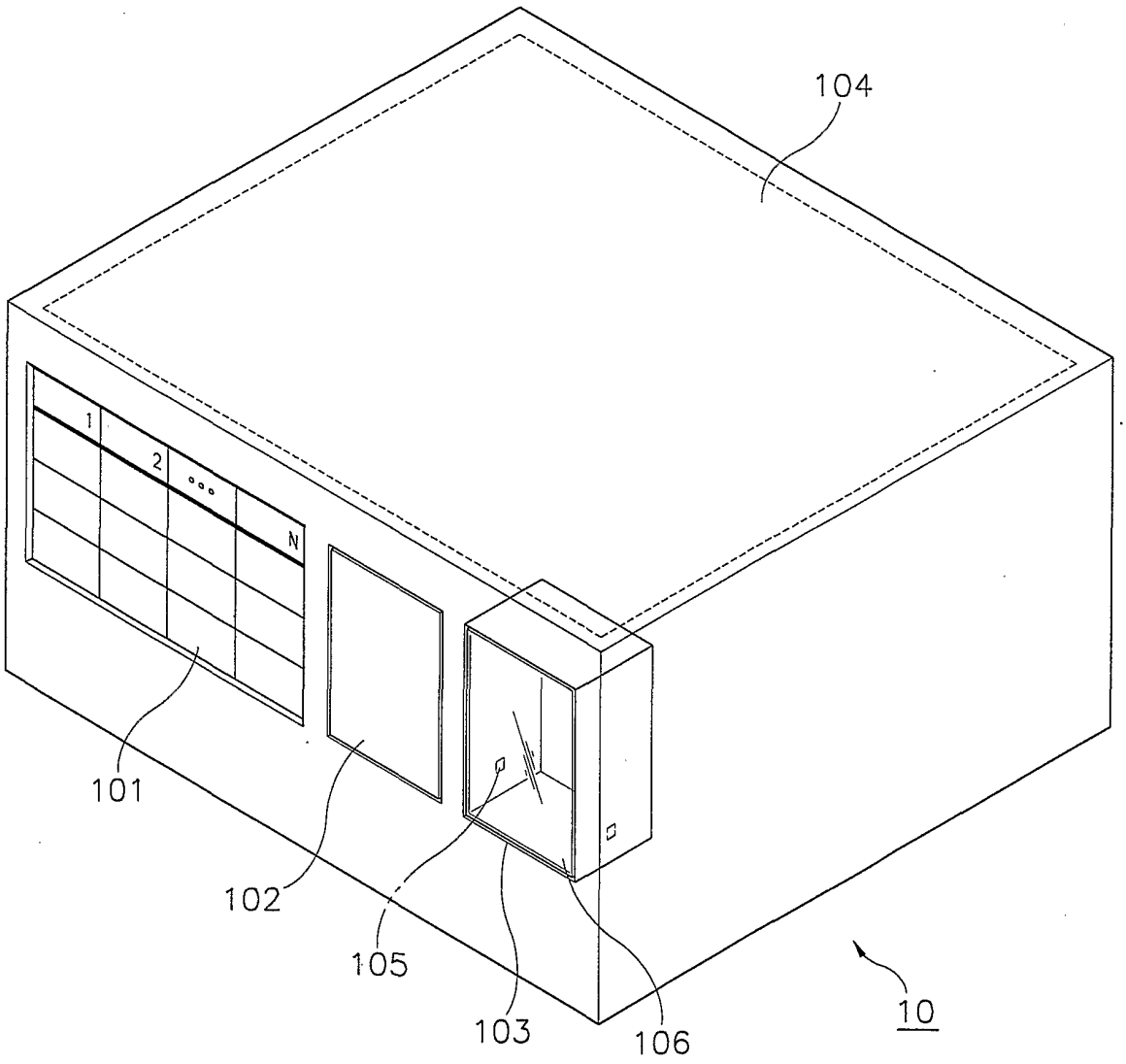


FIG.2

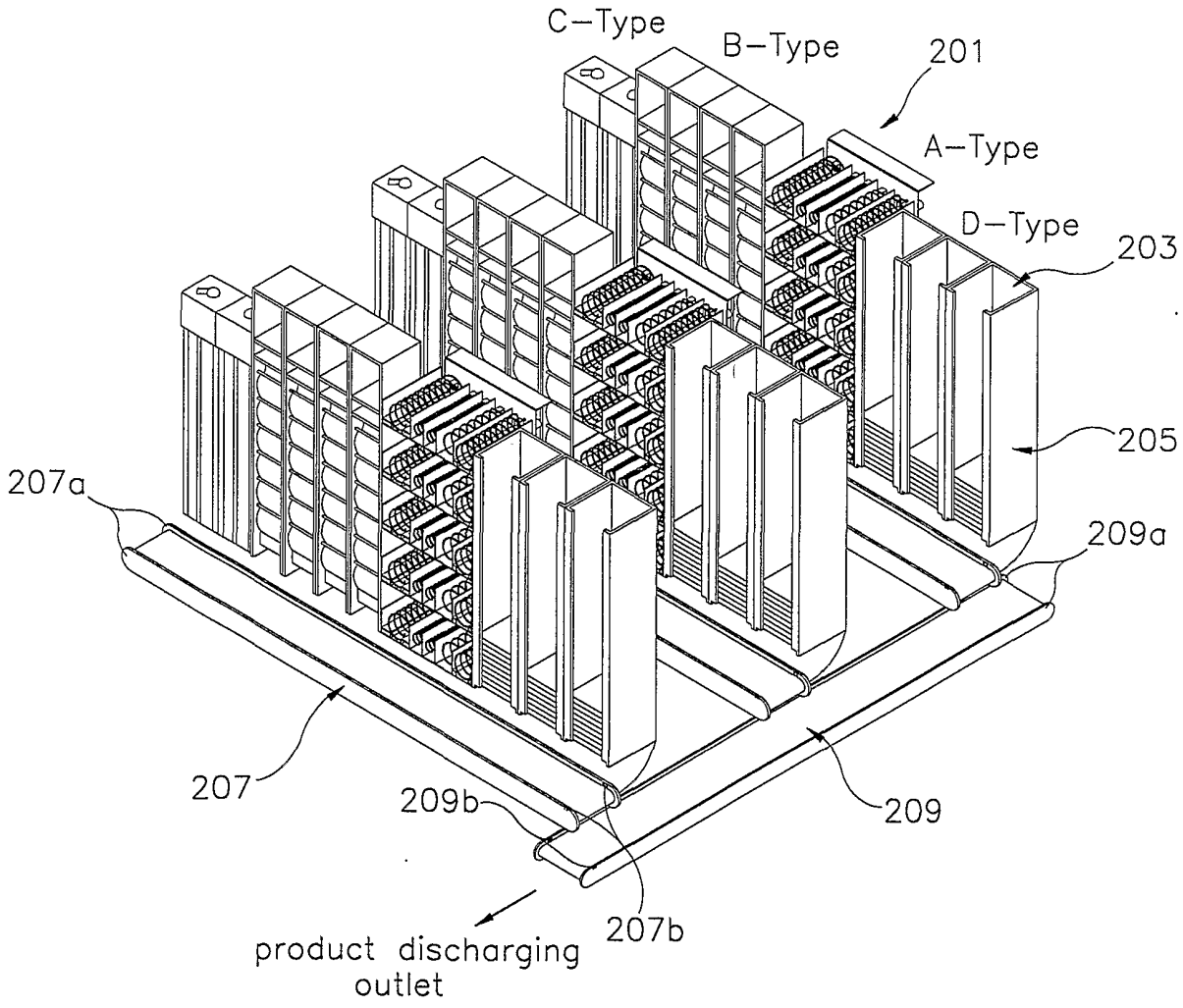

C-Type
B-Type
201
A-Type
D-Type
203
205
207a
209a
207
209b
209
207b
product discharging outlet

FIG.3

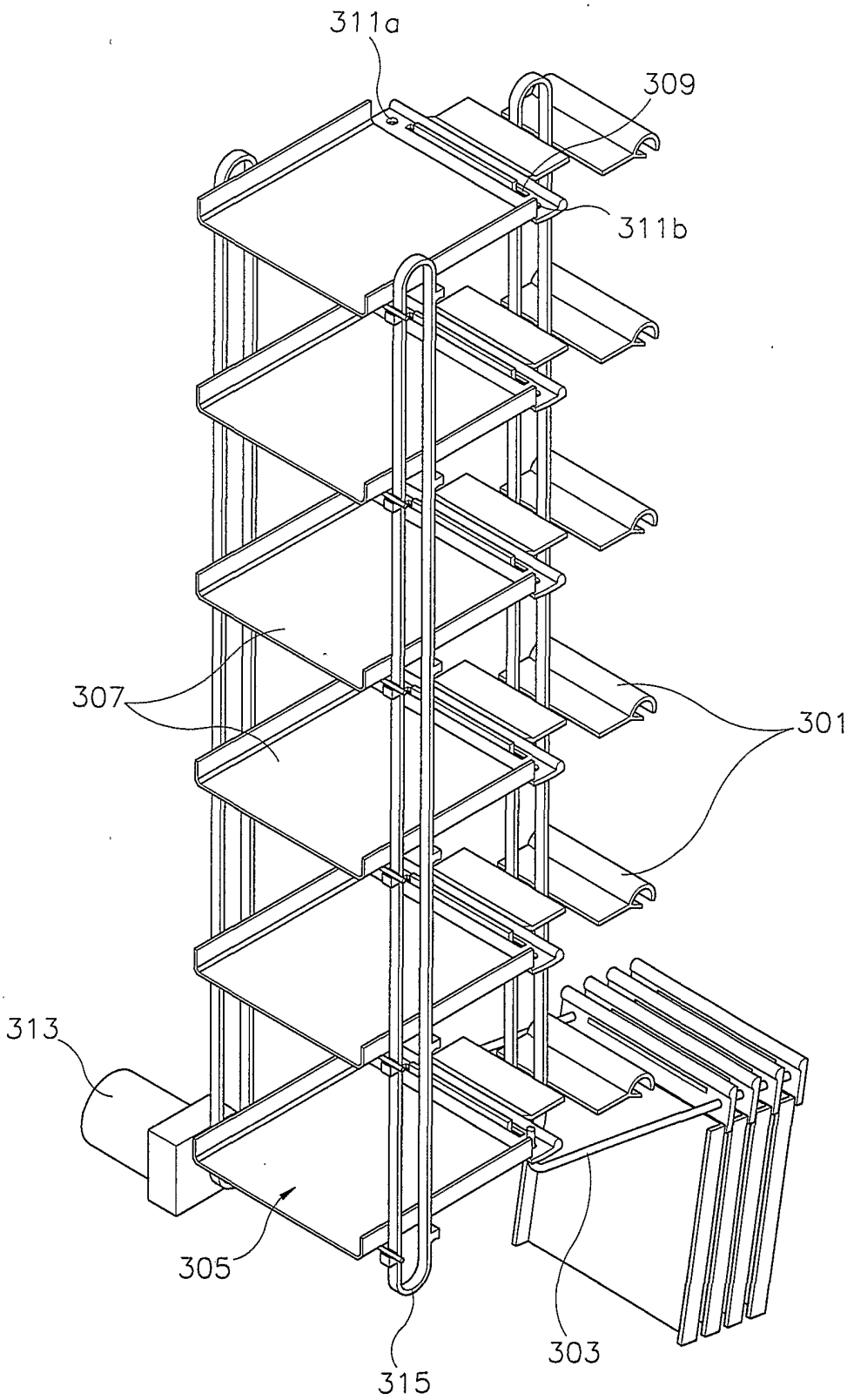


FIG.4

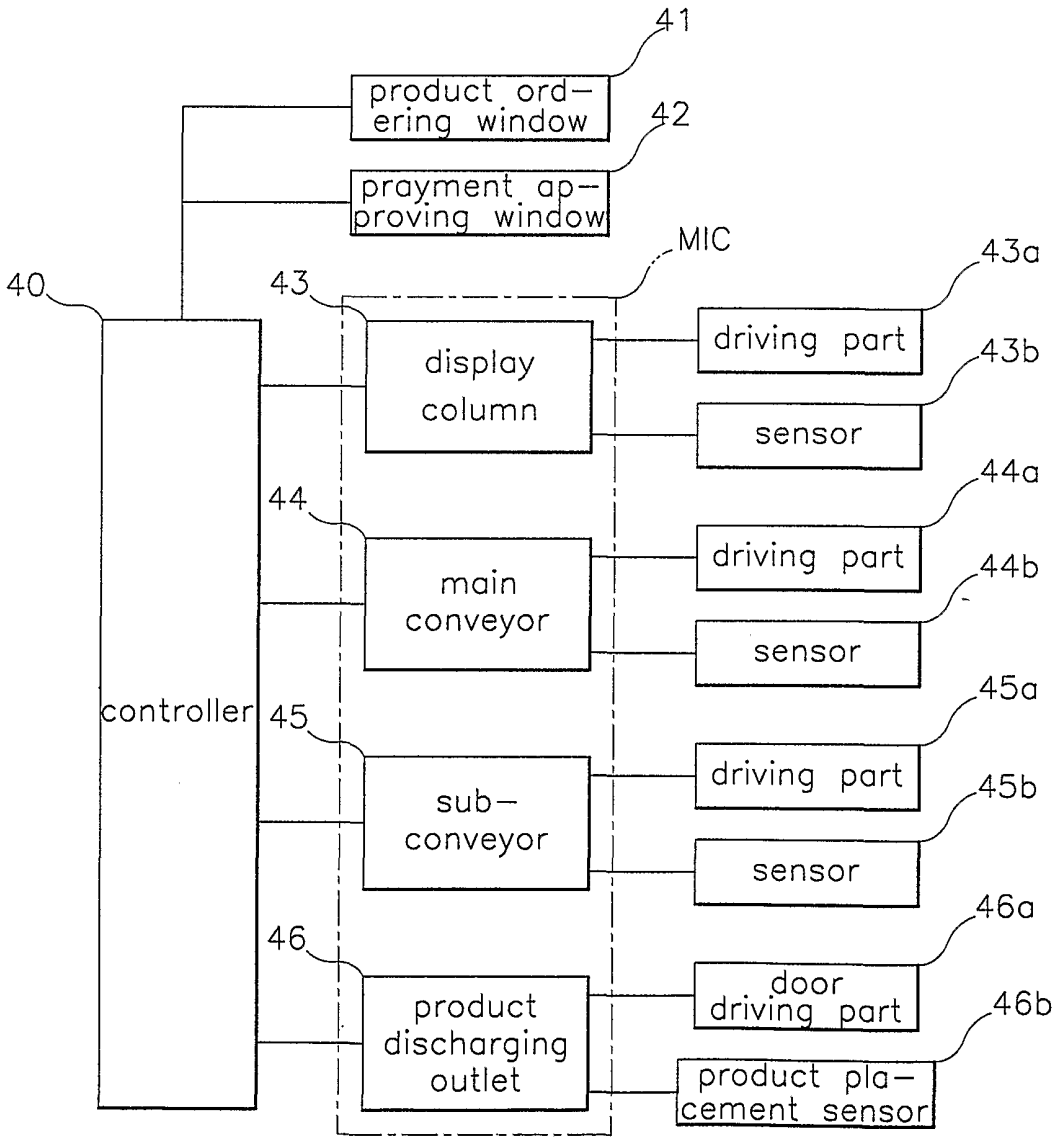

41
product ordering window
42
prayment approving window
MIC
40
43
43a
driving part
display column
43b
sensor
44
44a
driving part
main conveyor
44b
sensor
controller
45
45a
driving part
sub-conveyor
45b
sensor
46
46a
door driving part
product discharging outlet
46b
product placement sensor

FIG.5

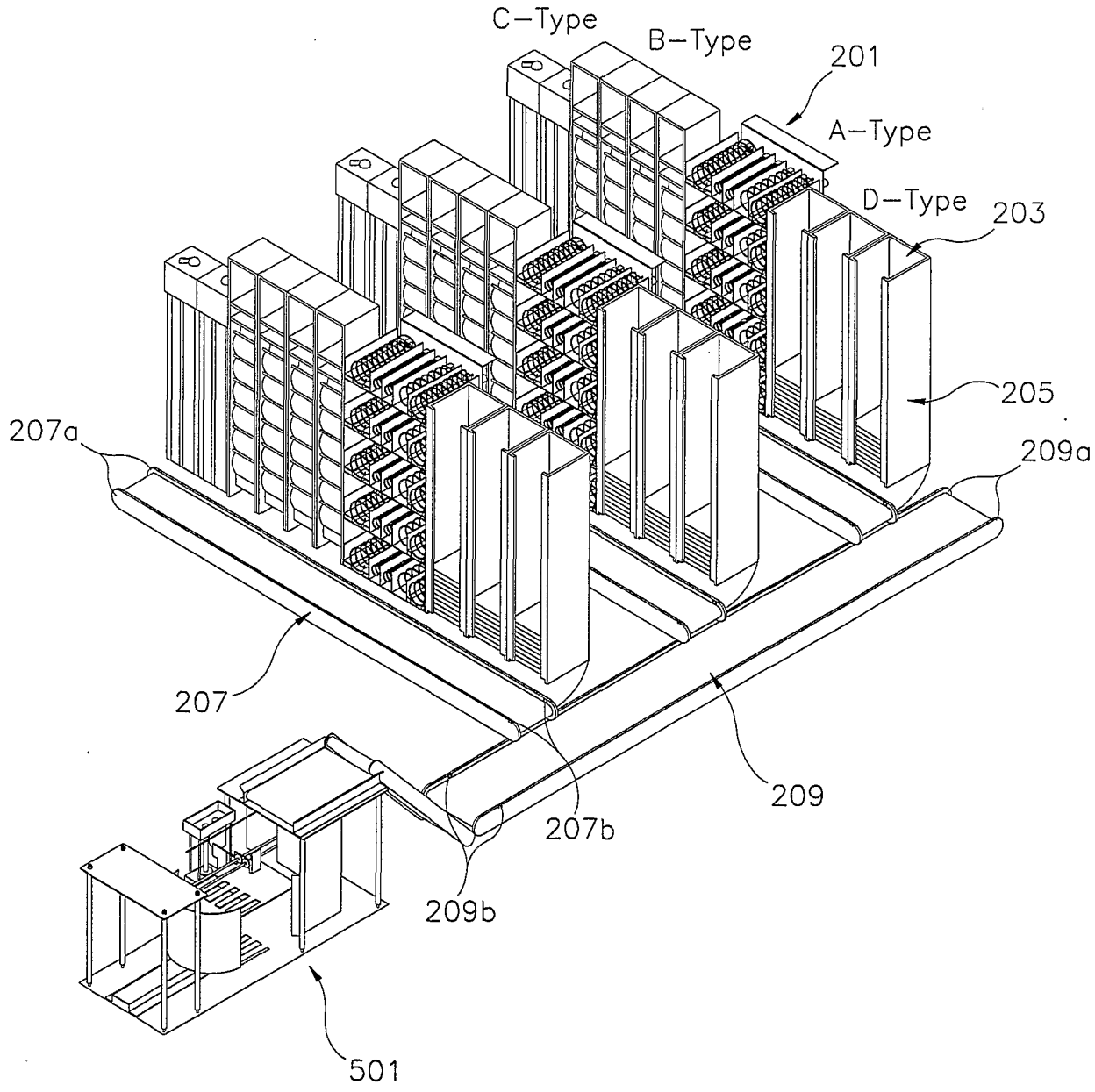

C-Type
B-Type
201
A-Type
D-Type
203
205
207a
209a
207
209
207b
209b
501

FIG.6

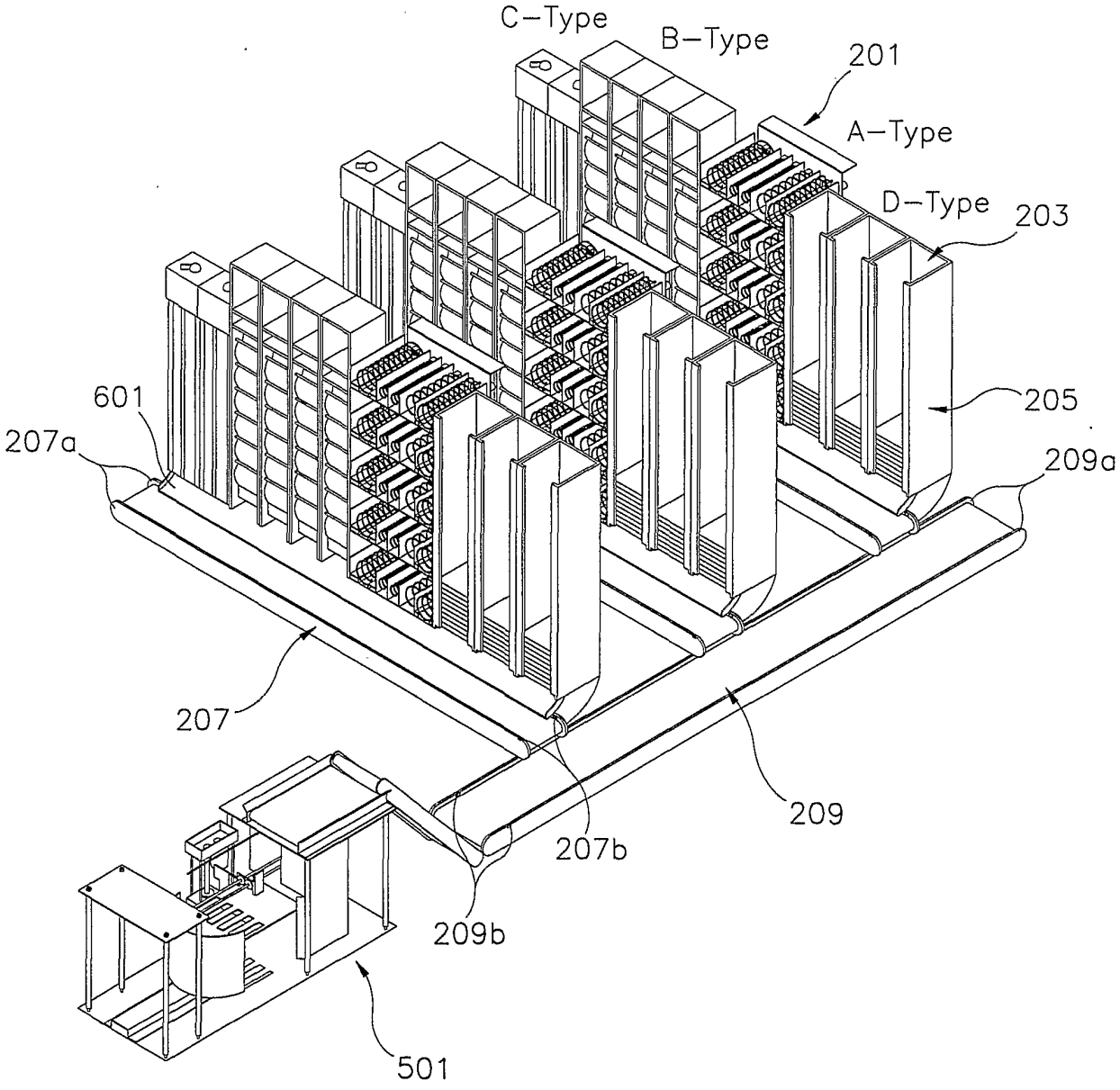

C-Type
B-Type
201
A-Type
D-Type
203
205
601
207a
209a
207
209
207b
209b
501

FIG.7

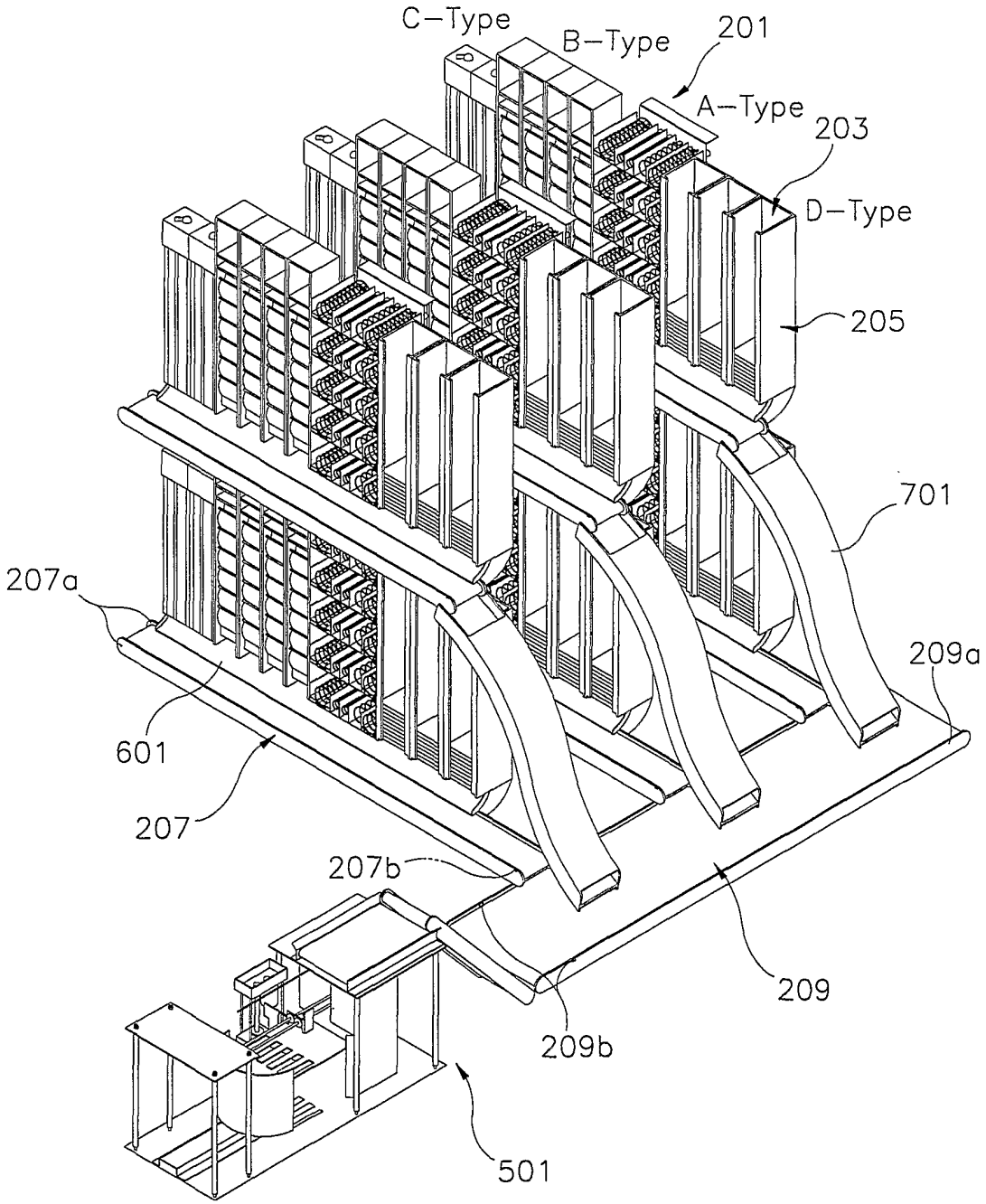

C-Type
B-Type
201
A-Type
203
D-Type
205
701
207a
209a
601
207
207b
209
209b
501

FIG.8

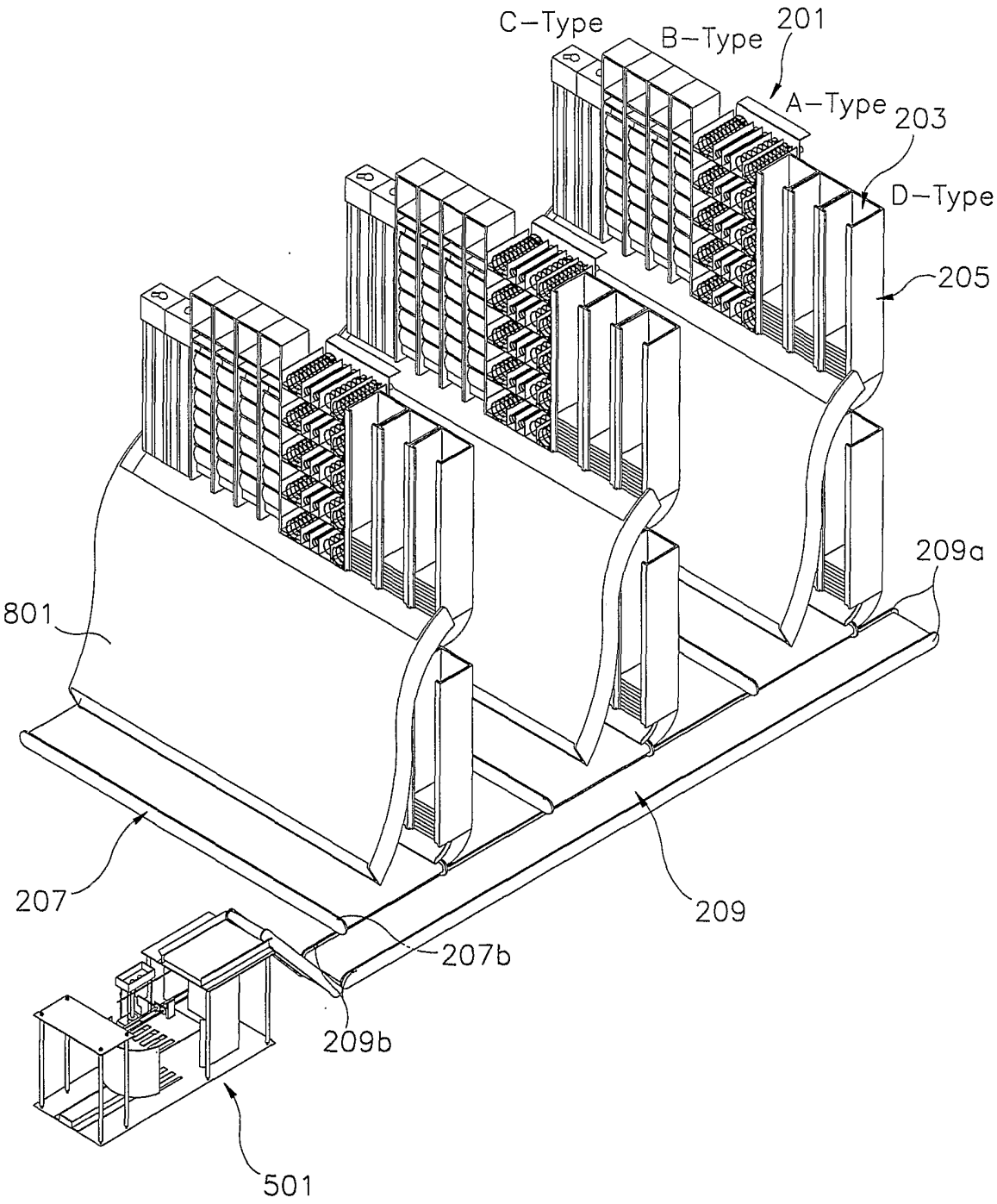

C-Type
B-Type
201
A-Type
203
D-Type
205
209a
801
207
209
207b
209b
501

FIG.9

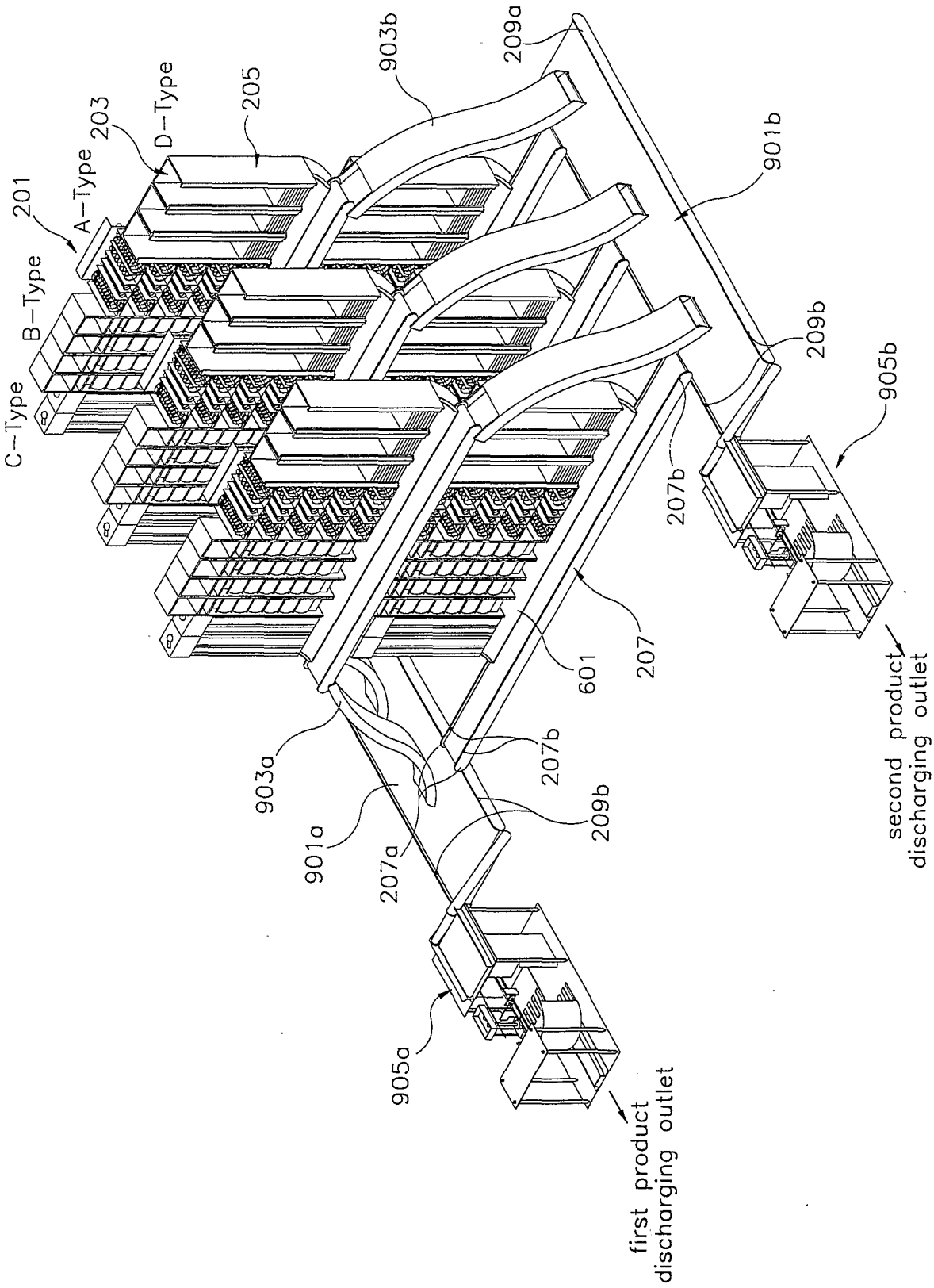

C-Type
B-Type
A-Type
201
203
D-Type
205
903b
209a
901b
209b
905b
207b
207
601
903a
901a
207a
905a
first product discharging outlet
second product discharging outlet

FIG.10

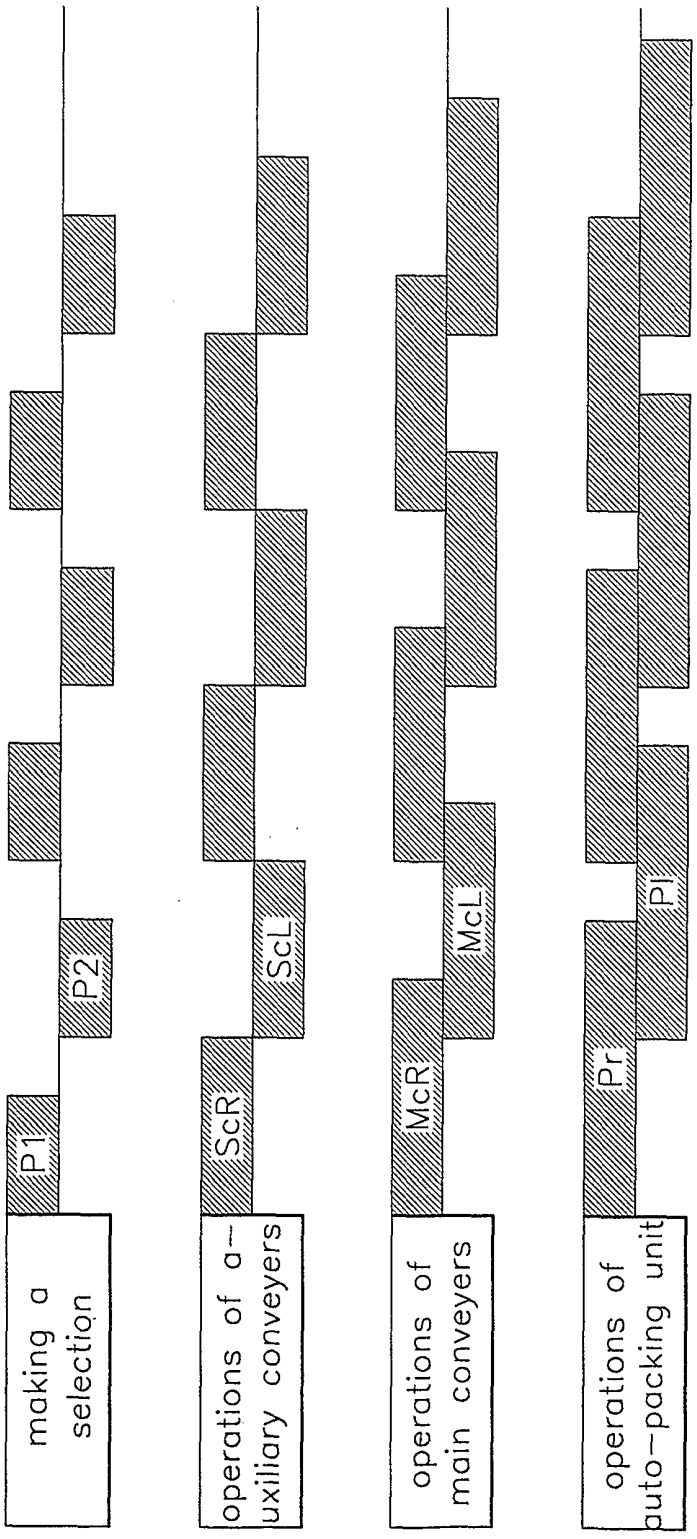
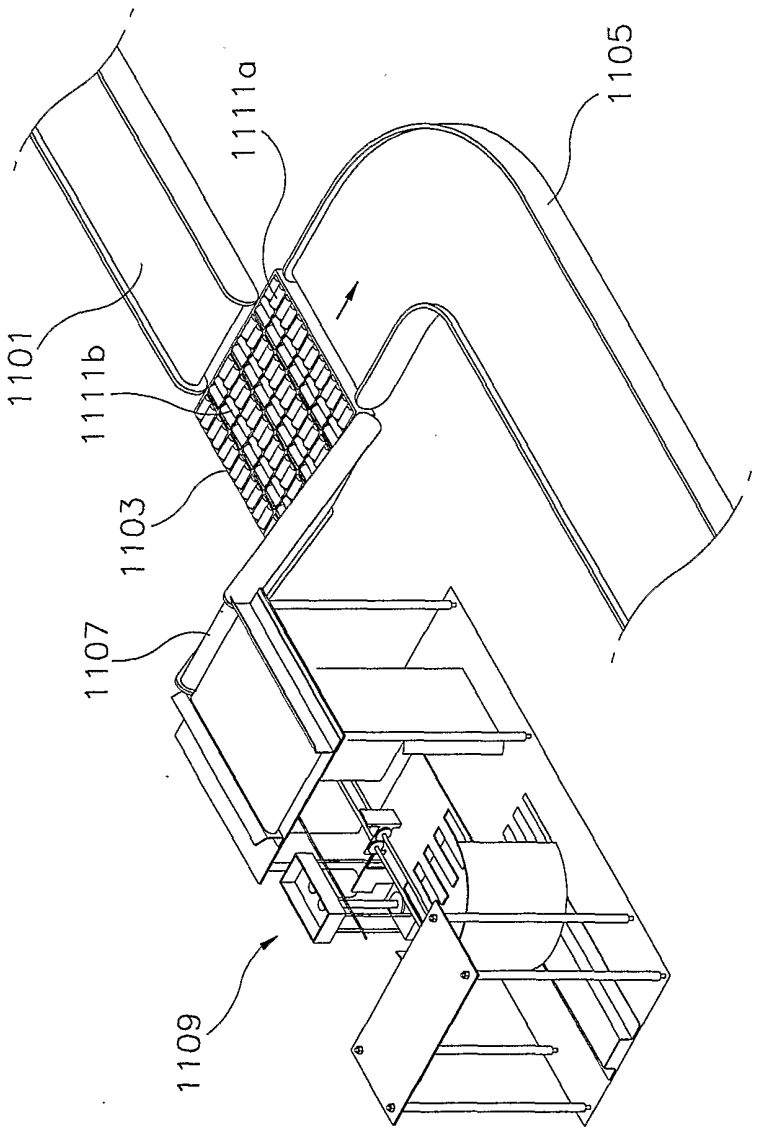

making a selection
P1
P2
operations of a-uxiliary conveyers
ScR
ScL
operations of main conveyers
McR
McL
operations of auto-packing unit
Pr
Pl

FIG. 11



INTERNATIONAL SEARCH REPORT

ıtional application No.
PCT/KR00/00844

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 G07F 17/40, G07F 9/00, G07F 5/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 G07F 17/40, G07F 9/00, G07F 5/18, B65G

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 51-144298 A (TOSHIBA CORP.) 11 DECEMBER 1976 see the whole document	1-16
A	JP 50-158398 A (TAKETA KIYORE) 22 December 1975 see the whole document	1-16

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 DECEMBER 2000 (20.12.2000)	21 DECEMBER 2000 (21.12.2000)

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