on the fixing bracket by a rotating shaft, one end of the jaw being connected to the clamping drive, the clamping drive being capable of driving the jaws to rotate, so that the two jaws are capable of clamping on two sides of the container trailer; and each of the jaws is provided with at least one hook, the at least one hook being used to hook on a side of the container trailer away from the rotating shaft.

[0035] The clamping drive may include a cylinder or a hydraulic cylinder, one end of the clamping drive being hinged to the jaw and the other end being hinged to the fixing bracket.

[0036] The fixing bracket is further provided with a top stop portion pressed against a side of the container trailer adjacent to the rotating shaft.

[0037] The clamping fixture may further include a catch for catching the bottom of the container trailer when the container trailer is in an upright or inclined storage condition.

[0038] The stereoscopic garage for a container trailer may further include a fence rail, the fence rail including at least two beams, the container trailer being movable into between the two beams, and the beams being capable of preventing the container trailer from tipping over.

[0039] The fence rail may include a high-position fence rail and a low-position fence rail for respectively preventing container trailers with different trailer lengths from tipping over.

[0040] The fence rail may be located at 2/3 upright height of the container trailer.

[0041] The stereoscopic garage for a container trailer may further include a control system, a power unit of the turning mechanism and a power unit of the moving mechanism being connected to the control system, and the control system being used to control the operation of the turning mechanism and the movement mechanism power unit power unit.

[0042] A power unit of the limiting mechanism is coupled to the control system, and the control system is used for controlling the operation of the limiting mechanism.

[0043] According to the above solution, the stereoscopic garage for a container trailer of the present invention may store the container trailer in an upright or inclined state, which may effectively utilize the placement space, increase the storage capacity per unit area, and may effectively improve the efficiency of the trailer storage and– retrieving operation, thus the loading and unloading of the trailer head is convenient and safe.

BRIEF DESCRIPTION OF THE DRAWINGS

[0044] Fig. 1 is a schematic view of the structure of a container trailer.

[0045] Fig. 2 is a front view showing the state of use of a stereoscopic garage for a container trailer of the present invention.

[0046] Fig. 3 is a perspective view of Fig. 2.

to the hook shank portion 227a is a wedge surface 227d. The rotating hook drive 228 includes a cylinder or hydraulic cylinder. In the present embodiment, the rotating hook drive 228 is an oil cylinder. One end of the rotating hook drive 228 is hinged to the rotating hook 227 and the other end is hinged to the mounting bracket 225. Of course, the rotating hook drive 228 may also be a motor driven system powered by a motor.

[0071] The moving mechanism includes at least one trolley 30. The limiting mechanism includes at least one clamping fixture 31 disposed on each of the trolleys 30. A plurality of container trailers 1 may be stored using a plurality of trolleys 30. Each of the trolleys 30 may also clamp and fix a plurality of container trailers 1. In the present embodiment, only one clamping fixture 31 is provided on each of the trolleys 30. As shown in Fig. 14, when conducting trolley loading, the container trailer 1 is first shifted to the inbound station by the trailer head. The trailer head is separated from the container trailer 1. The boom 210 moves under control and the robot unit 220 is controlled to grasp the container trailer 1. The container trailer 1 is then lifted by the boom 210, as shown in Fig. 15, and moved over the trolley 30, as shown in Fig. 16. After the container trailer 1 moves down and places on the trolley 30, the container trailer 1 is limited and fixed by the clamping fixture 31 on the trolley 30. The trolley 30 is then controlled to move to the storage station. When unloading, the trolley 30 is controlled to move to the outbound station. The clamping fixture 31 releases the container trailer 1. The container trailer 1 is lifted, moved, rotated, and finally laid flat by the boom 210. Then the trailer head is mounted to drive away.

[0072] The stereoscopic garage for a container trailer also includes a rail 301 for the trolley 30 to travel. The rail 301 may be a linear rail or curved rail. The trolley 30 may travel on the rail 301 or may be parked on the rail 301. A trolley guide plate 32 is disposed on either side of the rail 301. The trolley 30 is guided and limited on either side by the trolley guide plate 32 to prevent the trolley 30 from being derailed.

[0073] In the present embodiment, the rail 301 includes two parallel first sets of tracks 31a and two parallel second sets of tracks 31b perpendicularly intersecting the first sets of tracks 31a. The first set of tracks 31a and the second set of tracks 31b include two parallel monorails 310, respectively. The bottom of the trolley 30 is provided with a first set of wheels 32a for traveling on the first set of tracks 31a and a second set of wheels 32b for traveling on the second set of tracks 31b, so that when traveling to the intersection position on one of the first set of tracks 31a and the second set of tracks 31b, the trolley 30 may reverse to another set of tracks. In addition, the arrangement of the rail 301 may be various, such as a fishbone shape as shown in Fig. 20, or a mesh shape as shown in Fig. 21, which will not be described again.

[0074] The stereoscopic garage for a container trailer is also provided with a service station 300 located on the rail 301. The stereoscopic garage for a container trailer also

includes a fence rail 40. The fence rail 40 includes at least two beams 41 that are mounted on a beam frame 42. The container trailer 1 may be moved into between the two beams 41 for preventing the container trailer 1 from tipping over. The stereoscopic garage for a container trailer also includes a beam spreader 50 that includes a hanging beam 51 and a hanging hoist 52. The hanging beam 51 is at least partially positioned above the rail 301 at the service station 300. When the trolley 30 fails, the other trolleys may be driven to move the faulty trolley to the service station 300, and then the hanging hoist 52 may be used to lift the container trailer 1 on the trolley for repair.

[0075] When the rail 301 includes the first set of tracks 31a and the second set of tracks 31b intersecting with each other, the first set of tracks 31a or the second set of tracks 31b includes an extension 31c extending from the intersection position of the two. As in the present embodiment, for example, the extension 31c is provided on the first set of tracks 31a, and the service station 300 is located on the extension 31c. By disposing the service station 300 on the extension 31c, the troubled vehicle 30 may be moved to the extension 31c for service without hindering the normal operation of the other trolleys 30 in other areas than the extension 31c. When the faulty trolley 30 is repaired, the hanging hoist 52 is controlled to lower the container trailer 1 to the repaired trolley 30, and controls the trolley 30 to return to the normal operation area.

[0076] In this embodiment, an end of one track of the two first set of tracks 31a is an inbound station and an end of the other track is an outbound station. Of course, the loading function and the unloading function of the boom at the inbound station and the outbound station may be interchanged, and the inbound station and the outbound station may also be interchanged. In addition, in other embodiments, for example, the rail 301 includes only one set of tracks, the two ends of the set of tracks may be an inbound station and an outbound station, respectively, or the inbound and outbound stations may also be provided at one end of the set of tracks.

[0077] The trolley 30 is provided with a travel drive 33. As shown in Fig. 13, the travel drive 33 may be a drive motor disposed on the trolley 30 and powered by a battery 34. The drive motor is capable of driving the axles 324 of the first set of wheels 32a and the second set of wheels 32b at the lower end of the trolley 30 to rotate or stop rotating by a gear chain transmission device, thereby moving on one of the first set of tracks 31a and the second set of tracks 31b and reversing to another set of tracks at the intersection position thereof. The axles 324 of the first set of wheels 32a and the second set of wheels 32b are mounted on a lifting plate 321, respectively. The lifting plate 321 is respectively driven by a lifting drive 322 to be lifted and lowered during the reversing process. The travel drive 33 is also fixed to the lifting plate 321 so as to be lifted and lowered in synchronization with the lifting plate 321. Taking the example shown in Fig. 13, in the state shown in the figure, the second set of wheels 32b is in a lowered state. The lifting

Claims

WHAT IS CLAIMED IS:

1. A stereoscopic garage for a container trailer, comprising:

a turning mechanism disposed at an inbound station and an outbound station for turning the container trailer from a state of lying on the ground to an upright or inclined state, and turning from an upright or inclined state to a state of lying on the ground;

a moving mechanism for moving the container trailer when the container trailer is in an overturned or upright state, and moving the container trailer from the inbound station to a storage station and from the storage station to the outbound station; and

a limiting mechanism for limiting the container trailer to the storage station.

2. The stereoscopic garage for a container trailer according to claim 1, wherein the turning mechanism includes a lifting device and a turning device disposed on the lifting device, the turning device including a robot unit for grasping the container trailer and a rotating drive unit for driving rotation of the robot unit, and the lifting device being capable of lifting, moving or lowering the container trailer,

the moving mechanism includes at least one trolley, and the limiting mechanism includes at least one clamping fixture provided on the at least one trolley,

wherein each of the robot units includes a mounting bracket, at least one rotating hook mounted on the mounting bracket by a mounting shaft, and a rotating hook drive, the rotating hook drive being capable of driving the rotating hook to rotate and protrude into between two longitudinal beams of the container trailer to fasten one of the two longitudinal beams at the outside.

3.2 The stereoscopic garage for a container trailer according to claim 21, wherein the lifting device includes two booms arranged side by side, each of the booms being provided with a robot unit and a rotating drive unit; two of the robot units being capable of clamping on the left and right sides of the container trailer; the robot unit being mounted on the boom by a rotating shaft, a connecting rod being fixed on the rotating shaft, and the connecting rod being connected to the rotating drive unit.

43. The stereoscopic garage for a container trailer according to claim 32, wherein the rotating drive unit is a cylinder or a hydraulic cylinder, one end of the rotating drive unit being hinged to the connecting rod link and the other end being hinged to the boom.

5. The stereoscopic garage for a container trailer according to any one of claims 2 to 4, wherein each of the robot units includes a mounting bracket, at least one rotating

~~hook mounted on the mounting bracket by a mounting shaft, and a rotating hook drive, the rotating hook drive being capable of driving the rotating hook to rotate and protrude into between two longitudinal beams of the container trailer to fasten the longitudinal beams at its outside.~~

~~6~~4. The stereoscopic garage for a container trailer according to claim ~~5~~1, wherein the rotating hook includes a hook shank portion, a hook bend portion and a hook deep portion, the hook shank portion and the hook deep portion being respectively pressed against two opposite sides of the longitudinal beam, and the hook bend portion being pressed against an inner side surface of the longitudinal beam.

~~7~~5. The stereoscopic garage for a container trailer according to claim ~~6~~4, wherein a surface of the hook deep portion opposite to the hook shank portion is a wedge surface.

~~8~~6. The stereoscopic garage for a container trailer according to ~~any one of~~ claim~~s 5 to 7~~ 1, wherein the rotating hook drive includes a cylinder or a hydraulic cylinder, one end of the rotating hook drive being hinged to the rotating hook, and the other end being hinged to the mounting bracket.

~~9~~7. The stereoscopic garage for a container trailer according to ~~any one of~~ claim~~s 2-8~~2, wherein the boom includes a base, a forearm, a rear arm hinged to the base at one end and hinged to the middle of the forearm at the other end, a rear arm drive cylinder with two ends being respectively hinged to the base and the middle of the rear arm, and a forearm drive cylinder with two ends being respectively hinged to an end of the forearm and the middle of the rear arm.

~~10. The stereoscopic garage for a container trailer according to any one of claims 1 to 9, wherein the moving mechanism includes at least one trolley, and the limiting mechanism includes at least one clamping fixture provided on each of the trolleys.~~

~~11~~8. The stereoscopic garage for a container trailer according to claim ~~10~~1, further comprising a rail for the trolley to travel.

~~12~~9. The stereoscopic garage for a container trailer according to claim ~~11~~8, wherein the rail comprises a linear rail or curved rail.

~~13~~10. The stereoscopic garage for a container trailer according to claim ~~11~~8, wherein a trolley guide plate is provided on either side of the rail.

~~14~~11. The stereoscopic garage for a container trailer according to claim ~~11~~8, wherein the rail includes a first set of tracks and a second set of tracks intersecting with each other, the bottom of the trolley being provided with a first set of wheels traveling on the first set of tracks and a second set of wheels traveling on the second set of tracks, such that the trolley is capable of reversing into another set of tracks when traveling on one of the first set of tracks and the second set of tracks to the intersection of the two sets of tracks.

~~15~~12. The stereoscopic garage for a container trailer according to claim ~~14~~11, wherein the axles of the first set of wheels and the second set of wheels are respectively connected to a power output of a lifting drive.

~~16~~13. The stereoscopic garage for a container trailer according to claim ~~15~~12, wherein the lifting drive includes a cylinder or a hydraulic cylinder; the trolley is provided with a travel drive, and the travel drive and the axles are mounted on a lifting plate, the lifting plate being coupled to the cylinder or the hydraulic cylinder.

~~17~~14. The stereoscopic garage for a container trailer according to claim ~~14~~11, wherein the first set of tracks and the second set of tracks intersect perpendicularly to each other.

~~18~~15. The stereoscopic garage for a container trailer according to ~~any of~~ claim~~s 11-17~~11, wherein the first set of tracks has at least two tracks disposed in parallel.

~~19~~16. The stereoscopic garage for a container trailer according to claim ~~18~~15, wherein an end of either track of the first set of tracks is an inbound station and an end of the other track is an outbound station.

~~20~~17. The stereoscopic garage for a container trailer according to ~~any one of~~ claim~~s 10 to 19~~ 1, wherein the stereoscopic garage for a container trailer is further provided with a service station.

~~21~~18. The stereoscopic garage for a container trailer according to claim ~~20~~17, further comprising a beam spreader, the beam spreader including a hanging beam and a hanging hoist, the hanging beam being at least partially located above the rail for the trolley to travel at the service station.

~~22~~19. The stereoscopic garage for a container trailer according to claim ~~21~~18, wherein the rail includes a first set of tracks and a second set of tracks intersecting with each other, the first set of tracks or the second set of tracks including extensions extending at the intersection thereof, and the service station being located on the extension.

~~23~~20. The stereoscopic garage for a container trailer according to any one of claims 1-12 and ~~10~~ 14 to ~~22~~19, wherein the trolley is provided with a travel drive.

~~24~~21. The stereoscopic garage for a container trailer according to claim ~~22~~20, wherein the travel drive includes a drive motor, the drive motor being powered by a battery.

~~25. The stereoscopic garage for a container trailer according to claim 1, wherein the moving mechanism includes a beam spreader, the beam spreader including a hanging beam and a hanging hoist; and the limiting mechanism includes a clamping fixture disposed at the storage station.~~

~~26. The stereoscopic garage for a container trailer according to claim 1, wherein the stereoscopic garage for a container trailer is provided with a beam spreader, the beam spreader including a hanging beam and a hanging hoist; the turning mechanism and the moving mechanism are the beam spreader; and the limiting mechanism includes a clamping fixture disposed on the storage station.~~

~~27~~22. The stereoscopic garage for a container trailer according to any one of claims ~~10~~ 1 to ~~26~~19, wherein the clamping fixture includes a fixing bracket and a jaw provided on the fixing bracket.

~~28~~23. The stereoscopic garage for a container trailer according to claim ~~27~~22, wherein there are at least two jaws oppositely disposed, each of the jaws being mounted on the fixing bracket by a rotating shaft, one end of the jaw being connected to ~~the~~ a clamping drive, the clamping drive being capable of driving the jaws to rotate, so that the two jaws are capable of clamping on two sides of the container trailer; and wherein each of the jaws is provided with at least one hook, the at least one hook being used to hook on a side of the container trailer away from the rotating shaft.

~~29~~24. The stereoscopic garage for a container trailer according to claim ~~28~~23, wherein the clamping drive includes a cylinder or a hydraulic cylinder, one end of the

clamping drive being hinged to the jaw and the other end being hinged to the fixing bracket.

~~30~~25. The stereoscopic garage for a container trailer according to claim ~~28~~23, wherein the fixing bracket is further provided with a top stop portion pressed against a side of the container trailer adjacent to the rotating shaft.

~~31~~26. The stereoscopic garage for a container trailer according to ~~any of~~ claim~~s~~ ~~27-30~~22, wherein the clamping fixture further includes a catch for catching the bottom of the container trailer when the container trailer is in an upright or inclined storage condition.

~~32~~27. The stereoscopic garage for a container trailer according to any one of claims 1 to ~~31~~19, further comprising a fence rail, the fence rail including at least two beams, the container trailer being movable into between the two beams, and the beams being capable of preventing the container trailer from tipping over.

~~33~~28. The stereoscopic garage for a container trailer according to claim ~~32~~27, wherein the fence rail includes a high-position fence rail and a low-position fence rail for respectively preventing container trailers of different trailer lengths from tipping over.

~~34~~29. The stereoscopic garage for a container trailer according to claim ~~31~~27, wherein the fence rail is located at 2/3 upright height of the container trailer.

~~35~~30. The stereoscopic garage for a container trailer according to any one of claims 1 to ~~34~~19, further comprising a control system, a power unit of the turning mechanism and a power unit of the moving mechanism being connected to the control system, and the control system being used to control the operation of the turning mechanism and the movement mechanism.

~~36~~31. The stereoscopic garage for a container trailer according to claim ~~35~~30, wherein a power unit of the limiting mechanism is coupled to the control system, and the control system is used for controlling the operation of the limiting mechanism.