CLAIMS

1. A carrier vehicle, including a vehicle body running on a track, characterized in that:

at least one emergency stop device, a hopper fixing device, at least one camera device, a sensor device and an electric control box are arranged on the vehicle body;

the vehicle body includes a frame, on the bottom of which a set of wheels is arranged on each side thereof, and two motors opposite to each other in a diagonal manner are arranged on the frame, each motor being configured to drive one set of wheels through a gear box;

two emergency stop devices opposite to each other in a diagonal manner are arranged at a front end and a rear end of the vehicle body, respectively, each emergency stop device including an emergency stop sensor, and an emergency stop push rod assembly that can be pushed to trigger the emergency stop sensor;

the hopper fixing device includes a plurality of hopper push rod assemblies, for fixing a hopper carried by the carrier vehicle, each hopper push rod assembly being provided with a push rod retracting in-position sensor and a push rod extending in-position sensor;

two camera devices are arranged at the front end and the rear end of the vehicle body, respectively, each camera device including a camera, and a camera moving push rod for pushing the camera to rotate so as to change an angle of view thereof;

the sensor device includes at least one selected from a group consisting of:

an over-height sensor assembly, for detecting whether the hopper is lifted to a height exceeding a limit;

a carrier vehicle in-position sensor assembly, for detecting whether the carrier vehicle has reached its designated position;

two hopper in-position sensors, for detecting whether the position of the carrier vehicle is accurate before the hopper is picked;

a turning sensor, for detecting whether the track has a turning part; a wheel

wear sensor, for monitoring whether wheel wear exceeds a set value;

an ultrasonic sensor, for detecting whether there is an obstacle in front of the vehicle body; and

an encoding sensor, for detecting a position signal of the carrier vehicle in real time,

wherein the electrical control box is provided therein with a PLC, and the emergency stop sensor, the push rod retracting in-position sensor, the push rod extending in-position sensor, and various sensors included in the sensor device are all in signal communication with the PLC, and

wherein the motors, the hopper push rod assemblies, the cameras and the camera moving push rods are respectively controlled by the PLC.

2. The carrier vehicle according to claim 1, characterized in that the vehicle body is further provided with a plurality of anti-collision rubber columns and a limiting wheel assembly,

wherein the anti-collision rubber columns are respectively arranged at the front and rear ends of the vehicle body, and the limiting wheel assembly includes a plurality of limiting wheels in contact with the track, for reducing pressure of the wheels.

3. The carrier vehicle according to claim 1, characterized in that the PLC is configured to:

control said two motors to stop, when receiving an emergency stop signal from the emergency stop sensor;

control said two motors to run at differential speeds, when receiving a turning signal from the turning sensor;

control said two motors to stop, when receiving an obstacle signal from the ultrasonic sensor;

calculate a position of the carrier vehicle in real time, when receiving an real-time detection signal from the encoding sensor;

control said two motors to stop, when receiving an in-position signal from the carrier vehicle in-position sensor assembly; and

send an instruction to drive the hopper push rod assembly to fix the hopper, when the hopper is loaded on the carrier vehicle.

4. The carrier vehicle according to claim 1, characterized in that the emergency stop push rod assembly comprises two copper sleeves fixed on the vehicle body, a sliding shaft arranged inside said two copper sleeves, and a spring mounted around the sliding shaft for providing a restoring force to the sliding shaft,

wherein an end of the sliding shaft abuts against the emergency stop sensor.

5. The carrier vehicle according to claim 1, characterized in that the hopper push rod assembly includes an electric push rod and a load bearing shaft driven by the electric push rod,

wherein the electric push rod is configured to push, when the hopper is loaded on the carrier vehicle, the load bearing shaft to pass through a lug hole of the hopper under a command from the PLC, so as to fix the hopper on the carrier vehicle.

6. The carrier vehicle according to claim 2, characterized in that the limiting wheel assembly consists of two sets of limiting wheels, each set including an adjustable limiting wheel in contact with an inner side of the track and a fixed limiting wheel in contact with an outer side of the track.

7. The carrier vehicle according to claim 6, characterized in that a center point of the turning part of the track is configured to be on an extending line of a line connecting a center point of the adjustable limiting wheel and that of the fixed limiting wheel in each set of limiting wheels, when the carrier vehicle makes a turn.

8. An operation method of the carrier vehicle according to claim 1, comprising

steps of:

driving the carrier vehicle to a designated position according to an instruction from a control center;

activating said two camera devices after the carrier vehicle is driven, and acquiring real-time images at positions before and after the carrier vehicle and transmitting the images to the control center;

detecting, after the carrier vehicle is driven, whether there are obstacles in front of the carrier vehicle through the ultrasonic sensor, detecting whether wear of the wheels exceeds the set value through the wheel wear sensor, detecting a position signal of the carrier vehicle in real time through the encoding sensor, detecting whether the carrier vehicle enters the turning part of the track through the turning sensor, and detecting whether the carrier vehicle has reached the designated position through the carrier vehicle in-position sensor assembly;

controlling, after the carrier vehicle enters the turning part of the track, said two motors to run at differential speed, and controlling, after the carrier vehicle leaves the turning part of the track, said two motors to run at identical speed;

stopping the carrier vehicle after the carrier vehicle has reached the designated position, and adjusting the carrier vehicle to a hopper-picking position exactly through the hopper in-position sensor;

controlling, after the hopper is loaded on the carrier vehicle, the hopper fixing device to fix the hopper; and

driving the carrier vehicle with the hopper to a distribution position.