CLAIMS

What is claimed is:

1. A storage apparatus, wherein the storage apparatus includes a plurality of carrying shelves stored therein, and each of the carrying shelves is configured to carry an object, the storage apparatus comprising:

a main body having an access opening;

a processing device;

a transferring device including a stretchable structure, a rotatable structure, and a holding assembly, wherein the stretchable structure is connected to the rotatable structure, the holding assembly is connected to the stretchable structure, and the holding assembly is configured to hold one of the carrying shelves, wherein the transferring device is electrically connected to the processing device, and the processing device is configured to control the stretchable structure to allow the holding assembly to move forward or backward relative to the rotatable structure, and wherein the processing device is configured to control the rotatable structure to allow the stretchable structure and the holding assembly to rotate, wherein each of the carrying shelves includes a top board, a bottom board, and a plurality of side boards, the top board, the bottom board, and the side boards jointly define an accommodating chamber, the accommodating chamber is configured to carry the object, at least one of the side boards has at least one thru-hole penetrating there-through, and the accommodating chamber is in spatial communication with an external environment through the at least one thru-hole, wherein one of the side boards includes at least one auxiliary structure and at least one abutting structure at a side thereof, and

wherein the holding assembly includes two movable holding members, the two movable holding members are controllable to jointly hold the at least one auxiliary structure, each of the movable holding members includes an engaging portion, and the two engaging portions included by the holding assembly are configured to be engaged with the at least one abutting structure, so that one of the carrying shelves is configured to be hung on the holding assembly;

at least one first chamber disposed surrounding the transferring device and configured to accommodate the carrying shelves;

at least one second chamber disposed surrounding the transferring device, wherein the at least one second chamber is disposed above the at least one first chamber, and the at least one second chamber is configured to accommodate the carrying shelves;

a temperature barrier disposed between the at least one first chamber and the at least one second chamber, wherein the temperature barrier is configured to prevent heat inside the at least one first chamber and heat inside the at least one second chamber from mutual transfer; and

at least one environment adjusting device electrically connected to the processing device, wherein the processing device is configured to control the at least one temperature adjusting device so that a temperature of the at least one first chamber is less than or equal to a first temperature and a temperature of the at least one second chamber is less than or equal to a second temperature, and wherein the second temperature is less than 30℃, the first temperature is greater than -10℃, and the first temperature is less than or equal to the second temperature,

wherein the processing device is configured to control the transferring device to allow the holding assembly to transfer and dispose one of the carrying shelves arranged at the access opening into the at least one first chamber or the at least one second chamber, and the control device is configured to control the transferring device to allow the holding assembly to transfer one of the carrying shelves arranged in the at least one first chamber or the at least one second chamber to the access opening.

2. The storage apparatus according to claim 1, further comprising at least one base seat arranged in the at least one first chamber, wherein the at least one base seat is in an annular shape, and the at least one base seat is configured to carry the carrying shelves, and wherein the at least one base seat includes a plurality of draining grooves and a draining channel, an end of each of the draining grooves is in spatial communication with the draining channel, a liquid in each of the draining grooves is guided to the draining channel, and the liquid in the draining channel is guided and expelled.

3. The storage apparatus according to claim 1, further comprising a movable wall rotating structure, an annular movable wall, and a movable door, wherein the annular movable wall is connected to the movable wall rotating structure, the annular movable wall has an opening, the movable door is movably disposed on the annular movable wall, and the movable door is configured to be operated to cover the opening, or be operated to not cover the opening, wherein the movable wall rotating structure is configured rotate the annular movable wall relative to the at least one first chamber,

and wherein, when the opening is not covered by the movable door, the holding assembly is configured to penetrate through the opening to hold one of the carrying shelves in the at least one first chamber.

4. The storage apparatus according to claim 3, wherein the movable door is an arc-shaped board, the storage apparatus further includes a door opening assembly, the door opening assembly is connected to the rotatable structure, and the door opening assembly and the stretchable structure are configured to jointly follow the rotatable structure to rotate relative to the at least one first chamber, and wherein the door opening assembly is configured to open the movable door so that the opening is exposed, or configured to close the movable door so that the opening is not exposed.

5. The storage apparatus according to claim 1, further comprising an air blowing device electrically connected to the processing device, wherein the air blowing device is controllable by the processing device to blow a gas to the at least one first chamber, and wherein the storage apparatus includes two of the environment adjusting devices respectively defined as a first environment adjusting device and a second environment adjusting device, the first environment adjusting device is configured to control a temperature and a humidity of the at least one first chamber, and the second environment adjusting device is configured to control a temperature and a humidity of the at least one second chamber.

6. The storage apparatus according to claim 5, further comprising an air

suction device connected to the air blowing device, wherein the air suction device is configured to suction air outside the storage apparatus, and the air blowing device is configured to blow the air suctioned by the air suction device to the at least one first chamber.

7. The storage apparatus according to claim 1, further comprising at least one first base seat arranged in the at least one first chamber, wherein the at least one first base seat is in an annular shape, and the at least one first base seat is configured to carry the carrying shelves, wherein the at least one first base seat includes a plurality of positioning structures, and the positioning structures are configured to limit a movement range of the carrying shelves in the at least one first chamber relative to the at least on first base seat, and wherein the storage apparatus further includes a plurality of sensors, each of the sensors is electrically connected to the processing device, the sensors are disposed on the at least one first base seat, and each of the sensors is configured to sense whether each of the carrying shelves in the at least one first chamber is correctly disposed on the at least one base seat.

8. The storage apparatus according to claim 1, further comprising a reading device configured to read an identification unit to generate an identification data, wherein the identification unit is configured to be disposed on the object or one of the carrying shelves, wherein the processing device is electrically connected to the reading device, wherein the processing device is configured to control the transferring device to transfer one of the carrying shelves arranged at the access opening into the at least one first

chamber or the at least one second chamber according to the identification data, and wherein the processing device is configured to control the transferring device to transfer one of the carrying shelves arranged in the at least one first chamber or one of the carrying shelves arranged in the at least one second chamber to the access opening according to the identification data.

9. The storage apparatus according to claim 8, further comprising an access door and a carrying platform, wherein the access door is controllable to be open so that the at least one second chamber is in spatial communication with an external environment, or is controllable to be closed so that the at least one second chamber is not in spatial communication with the external environment, and wherein the carrying platform is arranged outside the at least one second chamber, the carrying platform is configured to carry one of the carrying shelves, the reading device is disposed near the carrying platform, and the reading device is configured to read the identification unit of one of the carrying shelves disposed on the carrying platform.

10. The storage apparatus according to claim 1, further comprising an access door, a carrying platform, and at least one carrying platform sensor, wherein the access door is controllable to be open so that the at least one second chamber is in spatial communication with an external environment, or is controllable to be closed so that the at least one second chamber is not in spatial communication with the external environment, and wherein the carrying platform is arranged outside the at least one second chamber, the

carrying platform is configured to carry one of the carrying shelves, the carrying platform sensor is configured to sense whether the carrying platform has one of the carrying shelves disposed thereon and generate a sensing data accordingly, and the processing device is configured to control the transferring device and the access door according to the sensing data.

11. The storage apparatus according to claim 1, wherein the processing device is configured to implement an unfreezing process, wherein, when the processing device implements the unfreezing process, the processing device controls the transferring device to transfer one of the carrying shelves and the object carried by the one of the carrying shelves that are arranged at the access opening to the at least one first chamber, and wherein, after the one of the carrying shelves and the object carried by the one of the carrying shelves are disposed in the at least one first chamber for a predetermined time period, the processing device controls the transferring device to transfer and dispose the one of the carrying shelves and the object carried by the one of the carrying shelves from the at least one first chamber into the at least one second chamber.

12. A storage system comprising:

a storage apparatus including a plurality of carrying shelves stored therein, wherein each of the carrying shelves is configured to carry an object, and the storage apparatus includes:

a main body including a carrying platform and an access opening, wherein the carrying platform is provided so that one of the

carrying shelves is configured to be disposed thereon;

a processing device;

a transferring device including a stretchable structure, a rotatable structure, and a holding assembly, wherein the stretchable structure is connected to the rotatable structure, the holding assembly is connected to the stretchable structure, and the holding assembly is configured to hold one of the carrying shelves, wherein the transferring device is electrically connected to the processing device, and the processing device is configured to control the stretchable structure to allow the holding assembly to move forward or backward relative to the rotatable structure, and wherein the processing device is configured to control the rotatable structure to allow the stretchable structure and the holding assembly to rotate, wherein each of the carrying shelves includes a top board, a bottom board, and a plurality of side boards, the top board, the bottom board, and the side boards jointly define an accommodating chamber, the accommodating chamber is configured to carry the object, at least one of the side boards has at least one thru-hole penetrating there-through, and the accommodating chamber is in spatial communication with an external environment through the at least one thru-hole, wherein one of the side boards includes at least one auxiliary structure and at least one abutting structure at a side thereof, and wherein the holding assembly includes two movable holding members, the two movable holding members are controllable to jointly hold the at least one auxiliary structure, each of the movable holding members includes an engaging portion, and the two engaging

portions included by the holding assembly are configured to be engaged with the at least one abutting structure, so that one of the carrying shelves is configured to be hung on the holding assembly;

at least one first chamber disposed surrounding the transferring device and configured to accommodate the carrying shelves;

at least one second chamber disposed surrounding the transferring device, wherein the at least one second chamber is disposed above the at least one first chamber, and the at least one second chamber is configured to accommodate the carrying shelves;

a temperature barrier disposed between the at least one first chamber and the at least one second chamber, wherein the temperature barrier is configured to prevent heat inside the at least one first chamber and heat inside the at least one second chamber from mutual transfer; and

at least one environment adjusting device electrically connected to the processing device, wherein the processing device is configured to control the at least one temperature adjusting device so that a temperature of the at least one first chamber is less than or equal to a first temperature and a temperature of the at least one second chamber is less than or equal to a second temperature, and wherein the second temperature is less than 30℃, the first temperature is greater than -10℃, and the first temperature is less than or equal to the second temperature,

wherein the processing device is configured to control the transferring device so that the holding assembly allows one of the

carrying shelves arranged at the carrying platform to pass through the access open and be moved and disposed into the at least one first chamber or the at least one second chamber, and wherein the processing device is configured to control the transferring device so that the holding assembly allows one of the carrying shelves arranged in the at least one first chamber or the at least one second chamber to pass through the access opening and be disposed on the carrying platform;

a transferring apparatus configured to transfer one of the carrying shelves and the object carried by the one of the carrying shelves to the carrying platform of the storage apparatus; and

a processing apparatus configured to receive a requirement data, wherein the processing apparatus is configured to control the transferring apparatus to take out and transfer at least one of the carrying shelves and the object carried by the at least one of the carrying shelves to the carrying platform according to the requirement data, wherein the processing device is configured to control the transferring device to transfer the at least one of the carrying shelves and the object carried by the at least one of the carrying shelves that are arranged at the carrying platform into the at least one first chamber according to the requirement data, and wherein, after the at least one of the carrying shelves and the object carried by the at least one of the carrying shelves are disposed in the at least one first chamber for a predetermined time period, the processing device is configured to control the transferring device to transfer the at least one of the carrying shelves and the object carried by the at least one of the carrying shelves into the at

least one second chamber according to the requirement data.