arranged around a top of the rotating shaft 42. In the first embodiment of the present invention, the rotating seat 43 is a circle disk-shaped bracket. The rotating seat 43 is located on a top of the liquid nitrogen drum 41, the five active doors 124 are located directly above the rotating seat 43 on the side of the carrying chamber 11, and the five active doors 124 are linearly extended as the radial direction of the rotating shaft 42. A bottom end of the shaft 42 is connected to a servomotor 44 through a transmission structure 421. The servomotor 44 is fixed on the body 10, so that the rotating seat 43 is received by the servomotor 44, and the rotating shaft 42 is rotated with a vertical axis being driven.

According to the number of the five active doors 124, five supporting structure groups 431 are provided from inside to outside in the rotating seat 43 in a concentric arrangement to form five rings. Each supporting structure group 431 has multiple annular spaced supporting structures 432. In the first embodiment of the present invention, each supporting structure 432 is a rectangular socket. When the servomotor 44 drives the rotating shaft 42 to rotate the rotating seat 43, the supporting structures 432 of each supporting structure group 431 will pass sequentially through the corresponding active doors 124, and this enables the transfer assembly 40 to drive the rotating seat 43 to selectively move one of the support structures 432 of the support structure group 431 to right below the selected active door 124.

A container frame 45 is respectively and vertically positioned at each support structure 432, and each container frame 45 is a rack extending in an up-down direction. Each container frame 45 is provided with multiple slots 451 symmetrically disposed at right and left sides thereof. The slots 451 are arranged

at top and bottom intervals, and each slot 451 is a slot inclined at an angle of 45 degrees or 60 degrees. A top of each container frame 45 is inserted in a corresponding support structure 432, and a width of each supporting structure 432 is larger than a width of each container frame 45. Two clips 452 are respectively formed on an inner side and an outer side at a top of each container frame 45. The two clips 452 are snapped and positioned at the top edge of the corresponding support structure 432, so that multiple container frames 45 are suspended and positioned at each supporting structure 432 of the rotating seat 43 and are located in the liquid nitrogen tank 41.

Each support structure 432 can position each one of the container frames 45 and provide a guiding effect to the container frame 45 to move in a vertical direction when each container frame 45 is pulled upwardly. Each container frame 45 can be pulled upwardly relative to the corresponding support structure 432. At the top of each container frame 45, a traction structure 453 is provided. In the first embodiment of the present invention, each traction structure 453 is a pull ring that can be gripped by the lifting clamper 33 of the extracting machine arm 30. At least one container 46 is inserted into one of the multiple slots 451 of each one of the container frames 45. Each container 46 has a surface and an identification tag 461 disposed on the surface of the container 46. Each identification tag 461 corresponds to a biological product stored in the corresponding container 46.

With the above configuration, the transfer assembly 40 drives the rotating seat 43 to selectively move one of the support structures 432 and the container frame 45 positioned on the support structure 432 at the selected active door 124. When the active door 124 is open, the extracting machine arm 30 can

pull the selected container frame 45 upwards out of the active door 124. At this time, the picking machine arm 20 can extend into the connection room 122 to pick the container 46 that is disposed on the selected container frame 45 up.

The liquid nitrogen supply assembly 50 is disposed beside the body 10. An end of the liquid nitrogen supply assembly 50 penetrates into the biological product storage room 121 of the body 10 and is connected to the liquid nitrogen drum 41. The method of injecting liquid nitrogen into the liquid nitrogen drum 41 adjusts and controls the environment temperature of the containers 46 and biological products stored in the biological product storage room 121.

With reference to Figs. 1 to 3, the controller 60 has a gate control module 61 and a controller connection module 62, and is electrically connected to the acquisition environment sensor 112, the tag reader 113, the product environment sensor 1213, the air cleaner 15, the blower 16, the picking machine arm 20, the extracting machine arm 30, the servomotor 44 of the transfer assembly 40, and the liquid nitrogen supply assembly 50. The gate control module 61 is electrically connected and controls each of the active doors 124, the relay door 131, and the pick-up door 132.

The controller 60 receives data of the environmental temperature, humidity, and air cleanliness of the biological product storage room 121 and the carrying chamber 11 sensed by the acquisition environment sensor 112 and the product environment sensor 1213. Determining whether it is necessary to control the liquid nitrogen supply assembly 50 to supplement the liquid nitrogen in the storage zone 12, maintain the temperature in the biological product storage room 121 within the user set ambient temperature and error range, and determine

WHAT IS CLAIMED IS:

1. A low-temperature storage device for an intelligent scientific and technological biological product comprising:

a body having

a carrying chamber disposed in the body;

at least one storage zone disposed in the body and communicating with the carrying chamber, and each storage zone having

a biological product storage room;

a connection room disposed above the biological product storage room and communicating with the carrying chamber; and

a top plate disposed between the biological product storage room and the connection room and having at least two active doors disposed on the top plate;

an object taking port formed through a sidewall of the body and communicating with the carrying chamber; and

a relay carrying room disposed in and communicating with the carrying chamber and the object taking port;

wherein a relay door is disposed between the relay carrying room and the carrying chamber; and

wherein the relay carrying room has a side corresponding to the object taking port and a pick-up door formed through the side of the relay carrying room;

a picking machine arm disposed in the carrying chamber of the body and

having a motion range reaching each storage zone and the object taking port;

at least one extracting machine arm disposed in the connection room of each storage zone respectively, and having a motion range reaching the at least two active doors of each top plate and the biological product storage room of each storage zone;

at least one transfer assembly disposed in the biological product storage room of each storage zone, and each having

a rotating seat rotatably vertically and having multiple supporting structure groups according to a number of the active doors of each top plate and disposed in a concentric arrangement to form at least two rings, and each supporting structure group having multiple supporting structures passed sequentially through each active door; and

a container frame vertically positioned at each support structure and having at least one container;

wherein each transfer assembly drives the rotating seat to selectively move one of the support structures of the support structure group to right below a selected active door;

a liquid nitrogen supply assembly communicating with the biological product storage room of each storage zone and injecting liquid nitrogen into each biological product storage room;

wherein an air cleaner is disposed around a top of the carrying chamber; and

wherein a blower is disposed in the carrying chamber and has an end connected to the relay carrying room by pipeline.

2. The low-temperature storage device as claimed in claim 1, wherein

each transfer assembly has a rotating shaft vertically and rotatably disposed in a center of the biological product storage room and connected to a servomotor;

the servomotor is disposed on the body;

the rotating seat is arranged around a top of the rotating shaft;

each supporting structure of each supporting structure group is a socket; and

each container has a top engaging with each supporting structure.

3. The low-temperature storage device as claimed in claim 2, wherein

each container frame is a rack extending in an up-down direction and has multiple slots symmetrically disposed at right and left sides thereof;

the slots are arranged at top and bottom intervals, and each slot is an inclined slot;

a width of each supporting structure is larger than a width of each container frame;

two clips are respectively formed on an inner side and an outer side at a top of each container frame, are snapped and positioned at a top edge of the corresponding support structure, so that multiple container frames are suspended and positioned at each supporting structure of the rotating seat.

4. The low-temperature storage device as claimed in claim 3, wherein

each transfer assembly has a liquid nitrogen drum disposed in the biological product storage room;

the container frames of each transfer assembly are disposed in the liquid nitrogen drum; and

an end of the liquid nitrogen supply assembly penetrates into the biological product storage room of the body and is connected to the liquid nitrogen drum.

5. The low-temperature storage device as claimed in any one of claims 1 to 4, wherein

the at least two active doors of each top plate are arranged in a row along a straight line at spaced intervals;

each container frame has a traction structure disposed on a top of the container frame;

each extracting machine arm has a linear rail disposed at a top of the connection room and located directly above the at least two active doors;

a railcar is disposed on the linear rail and selectively moved along the linear rail directly above the active doors, respectively; and

a lifting clamper is disposed on the railcar to configure with the traction structure of each container frame.

6. The low-temperature storage device as claimed in claim 5, wherein

each container has a surface and an identification tag disposed on the surface of the container; and

a tag reader is disposed in the carrying chamber of the body to read and identify the identification tag of each container.

7. The low-temperature storage device as claimed in claim 6, wherein

the biological product storage room has a product environment sensor disposed in the biological product storage room;

the body has a controller electrically connected to the product environment sensor, the picking machine arm, the extracting machine arm, and the liquid nitrogen supply assembly; and

the controller has a gate control module electrically connected and controlling each of the active doors, the relay door, and the pick-up door.

8. The low-temperature storage device as claimed in claim 7, wherein

the controller has a controller connection module; and

the low-temperature storage device has a console, and the console has

a console connection module wired connected to the controller connection module of the controller; and

an input/output interface controlling the motions of the picking machine arm and the extracting machine arm.