

DOUBLE MAST STORAGE/RETRIEVAL MACHINE

TECHNICAL FIELD

The present invention relates to a double mast storage/retrieval machine, and belongs to the technical field of warehousing logistics.

BACKGROUND

In the process of goods warehousing, after being transported into a warehouse, goods are generally required to be stacked on a goods shelf with special stacking equipment used in the warehouse. Existing warehouse stacking equipment generally includes a walking mechanism and a mechanism disposed on the walking mechanism for stacking the goods on the goods shelf. The existing stacking equipment is mainly composed of a walking mechanism, a lifting mechanism and a retractable shuttle structure. The existing stacking equipment uses a steel wire rope lifting mechanism with two winding drums, and the structure is complex. In addition, during operation, the structural mode of two winding drums has the problems that when one winding drum breaks down and stops working, the other winding drum still keeps a working state, resulting in the tilting of the lifting mechanism and the occurrence of a safety accident.

SUMMARY

The objective of the present invention is to solve the technical problem of how to simplify the structure and ensure safe operation of a double mast storage/retrieval machine.

In order to achieve the objective of solving the above-mentioned problem, the technical solution adopted by the present invention is to provide a double mast storage/retrieval machine: including an upper beam, a lower beam, masts, a carriage, a lifting motor, a winding drum, a steel wire rope, an upper beam rope sheave, a steel wire rope hanging clamp and a carriage rope sheave; two masts being disposed side by side between the upper beam and the lower beam; the carriage being disposed between the two masts; the lifting motor and the winding drum being disposed on the mast on one side, the upper beam rope sheave being disposed on one side of the upper beam above the winding drum, and the steel wire rope hanging clamp being disposed on the other side of the upper beam; the carriage rope sheave being disposed on the carriage; the steel wire rope disposed in the winding drum penetrating through the carriage rope sheave through the upper beam rope sheave disposed on one side of the upper beam to be connected to the steel wire rope hanging clamp disposed on the other side of the upper beam.

Preferably, a roof rail for guiding the movement of the storage/retrieval machine is disposed above the upper beam; a ground rail for guiding the movement of the storage/retrieval machine is disposed below the lower beam.

Preferably, a retractable shuttle for transporting goods is disposed on the carriage.

Preferably, a walking motor is disposed on the mast, and a walking wheel for driving the storage/retrieval machine to move on the ground rail is disposed on the walking motor; a driven wheel for assisting the storage/retrieval machine in moving on the ground rail and a walking guide wheel for guiding the movement of the storage/retrieval machine are disposed on the lower beam.

Preferably, a lifting guide wheel for limiting the movement direction of the steel wire rope is disposed on the mast.

Preferably, a safety gear for braking the steel wire rope for preventing the carriage from falling rapidly when the steel wire rope is broken is disposed on the mast.

Preferably, an upper and lower limit switch for limiting the ascending and descending positions of the carriage is disposed on the mast.

Preferably, an anti-collision device for protecting the storage/retrieval machine against collision damage in the movement process is disposed on the lower beam.

Compared with existing technologies, the present invention has the following beneficial effects:

The present invention is simple in structure, high in working efficiency, convenient for realizing unmanned operation, stable in walking, large in carrying capacity and small in noise. By using only the structure of a single winding drum and a single steel wire rope, the cost is saved, installation and maintenance are facilitated, the structure is simpler and use is safer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic structural view of the present invention;

FIG. 2 is a schematic cross-sectional structural view of the present invention; and

FIG. 3 is a schematic three-dimensional structural view of the present invention.

List of Reference Numerals: 1. Roof rail; 2. Ground rail; 3. Mast; 4. Carriage; 5. Electric cabinet; 6. Upper beam; 7. Lower beam; 8. Walking motor 9. Walking wheel 10. Driven wheel 11. Walking guide wheel 12. Lifting motor 13. Winding drum 14. Upper beam rope sheave; 15. Carriage rope sheave; 16. Steel wire rope hanging clamp; 17. Lifting guide wheel; 18. Safety gear; 19. Upper and lower limit switch; 20. Horizontal limit switch; 21. Anti-collision

device; 22. Shuttle; and 23. Steel wire rope.

DETAILED DESCRIPTION

To make the invention clear and easy to understand, exemplary embodiments are in detail described below with reference to the accompanying drawings.

As shown in FIGS. 1-3, the present invention provides a double mast storage/retrieval machine. The double mast storage/retrieval machine includes an upper beam 6, a lower beam 7, masts 3, a carriage 4, a lifting motor 12, a winding drum 13, a steel wire rope 23, an upper beam rope sheave 14, a steel wire rope hanging clamp 16 and a carriage rope sheave 15. Two masts 3 are disposed side by side between the upper beam 6 and the lower beam 7. The carriage 4 is disposed between the two masts 3. The lifting motor 12 and the winding drum 13 are disposed on the mast 3 on one side, the upper beam rope sheave 14 is disposed on one side of the upper beam 6 above the winding drum 13, and the steel wire rope hanging clamp 16 is disposed on the other side of the upper beam 6. The carriage rope sheave 15 is disposed on the carriage 4. The steel wire rope 23 disposed in the winding drum 13 penetrates through the carriage rope sheave 15 through the upper beam rope sheave 14 disposed on one side of the upper beam 6 to be connected to the steel wire rope hanging clamp 16 disposed on the other side of the upper beam 6. A roof rail 1 for guiding the movement of the storage/retrieval machine is disposed above the upper beam 6. A ground rail 2 for guiding the movement of the storage/retrieval machine is disposed below the lower beam 7. A retractable shuttle 22 for transporting goods is disposed on the carriage 4. A walking motor 8 is disposed on the mast 3, and a walking wheel 9 for driving the storage/retrieval machine to move on the ground rail is disposed on the walking motor 8. A driven wheel 10 for assisting the storage/retrieval machine in moving on the ground rail 2 and a walking guide wheel 11 for guiding the movement of the storage/retrieval machine are disposed on the lower beam 7. A lifting guide wheel 17 for limiting the movement direction of the steel wire rope 23 is disposed on the mast 3. A safety gear 18 for braking the steel wire rope for preventing the carriage from falling rapidly when the steel wire rope is broken is disposed on the mast 3. An upper and lower limit switch 19 for limiting the ascending and descending positions of the carriage is disposed on the mast 3. An anti-collision device 21 for preventing the storage/retrieval machine against collision damage in the movement process is disposed on the lower beam 7.

Embodiment

As shown in FIGS. 1 to 3, a double mast storage/retrieval machine includes a roof rail 1, a ground rail 2, a pair of masts 3, a carriage 4 and an electric cabinet 5. The roof rail 1 is connected to the mast 3 by an upper beam 6, and the ground rail 2 is connected to the mast 3 by a lower beam 7. A walking mechanism is disposed on the lower beam 7 and moves horizontally on the ground rail 2 to complete the work. The walking mechanism includes a walking motor 8, a walking wheel 9 connected to an output shaft of the walking motor, a driven wheel 10 fixed to the other end of the lower beam, and walking guide wheels 11 fixed to both ends of the lower beam. The carriage 4 is moved up and down along the mast 3 by a lifting mechanism to complete the work. The lifting mechanism includes a lifting motor 12, a winding drum 13 connected to an output shaft of the lifting motor, a steel wire rope 23 wound on the winding drum 13, an upper beam rope sheave 14 fixed to the upper beam, a carriage rope sheave 15 fixed to the carriage, a steel wire rope hanging clamp 16 fixed to the upper beam, and a lifting guide wheel 17 fixed to the carriage. A safety gear 18 is disposed on the carriage 4 for falling protection. An upper and lower limit switch 19 is disposed on the mast 3 for limit position protection. A horizontal limit switch 20 is disposed on the lower beam 7 for position protection and an anti-collision device 21 is also disposed for anti-collision protection. The electric cabinet 5 is fixed to the lower beam 7. A shuttle 22 is disposed on the carriage 4 for completing the picking and placement work.

As shown in FIGS. 1-3, when the equipment of the present invention operates, the walking motor 8 provides power for the walking mechanism, and outputs the power to the walking wheel 9 via a driving shaft installed on the carriage 4, further the walking wheel 9 rotates to drive the driven wheel 10 to rotate to complete the horizontal displacement of the equipment, and the walking guide wheels 11 installed on both sides of the lower beam 7 prevent the inclination of the equipment and play a guiding role. At the same time, the lifting motor 12 in the lifting mechanism provides power output to the steel wire rope winding drum 13 fixed to the output shaft, and transmits the power via the steel wire rope 23 with one end fixed to the winding drum 13, and further the steel wire rope 23 crosses upwards over the upper beam rope sheave 14 fixed to the upper beam 6. Moreover, a rope hole for the steel wire rope 23 to penetrate through is formed in the upper beam, further the steel wire rope 23 penetrates through the rope hole to cross downwards again over the carriage rope sheave set 15 fixed to the carriage 4, and converges upwards, at the other end, to the steel wire rope hanging clamp 16 fixed to the upper beam 6, so as to complete the vertical displacement of the carriage 4. In addition, the lifting guide wheels 17 are disposed on both sides of the carriage 4 to roll along the mast to complete the guiding function. At the same time, the shuttle 22 is disposed on the

carriage 4, picking and placing of goods is completed by the telescoping of the shuttle 22, and photoelectric detection is further provided on the carriage 4 for detecting the boundary dimension of the goods.

The foregoing descriptions are merely exemplary embodiments of the present invention, and are not intended to limit the present disclosure in any form or substance. It is noted that a person of ordinary skill in the art may make some improvements and supplementations without departing from the principle of the present invention, and the improvements and supplementations shall fall within the protection scope of the present invention. A person skilled in the art may make some alterations, modifications, and evolutions to the above-disclosed technical content without departing from the spirit and the scope of the technical solutions of the present utility model, and such alterations, modifications, and evolutions are equivalent embodiments of the present invention. In addition, any equivalent variations such as alterations, modifications, and evolutions made to the foregoing embodiments according to the technical essence of the present invention shall still fall within the protection scope of the technical solution of the present invention.

CLAIMS

What is claimed is:

1. A double mast storage/retrieval machine, comprising: an upper beam, a lower beam, masts, a carriage, a lifting motor, a winding drum, a steel wire rope, an upper beam rope sheave, a steel wire rope hanging clamp and a carriage rope sheave; two masts being disposed side by side between the upper beam and the lower beam; the carriage being disposed between the two masts; the lifting motor and the winding drum being disposed on the mast on one side, the upper beam rope sheave being disposed on one side of the upper beam above the winding drum, and the steel wire rope hanging clamp being disposed on the other side of the upper beam; the carriage rope sheave being disposed on the carriage; the steel wire rope disposed in the winding drum penetrating through the carriage rope sheave through the upper beam rope sheave disposed on one side of the upper beam to be connected to the steel wire rope hanging clamp disposed on the other side of the upper beam.

2. The double mast storage/retrieval machine according to Claim 1, wherein a roof rail for guiding the movement of the storage/retrieval machine is disposed above the upper beam; a ground rail for guiding the movement of the storage/retrieval machine is disposed below the lower beam.

3. The double mast storage/retrieval machine according to Claim 2, wherein a retractable shuttle for transporting goods is disposed on the carriage.

4. The double mast storage/retrieval machine according to Claim 3, wherein a walking motor is disposed on the mast, and a walking wheel for driving the storage/retrieval machine to move on the ground rail is disposed on the walking motor; a driven wheel for assisting the storage/retrieval machine in moving on the ground rail and a walking guide wheel for guiding the movement of the storage/retrieval machine are disposed on the lower beam.

5. The double mast storage/retrieval machine according to Claim 4, wherein a lifting guide wheel for limiting the movement direction of the steel wire rope is disposed on the mast.

6. The double mast storage/retrieval machine according to Claim 5, wherein a safety gear for braking the steel wire rope for preventing the carriage from falling rapidly when the steel wire rope is broken is disposed on the mast.

7. The double mast storage/retrieval machine according to Claim 6, wherein an upper and lower limit switch for limiting the ascending and descending positions of the carriage is disposed on the mast.

8. The double mast storage/retrieval machine according to Claim 7, wherein an anti-

collision device for protecting the storage/retrieval machine against collision damage in the movement process is disposed on the lower beam.