Claims

1. A transport robot, comprising:

a body;

a lifting assembly arranged on the body; and

a first climbing assembly arranged on the lifting assembly and located on only one side of the body in a horizontal direction;

wherein the lifting assembly is configured to drive the first climbing assembly to ascend or descend;

wherein the first climbing assembly is configured to be docked with a second climbing assembly of a rack after being driven to ascend, and to climb along the second climbing assembly in a vertical direction.

2. The transport robot according to claim 1, wherein the first climbing assembly comprises a first driver, a transmission mechanism, and a first engaging mechanism, wherein two ends of the transmission mechanism are respectively in transmission connection with the first driver and the first engaging mechanism, the first driver is configured to control, through the transmission mechanism, the first engaging mechanism to move, and the first engaging mechanism is configured to be engaged with the second climbing assembly.
3. The transport robot according to claim 2, wherein the first engaging mechanism comprises a synchronous belt, a plurality of protrusions are arranged on the synchronous belt, and the synchronous belt is configured to be engaged with the second climbing assembly through the plurality of protrusions.
4. The transport robot according to claim 2, wherein the first engaging mechanism comprises a chain wheel, and the chain wheel is configured to be engaged with the second climbing assembly.
5. The transport robot according to claim 4, wherein the transmission mechanism comprises a first driven wheel, a second driven wheel, and a transmission belt, the first driven wheel is coaxially connected to a driving shaft of the first driver, the second driven wheel is coaxially connected to the chain wheel, and the first driven wheel and the second driven wheel are in transmission connection through the transmission belt.

6. The transport robot according to claim 4, wherein the first climbing assembly further comprises a support arm, and the chain wheel is rotatably arranged at an end of the support arm away from the body.
7. The transport robot according to claim 6, wherein a first roller is arranged on the support arm, a first surface is arranged on a side of the second climbing assembly that fits with the first climbing assembly, and the first roller is configured to be in rolling contact with the first surface; and/or

a second roller is arranged on the support arm, a second surface is arranged on a side of the second climbing assembly facing away from the side that fits with the first climbing assembly, and the second roller is configured to be in rolling contact with the second surface.

8. The transport robot according to any one of claims 1 to 7, wherein the body comprises a turntable, a chassis assembly, a second driver, and a third driver, wherein

the turntable is rotatably connected to the chassis assembly, and the lifting assembly is arranged on the turntable;

the second driver is connected to the turntable, and is configured to control the turntable to rotate relative to the chassis assembly; and

the chassis assembly is provided with a walking wheel assembly, and the third driver is connected to the walking wheel assembly, the third diver being configured to control the walking wheel assembly to go straight or steer, to drive the chassis assembly to rotate.

9. The transport robot according to claim 8, wherein a shape of a projection of the chassis assembly in a horizontal plane is circular.
10. The transport robot according to any one of claims 1 to 9, wherein the transport robot further comprises a fork assembly, the fork assembly is configured to retrieve or place a material, the fork assembly comprises a base, the base is configured to temporarily store the material, and the base is arranged on the lifting assembly.
11. The transport robot according to claim 10, wherein the lifting assembly comprises a scissor-cross rod structure and a fourth driver, and the fourth driver is connected to the scissor-cross rod structure and is configured to drive the scissor-cross rod structure to ascend or descend.
12. The transport robot according to claim 11, wherein the scissor-cross rod structure comprises a driving rod, a first connecting rod, and a second connecting rod, and a middle portion of the first connecting rod is rotatably connected to a middle portion of the second connecting rod;

an end of the first connecting rod is rotatably connected to the base, and the other end of the first connecting rod is slidably connected to the body;

an end of the second connecting rod is slidably connected to the base, and the other end of the second connecting rod is rotatably connected to the body;

an end of the driving rod is slidably connected to the body, and the other end of the driving rod is rotatably connected to middle portions of the first connecting rod and the second connecting rod; and

the fourth driver is connected to the driving rod, and is configured to control the end of the driving rod that is connected to the body to slide in a direction perpendicular to a lifting direction of the lifting assembly.

13. A rack, wherein a second climbing assembly is arranged on the rack, and the second climbing assembly is configured to fit with the first climbing assembly of the transport robot according to any one of claims 1 to 11, so that the transport robot is capable of climbing on the rack in a vertical direction.
14. The rack according to claim 13, wherein the second climbing assembly comprises a second engaging mechanism, and the second engaging mechanism is configured to be engaged with the first engaging mechanism of the transport robot, so that the transport robot is capable of climbing on the rack in the vertical direction.
15. The rack according to claim 14, wherein the rack comprises a longitudinal beam, the second climbing assembly further comprises a mounting base, the mounting base is connected to the longitudinal beam, and the second engaging mechanism is connected to the mounting base;

a groove is provided on the mounting base, the second engaging mechanism is arranged in the groove, and in a horizontal direction, an end surface of a side wall of the groove is configured to come into contact with a first roller of the first climbing assembly; and/or

a guide rib is provided on an outer side wall of the mounting base, the guide rib extends in the vertical direction, and a surface of a side of the guide rib facing away from the transport robot is configured to come into contact with a second roller of the first climbing assembly.

16. The rack according to claim 13, wherein a channel for the transport robot to walk is arranged at a bottom of the rack, and the second climbing assembly is located above the channel.
17. The rack according to claim 13, wherein a plurality of support columns are further arranged at a bottom of the rack, a channel is formed between the support columns, and a distance between

two adjacent support columns is greater than a maximum length dimension of the transport robot in a horizontal direction.

18. The rack according to claim 16 or 17, wherein a height of the channel is greater than a height of the transport robot before the lifting assembly is lifted, and the height of the channel is less than a maximum height of the transport robot after the lifting assembly is lifted.
19. A warehousing system, comprising the transport robot according to any one of claims 1 to 12 and the rack according to any one of claims 13 to 18, wherein the transport robot is configured to climb on the rack in the vertical direction through fitting between the first climbing assembly and the second climbing assembly on the rack.
20. A docking method, applied to the warehousing system according to claim 19, the method comprising:

controlling a transport robot to move to a docking position;

controlling a lifting assembly of the transport robot to ascend to a target height, so that a first climbing assembly of the transport robot is docked with a second climbing assembly on a rack; and

controlling the first climbing assembly to climb on the second climbing assembly in a vertical direction to reach a target position for retrieving or placing a container.