LIFT CARRIER

Field of the Invention

The present invention relates to handling equipment, in particular to a simple, aboveground carrier.

Background of the Invention

As to traditional aboveground handling equipment, forklift has been widely used. However, generally speaking, forklift can be used to handle small-sized and light-weighed goods only. For large structural members such as concrete pre-fabricated members and its templates, they are generally hoisted by a crane, which comprises a motor, overhead guide rails, steel wire ropes, or the like. During hoisting, the crane is controlled by an operator, and the motor generates a driving force, so that the large structural members can be hoisted by the steel wire ropes and then transferred along the guide rails to the destination.

However, such hoisting operation is performed high above the ground, and after long-time use of the crane motor, deadlock of the motor and drop of the hoisted members would easily happen. Therefore, the hoisting operation is of high risk. Moreover, assistances must be provided before and after the hoisting operation, and thus the hoisting operation is time-consuming and labor-consuming.

Summary of the Invention

The technical problem to be solved by the present invention is to provide a lift carrier, which can be operated automatically without a hoisting tool.

In order to solve the above technical problem, the present invention proposes a lift carrier, including a supporting frame, trolleys mounted at a bottom of the supporting frame, and a first motor for controlling movement of the trolleys. The lift carrier further includes a bearing mechanism arranged on the supporting frame, and a lifting mechanism for driving the bearing mechanism to move up and down. The bearing mechanism includes multiple bearing arms, and a powering unit for controlling the bearing arms to extrude forwardly or retreat backwardly.

The supporting frame includes columns, which consist of two right columns and two left columns, upper beams each connecting top parts of two adjacent columns, lower beams each connecting bottom parts of two adjacent columns, and diagonal rods each connecting the top parts of two columns arranged along a diagonal direction.

The bearing arms are mounted on a lifting frame, which forms a square frame structure consisting of lateral rods and longitudinal rods.

A short post is arranged at a position where the lateral rod is connected with the longitudinal rod, and fixed with the lateral rod and the longitudinal rod. Two pulleys, one above the other, are mounted on the short post, and abut against the column of the supporting frame.

The column is made of I-beam, which has a side recess in which a slide rail extending along a lengthwise direction of the column is fixed. The pulleys of the short post abut against the slide rail within the side recess of the column.

The lifting mechanism comprises a winding reel, a second motor for controlling rotation of the winding reel, a pulling rope, and a fixed pulley mounted on the supporting frame. The pulling rope has one end wound around the winding reel, and

another end wound around the fixed pulley to connect with the bearing mechanism.

The powering unit includes a hydraulic cylinder connected with the supporting arms, and a hydraulic pump connected with the hydraulic cylinder.

Compared with the prior arts, the lift carrier according to the present invention can be used to transfer large-sized components on the ground, so that overhead hoisting is unnecessary. Therefore, operation safety is improved, and the labor and time necessary for handling the large-sized components are significantly reduced.

Brief Description of the Drawings

Fig. 1 schematically shows the structure of a lift carrier according to the present invention;

Fig. 2 schematically shows the structure of a supporting frame;

Fig. 3 schematically shows the structure of a bearing mechanism;

Fig. 4 is an enlarged view showing an area, in which pulleys of a lifting frame abut against a column of the supporting frame;

Fig. 5 schematically shows the structures of a bearing arm and a hydraulic cylinder; and

Fig. 6 schematically shows the structure of a lifting mechanism.

Detailed Description of the Embodiments

The present invention will be described in further detail with reference to the embodiments as shown in the accompanying drawings.

As shown in Fig. 1, the lift carrier according to the present invention includes a supporting frame 1, trolleys 2 mounted at a bottom of the supporting frame 1, a first motor 3 for controlling movement of the trolleys 2, a bearing mechanism 5, and a lifting mechanism 6 for driving the bearing mechanism 5 to move up and down.

As shown in Fig. 2, the supporting frame 1 has a frame structure of a cuboid or a cube, and includes four columns 11 (two at right and two at left), four upper beams 12 each connecting the top parts of two adjacent columns 11, two lower beams 13 each connecting the bottom parts of two adjacent columns 11, and two diagonal rods 14 each connecting the top parts of two columns 11 arranged along a diagonal direction. The trolleys 2 are fixed at the bottoms of two lower beams 13, a right one and a left one, respectively. The first motor 3 can drive the trolleys 2 into rotation, so as to move the supporting frame 1 front and back. In the present embodiment, the columns 11, the upper beams 12 and the lower beams 13 are all made of I-beams with high strength, while the diagonal rods 14 are made of square tubes.

As shown in Fig. 3, the bearing mechanism 5 comprises a lifting frame 52, four bearing arms 51 mounted on the lifting frame 52, and its powering unit. The lifting frame 52 has a square frame structure consisting of two lateral rods 521 (a front one and a rear one), four longitudinal rods 522 (two at right and two at left), and two intermediate rods 525 fixed between said two longitudinal rods 522. Each longitudinal rod 522 includes two sub-rods, one above the other. A short post 523 is arranged at each corner of the square frame structure, so as to fix the lateral rod 521 and the two sub-rods together. Each short post 523 is provided with two pulleys 524, one above the other. As shown in Fig. 4, the column 11 of I-beam has a side recess, in which a slide rail 111 extending along a lengthwise direction of the column 11 is fixed. The pulleys 524 of the short post 523 extend into the slide rail 111 within the side recess of the column 11, so that the lifting frame 52 can move along the column 11 along a vertical direction in a stable and reliable manner. Four bearing arms 51 are mounted on said two longitudinal rods 522, two arms on one rod. As shown in Fig. 5, each

bearing arm 51 is provided with a hydraulic cylinder 53 thereon, which can control the bearing arm 51 to extrude forwardly or retreat backwardly. A hydraulic pump 54 is mounted on the top of the two intermediate rods 525, and connected with the hydraulic cylinder 53 of each bearing arm 51. The method of controlling the bearing arms 51 by means of the hydraulic cylinder 53 and the hydraulic pump 54 is known in the art, and thus would not be described here for the sake of conciseness.

As shown in Fig. 6, the lifting mechanism 6 comprises a winding reel 61, a second motor 62 for controlling rotation of the winding reel 61, a pulling rope 63, and a fixed pulley 64. The winding reel 61 and the second motor 62 are mounted on the lower beam 13 of the supporting frame 1, and the fixed pulley 64 is mounted on the upper beam 12 of the supporting frame 1. The pulling rope 63 has one end wound around the winding reel 61, and another end wound around the fixed pulley 64 to connect with the lifting frame 52. Four sets of the lifting mechanism 6 are provided. Two of them are arranged at a right side and connected with the longitudinal rods at the same side, while the other two are arranged at a left side and connected with the longitudinal rods at the same side. The second motor 62 can control the rotation of the winding reel 61, and move the lifting frame 52 up or down through the pulling rope 63 and the fixed pulley 64.

During handling goods, the first motor 3 drives the trolleys 2 in rotation, so that the supporting frame 1 will be moved to a position where the goods to be handled are placed. The second motor 62 is activated to lower down the lifting frame 52. At this moment, the bearing arms 51 are in a state of being retreated. If the bearing arms 51 are lower than the goods, the bearing arms 51 are controlled by the hydraulic pump 54 to extrude forwardly so as to be under the goods. Then, the second motor 52 is activated to lift the lifting frame 52 and the goods. After the goods are in place, the lifting frame 52 is lowered down again, and the bearing arms 51 are retreated again. Therefore, the goods can be placed at the desirable position thereof.

The foregoing description is merely illustrative of preferred embodiments of the present invention, and is not intended to limit the present invention. Various changes and modifications may be made by those skilled in the art. Any modifications, equivalent substitutions, improvements, and the like within the spirit and principles of the present invention are intended to be included within the scope of the present invention.

AMENDED CLAIMS

1. A lift carrier, including a supporting frame (1), trolleys (2) mounted at a bottom of the supporting frame (1), and a first motor (3) for controlling movement of the trolleys (2),

characterized in that the lift carrier further includes a bearing mechanism (5) arranged on the supporting frame (1), and a lifting mechanism (6) for driving the bearing mechanism (5) to move up and down,

wherein the bearing mechanism (5) includes multiple bearing arms (51), and a powering unit for controlling the bearing arms (51) to extrude forwardly or retreat backwardly,

wherein the bearing arms (51) are mounted on a lifting frame (52), which forms a square frame structure consisting of lateral rods (521) and longitudinal rods (522),

wherein a short post (523) is arranged at a position where the lateral rod (521) is connected with the longitudinal rod (522), and fixed with the lateral rod (521) and the longitudinal rod (522), and

wherein two pulleys (524), one above the other, are mounted on the short post (523), and abut against the column (11) of the supporting frame (1).

2. The lift carrier according to claim 1, characterized in that the supporting frame (1) includes columns (11), which consist of two right columns and two left columns, upper beams (12) each connecting top parts of two adjacent columns (11), lower beams (13) each connecting bottom parts of two adjacent columns (11), and diagonal rods (14) each connecting top parts of two columns (11) arranged along a diagonal direction.

3. The lift carrier according to claim 1, characterized in that the column (11) is made of I-beam, which has a side recess in which a slide rail (111) extending along a lengthwise direction of the column (11) is fixed, the pulleys (524) of the short post (523) being abutted against the slide rail (111) within the side recess of the column

(11).

4. The lift carrier according to claim 1 or 2, characterized in that the lifting mechanism (6) comprises a winding reel (61), a second motor (62) for controlling rotation of the winding reel (61), a pulling rope (63), and a fixed pulley (64) mounted on the supporting frame (1), wherein the pulling rope (63) has one end wound around the winding reel (61), and another end wound around the fixed pulley (64) to connect with the bearing mechanism (5).

5. The lift carrier according to claim 1 or 2, characterized in that the powering unit includes a hydraulic cylinder (53) connected with the bearing arms (51) and a hydraulic pump (54) connected with the hydraulic cylinder (53).