

STEREOSCOPIC GARAGE FOR CONTAINER TRAILER

TECHNICAL FIELD

[0001] The present invention relates to a stereoscopic garage for a container trailer which belongs to the field of garages.

BACKGROUND

[0002] Container refers to a large loading vessel with certain strength, rigidity and specifications for turn-around. When a container is used to transfer goods, the goods may be directly loaded in the shipper's warehouse, and shipped to the consignee's warehouse for unloading. When vehicle or ship is changed midway, the goods need not be taken out of the container. Containers are widely used in ports and wharfs. Container transfers are usually carried out using container trailers. As shown in Fig. 1, a container trailer 1 includes a cradle 101 and a wheel 102. The wheel 102 is collectively mounted under one side of the cradle 101, and the other side of the cradle 101 is used for hooking on a tractor. The cradle 101 is used for supporting the container. The tractor is used for pulling the container trailer 1 to move. The cradle 101 generally includes two parallel longitudinal beams 101a and a plurality of cross bars 101b being welded together. With the development of the global logistics industry and the increasing popularity of container transportation, the contradiction between the storage areas of container transport trailers has become prominent, especially in developed port cities and regions such as Singapore and Hong Kong, which are small and populated. Container trailers require sufficient space for storage after the end of the operation. There is a particularly urgent needs for a smaller footprint to store more trailers while meeting the requirements of safety, convenience and efficiency.

SUMMARY

[0003] Therefore, an object of the present invention is to provide a stereoscopic garage for a container trailer, which achieves the purpose of increasing the storage capacity per unit area by placing the container trailer in an upright or inclined manner.

[0004] In order to achieve the above object, a stereoscopic garage for a container trailer of the present invention includes:

[0005] 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;

[0006] a moving mechanism for moving the container trailer which is in a overturned or upright state from the inbound station to a storage station and from the storage station to the outbound station; and

[0007] a limiting mechanism for limiting the container trailer to the storage station.

[0008] 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.

[0009] 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; the two 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.

[0010] The rotating drive unit may be a cylinder or a hydraulic cylinder, one end of the rotating drive unit being hinged to the link and the other end being hinged to the boom.

[0011] Each of the robot units may include a mounting bracket, with at least one rotating hook mounted thereon by a mounting shaft, and a 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.

[0012] 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.

[0013] A surface of the hook deep portion opposite to the hook shank portion is a wedge surface.

[0014] 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.

[0015] 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.

[0016] The moving mechanism includes at least one trolley, and the limiting mechanism includes at least one clamping fixture provided on each of the trolleys.

[0017] The stereoscopic garage for a container trailer may further comprise a rail for the trolley to travel.

[0018] The rail may include a linear rail or a curved rail.

[0019] A trolley guide plate is provided on either side of the rail.

[0020] 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.

[0021] 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.

[0022] The lifting drive includes a cylinder or a hydraulic cylinder; 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.

[0023] The first set of tracks and the second set of tracks intersect perpendicularly to each other.

[0024] The stereoscopic garage for a container trailer may also be provided with a service station located on the rail.

[0025] The stereoscopic garage for a container trailer may further include 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.

[0026] 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.

[0027] The first set of tracks first set of tracks has at least two tracks disposed in parallel.

[0028] 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.

[0029] The trolley is provided with a travel drive.

[0030] The travel drive includes a drive motor, the drive motor being powered by a battery.

[0031] 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.

[0032] The stereoscopic garage for a container trailer may be 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.

[0033] The clamping fixture may include a fixing bracket and a jaw disposed on the fixing bracket.

[0034] 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 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 $\frac{2}{3}$ 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 unitpower 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.

[0047] Fig. 4 is a front view of the stereoscopic garage for a container trailer of the present invention.

[0048] Fig. 5 is a top view of Fig. 4.

[0049] Fig. 6 is a schematic view showing the arrangement of a rail.

[0050] Fig. 7 is a schematic view showing the structure of a boom, a container trailer and a trolley.

[0051] Fig. 8 is a partially enlarged view of a portion A in Fig. 7;

[0052] Fig. 9 is a schematic view showing the structure of the boom.

[0053] Fig. 10 is a partially enlarged view of a portion B of Fig. 9.

[0054] Fig. 11 is a schematic view showing the structure in which the container trailer is fixed on the trolley in an upright manner.

[0055] Fig. 12 is a schematic view of the structure of the trolley.

[0056] Fig. 13 is a schematic view of another angle of Fig. 12.

[0057] Fig. 14 is a schematic view of the container trailer before loading.

[0058] Fig. 15 is a schematic view of the container trailer being lifted by the boom.

[0059] Fig. 16 is a schematic view of the container trailer moving over the trolley.

[0060] Fig. 17 is a schematic view showing the structure of a fence rail.

[0061] Fig. 18 is a schematic view showing the structure of a beam spreader.

[0062] Fig. 19 is a partially enlarged view of a portion C in Fig. 18.

[0063] Fig. 20 is a schematic view showing a fishbone structure according to an embodiment of the rail.

[0064] Fig. 21 is a schematic view showing a mesh structure according to an embodiment of the rail.

DETAILED DESCRIPTION

[0065] The present invention will be further described in detail below with reference to the drawings and specific embodiments.

[0066] An embodiment of the present invention provides a stereoscopic garage for a container trailer, which includes turning mechanisms, a moving mechanism and a limiting mechanism. The turning mechanism performs loading or unloading when the container trailer enters and exits the stereoscopic garage. The turning mechanisms are disposed respectively at an inbound station and an outbound station of the stereoscopic garage 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. The moving mechanism is used to move the container trailer from the inbound station to the storage station and from the storage station to the outbound station when the container trailer is in an overturned or upright state. The limiting mechanism is used to limit the container trailer to the storage station.

[0067] Therefore, the footprint of the container trailer may be effectively reduced by storing the container trailer in an upright or inclined manner. For example, with the traditional parking method, an ordinary 6.67 m trailer has a footprint of about 20 m², and an ordinary 40 13.33 m trailer has a footprint of about 35 m². With the stereoscopic garage of the present invention, when the container trailer is stored in an upright manner, 20-foot and 13.33 m trailers respectively occupy 5m², the stereoscopic garage covers an area of 14%-20% of ordinary storage, and the land utilization rate is increased by about 5 times.

[0068] In one embodiment of the present invention, as shown in Figs. 2-5, the turning mechanism includes a lifting device 21 and a turning device 22 disposed on the lifting device 21. The turning device 22 includes a robot unit 220 for grasping the container trailer 1 and a rotating drive unit 221 for driving the rotation of the robot unit 220. The lifting device 21 is capable of lifting, moving or lowering the container trailer 1.

[0069] The lifting device 21 includes a boom 210. As shown in Figs. 7 and 9, the boom 210 includes a base 211, a forearm 212, a rear arm 213 of which one end is hinged to the base 211 and the other end is hinged to the middle of the forearm 212, a rear arm drive cylinder 214 of which two ends are respectively hinged to the base 211 and the middle of the rear arm 213, and a forearm drive cylinder 215 of which two ends are respectively hinged to an end of the forearm 212 and the middle of the rear arm 213. In this embodiment, there are two booms 210 disposed at the inbound or outbound station. Each of the booms 210 is provided with a robot unit 220 and a rotating drive unit 221. The two robot units 220 may clamp on the left and right sides of the container trailer 1. The robot unit 220 is mounted on the boom 210 via a rotating shaft 223. A connecting rod 224 is fixed to the rotating shaft 223 and connected to the rotating drive unit 221. The rotating drive unit 221 may be a cylinder or a hydraulic cylinder. In the present embodiment, the rotating drive unit 221 is an oil cylinder. One end of the rotating drive unit 221 is hinged to the connecting rod 224, and the other end thereof is hinged to the boom 210. Of course, the rotating drive unit 221 may also be a motor drive system powered by a motor.

[0070] As shown in Fig. 10, each of the robot units 220 includes a mounting bracket 225, at least one rotating hook 227 mounted on the mounting bracket 225 by a mounting shaft 226, and a rotating hook drive 228 capable of driving the rotating hook 227 to rotate and extending into between two longitudinal beams 101a of the container trailer bracket 101 and fastening one of the two longitudinal beams 101a at the outside thereof. The rotating hook 227 includes a hook shank portion 227a, a hook bend portion 227b, and a hook deep portion 227c. As shown in Fig. 8, the hook shank portion 227a and the hook deep portion 227c are respectively pressed against two opposite side surfaces of the longitudinal beam 101a, and the hook bend portion 227b is pressed against an inner side surface of the longitudinal beam 101a. A surface of the hook deep portion 227c opposite

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 31 for the trolley 30 to travel. The rail 31 may be a linear rail or curved rail. The trolley 30 may travel on the rail 31 or may be parked on the rail 31. A trolley guide plate 32 is disposed on either side of the rail 31. 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 31 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 31 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 31. 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 31 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 31 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 31 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

drive 322 may be a cylinder or a hydraulic cylinder. In the present embodiment, the lifting drive 322 is a hydraulic cylinder.

[0078] Since the hanging hoist 52 per se in the beam spreader 50 has the function of moving on the hanging beam 51, the moving mechanism may be a beam spreader 50 in addition to the trolley 30, and the limiting mechanism may be multiple clamping fixtures disposed at the storage station. The container trailer 1 may be lifted, rotated, and moved below the hanging hoist 52 by the boom, and the container trailer 1 is lifted by the hanging hoist 52 and moved above the clamping fixture by the hanging beam 51, and the container trailer 1 is released downward and clamped and held by the clamping fixture.

[0079] As another embodiment, the turning mechanism and the moving mechanism may each be a beam spreader. The limiting mechanism includes a clamping fixture disposed at the storage station. In this embodiment, the function of turning the container trailer is realized by the beam spreader. The cable of the hanging hoist is released during use, the hanging hoist is moved down and hooked to an end of the cradle of the container trailer, and then the beam spreader is controlled to be lifted, the container trailer is gradually inclined and stays upright, and finally lifted off the ground. At this time, the hanging hoist is moved to the storage station, and the container trailer is kept upright and clamped and fixed by the clamping fixture.

[0080] The clamping fixture 31 includes a fixing bracket 311 and a jaw 312 disposed on the fixing bracket 311. As shown in Figs. 11-13, there are at least two oppositely disposed jaws 312. Each of the jaws 312 is mounted on the fixing bracket 311 via a rotating shaft 313. One end of the jaw 312 is connected to the clamping drive 314. The clamping drive 314 may drive the jaws 312 to rotate, so that the two jaws 312 may clamp on two sides of the container trailer 1. Each jaw 312 is provided with at least one hook 312a. The at least one hook 312a is hooked on a side of the container trailer 1 away from the axle 313. The clamping drive 314 includes a cylinder or a hydraulic cylinder. In this embodiment, the clamping drive 314 is an oil cylinder. One end of the clamping drive 314 is hinged to the jaw 312, and the other end is hinged to the fixing bracket 311. Of course, the clamping drive 314 may also be a motor drive system powered by a motor. A top stop portion 315 abutted against the side of the container trailer 1 adjacent to the rotating shaft 313 is also provided on the fixing bracket 311. The clamping fixture 31 also includes a catch 316 for catching the bottom of the container trailer 1 when the container trailer 1 is in an upright or inclined storage condition.

[0081] As shown in Fig. 17, in the present embodiment, the fence rail 40 may include a high-position protection beam 40b and a low-position protection beam 40a for preventing the 40-foot container trailer and the 20-foot container trailer from being tipping over, respectively. The fence rail 40 is located at a 2/3 upright height position of the container trailer.

[0082] The stereoscopic garage for a container trailer also includes a control system. A power unit of the turning mechanism (such as the rotating drive unit 221, the cylinder, the hydraulic cylinder or the motor, etc. in the rotating hook drive 228), a power unit of the moving mechanism (such as the travel drive device, etc.), and a power unit of the limiting mechanism (such as the cylinder, hydraulic cylinder or motor, etc. of the clamping drive 314) are connected to the control system to control the operation of the turning mechanism, the moving mechanism and the limiting mechanism. Only operator duty is only required at the inbound and outbound stations. The moving mechanism may operate completely in automation. The entire system operation process is fully automatic. In addition to manual intervention for loading and unloading the trailer head, other actions rely on sensors and servo motors, as well as PLC program control, to achieve unmanned operation. In case of failure, there will be an early warning and an inspection plan and measures will be given. There will be grating isolation in the entire operating area. If someone enters or other external disturbances appear, it will automatically alarm and carry out safety protection measures.

[0083] The above embodiments are merely illustrative of the embodiments and are not intended to limit the embodiments. Other variations or modifications of various forms may be made by those skilled in the art in light of the above description. There is no need and no way to exhaust all of the implementations. Obvious changes or variations resulting therefrom are still within the protection scope of the present invention.

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.
3. The stereoscopic garage for a container trailer according to claim 2, 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.
4. The stereoscopic garage for a container trailer according to claim 3, wherein the rotating drive unit is a cylinder or a hydraulic cylinder, one end of the rotating drive unit being hinged to the 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. The stereoscopic garage for a container trailer according to claim 5, 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. The stereoscopic garage for a container trailer according to claim 6, wherein a surface of the hook deep portion opposite to the hook shank portion is a wedge surface.

8. The stereoscopic garage for a container trailer according to any one of claims 5 to 7, 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. The stereoscopic garage for a container trailer according to any one of claims 2-8, 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. The stereoscopic garage for a container trailer according to claim 10, further comprising a rail for the trolley to travel.

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

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

14. The stereoscopic garage for a container trailer according to claim 11, 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. The stereoscopic garage for a container trailer according to claim 14, 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. The stereoscopic garage for a container trailer according to claim 15, wherein the lifting drive includes a cylinder or a hydraulic cylinder; 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. The stereoscopic garage for a container trailer according to claim 14, wherein the first set of tracks and the second set of tracks intersect perpendicularly to each other.

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

19. The stereoscopic garage for a container trailer according to claim 18, 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. The stereoscopic garage for a container trailer according to any one of claims 10 to 19, wherein the stereoscopic garage for a container trailer is further provided with a service station.

21. The stereoscopic garage for a container trailer according to claim 20, 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. The stereoscopic garage for a container trailer according to claim 21, 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. The stereoscopic garage for a container trailer according to any one of claims 10 to 22, wherein the trolley is provided with a travel drive.

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

28. The stereoscopic garage for a container trailer according to claim 27, 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 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. The stereoscopic garage for a container trailer according to claim 28, 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. The stereoscopic garage for a container trailer according to claim 28, 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. The stereoscopic garage for a container trailer according to any of claims 27-30, 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. The stereoscopic garage for a container trailer according to any one of claims 1 to 31, 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. The stereoscopic garage for a container trailer according to claim 32, 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. The stereoscopic garage for a container trailer according to claim 31, wherein the fence rail is located at $\frac{2}{3}$ upright height of the container trailer.

35. The stereoscopic garage for a container trailer according to any one of claims 1 to 34, 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. The stereoscopic garage for a container trailer according to claim 35, 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.