CLAIMS

What is claimed is:

1. A warehousing apparatus, comprising:

a temporary storage layer board, wherein the temporary storage layer board is used to provide a temporary storage position;

a plurality of shelves, wherein each of the shelves comprises at least one storage layer board and a plurality of columns arranged at an interval in a horizontal direction, the storage layer board is used to provide a storage position, and the storage layer board is arranged at an interval with the temporary storage layer board in a vertical direction through the columns;

a first robot channel for a first robot to drive, wherein the first robot is used to access a cargo on the temporary storage layer board; and

a second robot channel for a second robot to drive, wherein the second robot is used to transfer the cargo between the temporary storage layer board and the storage layer board,

wherein the first robot has a furcal arm, the temporary storage layer board is provided with a furcal groove, and the furcal groove is used to cooperate with the furcal arm of the first robot;

wherein in a case of accessing a cargo on the temporary storage layer board, the furcal arm of the first robot cooperates with the furcal groove of the temporary storage layer board to access the cargo.

2. The warehousing apparatus of claim 1, wherein the first robot channel comprises a cargo access channel and the cargo access channel is located below the temporary storage layer board.

3. The warehousing apparatus of claim 2, wherein the cargo access channel is further used for the first robot to drive in a case that the first robot is unloaded.

4. The warehousing apparatus of claim 1, wherein the columns are arranged on a periphery of the storage layer board, the first robot channel comprises a first driving channel, and the first driving channel is located between the temporary storage layer board and the columns.

5. The warehousing apparatus of claim 1, wherein the first robot channel comprises a second driving channel, and the second driving channel is located between the temporary storage layer board and a column located at a first end of the temporary storage layer board.

6. The warehousing apparatus of claim 5, wherein the temporary storage layer board comprises a plurality of temporary storage boards for providing the temporary storage position, the first robot channel comprises a third driving channel, and the third driving channel is located between at least two of the temporary storage boards.

7. The warehousing apparatus of claim 6, wherein the first robot channel comprises a fourth driving channel; the fourth driving channel is located between two adjacent shelves, and connects two third driving channels or two second driving channels.

8. The warehousing apparatus of any one of claims 1 to 7, wherein the second robot channel is located on a periphery of the shelves and comprises a channel between adjacent shelves.

9. The warehousing apparatus of any one of claims 1 to 7, wherein the temporary storage layer board is arranged on the shelves.

10. The warehousing apparatus of claim 9, further comprising a docking platform, wherein the first robot channel comprises a fifth driving channel, the fifth

driving channel is located between the docking platform and the shelves, and the docking platform comprises:

a platform body; and

a slope platform, wherein a slope surface of the slope platform comprises a concave slope surface and a convex slope surface that are arranged in a direction from a slope bottom to a slope top, and a top edge of the concave slope surface is smoothly connected to a bottom edge of the convex slope surface;

wherein the slope platform is arranged on one side of the platform body, so that the slope surface is smoothly engaged with a top surface of the platform body.

11. The warehousing apparatus of claim 10, wherein a projection of the concave slope surface in the vertical direction is a first arc, a projection of the convex slope surface in the vertical direction is a second arc, and an arc radius of the first arc is greater than or equal to an arc radius of the second arc.

12. The warehousing apparatus of claim 10, wherein a side wall of the platform body opposite to the slope platform is provided with a clamping groove, a side wall of the slope platform opposite to the platform body is provided with a clamping strip, and the clamping strip is clamped in the clamping groove, so that the slope platform is clamped with the platform body; the clamping groove is arranged along a length direction of the platform body, and the clamping strip is arranged along a width direction of the slope platform; there are at least two slope platforms, and clamping strips of two of the slope platforms is slidable along the clamping groove to adjust a spacing.

13. An in-warehouse control method, applied to the warehousing apparatus of any one of claims 1 to 12, comprising:

determining a target temporary storage position according to a target storage position of a target cargo;

instructing a first robot to transfer the target cargo to the target temporary storage position; and

in a case that a transfer completion signal sent by the first robot is received, instructing a second robot to transfer the target cargo from the target temporary storage position to the target storage position.

14. The method of claim 13, wherein the determining the target temporary storage position according to the target storage position of the target cargo, comprises:

determining a first idle temporary storage position closest to the target storage position;

instructing the first robot to drive toward the first idle temporary storage position;

during a driving process of the first robot, updating an occupancy status of each temporary storage position based on a preset time interval;

in a case that a time when the first robot drives to the first idle temporary storage position is greater than a first preset time threshold, determining whether there is a second idle temporary storage position closest to the target storage position according to an updated occupancy status of each temporary storage position; and

in a case that there is the second idle temporary storage position, determining the second idle temporary storage position as the target temporary storage position.

15. The method of claim 13, wherein the instructing the first robot to transfer the target cargo to the target temporary storage position, comprises:

determining a first transfer route from the first robot channel according to position information between the first robot and the target temporary storage position; and

instructing the first robot to drive to a lower side of the target temporary storage position along the first transfer route.

16. The method of claim 15, wherein the first robot channel comprises a cargo access channel located below the temporary storage layer board, and the method further comprises:

in a case that the first robot is unloaded, determining an unloaded driving route from the first robot channel; and

instructing the first robot to drive along the unloaded driving route.

17. The method of claim 13, wherein the instructing the second robot to transfer the target cargo from the target temporary storage position to the target storage position, comprises:

determining a second transfer route from the second robot channel according to position information between the second robot and the target temporary storage position; and

instructing the second robot to drive to a side of the target temporary storage position along the second transfer route.

18. An ex-warehouse control method, applied to the warehousing apparatus of any one of claims 1 to 12, comprising:

instructing a second robot to transfer a target cargo away from a current storage position;

determining a target temporary storage position according to a position of the second robot;

instructing the second robot to transfer the target cargo to the target temporary storage position; and

in a case that a transfer completion signal sent by the second robot is received, instructing the first robot to transfer the target cargo away from the target temporary storage position.

19. The method of claim 18, wherein the determining the target temporary storage position according to the position of the second robot, comprises:

determining a first idle temporary storage position closest to the second robot;

instructing the second robot to drive toward the first idle temporary storage position;

during a driving process of the second robot, updating an occupancy status of each temporary storage position based on a preset time interval;

in a case that a time when the second robot drives to the first idle temporary storage position is greater than a second preset time threshold, determining whether there is a second idle temporary storage position closest to the second robot according to an updated occupancy status of each temporary storage position; and

in a case that there is the second idle temporary storage position, determining the second idle temporary storage position as the target temporary storage position.

20. The method of claim 18, wherein the instructing the first robot to transfer the target cargo away from the target temporary storage position, comprises:

determining a first transfer route from the first robot channel according to position information between the first robot and the target temporary storage position; and

instructing the first robot to drive to a lower side of the target temporary storage position along the first transfer route.

21. A warehousing system, comprising:

the warehousing apparatus of any one of claims 1 to 12;

a control device, comprising a processor and a memory, wherein the memory stores instructions, and the instructions, when being loaded and executed by the processor, implement the method of any one of claims 13 to 20;

a first robot, driving on ~~a~~the first robot channel; and

a second robot, driving on ~~a~~the second robot channel.