CLAIMS

1. A distribution machine, comprising a hopper carrier (10), a rail car (20), and an electric control box for controlling the hopper carrier (10) and the rail car (20), the hopper carrier (10) being arranged on the rail car (20) and movable relative to the rail car (20), and a hopper for receiving concrete being detachably arranged on the hopper carrier (10),

wherein the hopper carrier (10) includes a hopper carrier frame (100), which is provided thereon with a position-limiting assembly (103) for fixing the hopper, a unloading vibrator (104) for applying vibration to the hopper, a hook opening device (101) for opening a hook arranged on the hopper, and a hopper opening device for opening a discharging port of the hopper, the hopper opening device including a hopper opening motor (102), an encoder (107) connected to the hopper opening motor (102), and a hopper opening assembly (108) for opening the discharging port of the hopper when being driven by the hopper opening motor (102); and

the rail car (20) includes a car body frame (200), on which a transmission device for driving the hopper carrier (10) to move and a plurality of position sensors for detecting a position of the hopper carrier (10) are arranged, and a rail walking device for running on a rail and a plurality of limit sensors for detecting and controlling a position of the rail car (20) are provided under the car body frame (200).

2. The distribution machine according to claim 1, characterized in that the hopper opening assembly (108) is configured to be rotated by the hopper opening motor (102);

the hopper opening assembly (108) is provided with an upward opening, which is configured as being consistent with a movement trajectory of a hopper opening link arranged on the hopper, for driving the hopper opening link to move so as to open the discharging port of the hopper; and

the encoder (107) is connected to a shaft of the hopper opening motor (102), for

transmitting a position signal of the hopper opening motor (102) to a frequency converter in the electrical control box.

3. The distribution machine according to claim 1, characterized in that the position-limiting assembly (103) includes a plurality of trapezoidal position-limiting blocks, which together enclose a position-limiting groove consisting of a large top portion and a small bottom portion, wherein a footstand of the hopper is received in the position-limiting groove.

4. The distribution machine according to claim 1, characterized in that the hopper carrier (10) further includes a plurality of vibration absorbing mechanisms (105) acting on the hopper, and a plurality of anti-collision rubber blocks (106) arranged on an outer periphery of the hopper carrier frame (100).

5. The distribution machine according to claim 1, characterized in that the transmission device includes a chain (201) for driving the hopper carrier (10), a sprocket (206) for driving the chain (201), a coupling assembly (207) for driving the sprocket (206), a hopper carrier moving motor (208) for driving the coupling assembly (207), and an adjustable bearing (212) for adjusting a tightness of the chain (201).

6. The distribution machine according to claim 1, characterized in that said plurality of position sensors include a left limit sensor (202) and a left position sensor assembly (203) arranged at one end along a moving direction of the hopper carrier (10), and a right position sensor assembly (204) and a right limit sensor (205) arranged at the other end thereof.

7. The distribution machine according to claim 5, characterized in that the rail walking device includes wheels arranged under the car body frame (200), and a car

driving motor (211) for driving the wheels.

8. The distribution machine according to claim 1, characterized in that said plurality of limit sensors includes an origin and parking limit sensor unit (209) and a limit sensor assembly (210),

wherein the origin and parking limit sensor unit (209) includes three slot sensors arranged side by side, which are controlled by the electric control box for detecting position signal, so as to control the rail car (20) to return to the origin or stop, and

the limit sensor assembly (210) includes two slot sensors, which are controlled by the electric control box for detecting position signal, so as to control the rail car to stop when moving to its extreme position.

9. The distribution machine according to claim 7, characterized in that the electric control box is arranged on the car body frame (200) or the hopper carrier frame (100);

the electric control box is provided therein with a PLC, a wireless receiver, a solenoid valve for controlling a cylinder, and a frequency converter for controlling the hopper opening motor (102), the hopper carrier moving motor (208) and the car drive motor (211), wherein the wireless receiver, the solenoid valve and the frequency converter are all in communication with the PLC.

10. A method of operating the distribution machine according to claim 1, comprising steps:

placing the hopper filled with concrete on the hopper carrier of the distribution machine;

unloading the concrete after controlling the rail car of the distribution machine to move to a predetermined position, the unloading including: controlling the hook opening device of the hopper carrier to open the hook on the hopper; controlling the hopper opening device of the hopper carrier to open the discharging port of the hopper,

and adjusting a size of the discharging port according to on-site requirement; and controlling the unloading vibrator to apply vibration on the hopper when the unloading is not smooth;

controlling, after unloading at a first position is completed, the hopper carrier to move on the rail car, and/or, the rail car to move on the rail to unload at a second position;

controlling the hopper opening device to close the discharging port of the hopper after all the concrete in the hopper is unloaded; and

controlling the rail car to move to a designated position.