CLAIMS

1. A multimodal transportation interworking system, at least comprising:

a rail system;

a cargo vehicle movably disposed on a rail beam of the rail system;

a transfer apparatus used for transferring a goods loading device from a transportation tool to the cargo vehicle and loading the goods loading device onto the cargo vehicle, or unloading the goods loading device from the cargo vehicle and conveying the goods loading device onto the transportation tool;

a processor connected to the cargo vehicle and the transfer apparatus so as to control the transfer apparatus to transfer the goods loading device, and to control the cargo vehicle to move on the rail beam after the goods loading device is secured onto the cargo vehicle;

wherein, as the goods loading device needs to be transferred, the transfer apparatus transfers the goods loading device from the transportation tool to the cargo vehicle and loads the goods loading device onto the cargo vehicle, and the processor controls the cargo vehicle to move on the rail beam, or the transfer apparatus unloads the goods loading device from the cargo vehicle and conveys the goods loading device onto the transportation tool;

wherein the rail system is bilaterally symmetrically mounted with two rail beams, the two rail beams being respectively provided with a plurality of cargo vehicles which are movable thereon, the goods loading device being suspended on a lower end of the plurality of cargo vehicles below the rail beam at each side;

wherein the rail beams are of a box-type structure, a lower surface of the rail beams being provided with an opening which extends through from a front end to a rear end thereof, the cargo vehicle being supported at a lower surface of an inner cavity of the rail beams;

wherein each of the cargo vehicles comprises a cargo vehicle bogie being supported at the lower surface of the inner cavity of the rail beams, the cargo vehicle bogie comprising a bogie frame whose front and rear ends are connected with gearboxes respectively, each of the gearboxes being symmetrically provided with two output shafts on left and right sides, a travelling wheel being mounted on each of the output shafts, the cargo vehicle bogie running on the rail beams by four travelling wheels, front and rear ends of two gearboxes being connected to two frame intermediate

connections respectively, front and rear ends of the two frame intermediate connections being respectively connected to two traction electric motors which control the cargo vehicle bogie to run, a lower end of the cargo vehicle bogie being connected to a goods loading device integrated spreader via a suspension device after passing through the opening, a lower end of the goods loading device integrated spreader being connected to the goods loading device; the processor is connected to the traction electric motor.

2. The system of claim 1, wherein a left side and a right side of a housing of each of the traction electric motors are symmetrically connected with two guide wheel mounting seats on a lower portion thereof, guide wheels being mounted on the two guide wheel mounting seats respectively, guide rails being provided on left and right side walls of the opening of the rail beams respectively, the two guide wheels moving along the two guide rails respectively.

3. The system of claim 2, wherein the suspension device comprises a center pin, an upper end of the center pin being connected to a lower end of the bogie frame, a lower end of the center pin being connected with a connection seat which is connected to two suspension arms via multiple first spindles, lower ends of the two suspension arms being connected to a mounting seat via multiple second spindles, the mounting seat being connected to the goods loading device integrated spreader.

4. The system of claim 1, wherein the transfer apparatus at least comprises: a conveyance mechanism, a grab mechanism and a lift mechanism; the grab mechanism places the goods loading device on the conveyance mechanism; the conveyance mechanism transports the goods loading device to the lift mechanism; the lift mechanism lifts or lowers the goods loading device; the goods loading device is loaded onto or unloaded from the cargo vehicle; the processor is communicatively connected to the conveyance mechanism, the grab mechanism and the lift mechanism.

5. The system of claim 4, wherein the conveyance mechanism at least comprises: a first frame, a chain, a first group of rotation shafts and a power outputting device; the first group of rotation shafts is disposed on the first frame; each rotation shaft of the first group of rotation shafts is provided with gears; the chain is fitted around the gears to drive each rotation shaft of the first group of rotation shafts to rotate; a power output end of the power outputting device is connected to the chain.

6. The system of claim 4, wherein the grab mechanism at least comprises: a telescopic arm, a first support rod, a second support rod, a first telescopic rod, a second telescopic rod, a third telescopic

rod and a spreader; a first end of the first support rod is fixedly connected to the first frame, and a second end of the first support rod is hinged to a first end of the second support rod; a second end of the second support rod is hinged to the telescopic arm; a first end of the first telescopic rod is fixedly connected to the first frame, and a second end of the first telescopic rod is hinged to the second support rod; a first end of the second telescopic rod is hinged to the first end of the second support rod, and a second end of the second telescopic rod is hinged to a first end of the telescopic arm; a first end of the third telescopic rod is fixedly connected to the first end of the telescopic arm, and a second end of the third telescopic rod is fixedly connected to a second end of the telescopic arm; the second end of the telescopic arm is connected to the spreader.

7. The system of claim 1, wherein the transfer apparatus comprises: an underframe, a lifting device, a lifting table, a lift driving device, a plurality of travel wheels and a travel driving device;

the lifting device is connected between the underframe and the lifting table;

the lift driving device is connected to the lifting device for driving the lifting device to lift or lower the lifting table;

the plurality of travel wheels are fixed under the underframe;

the travel driving device is fixed onto the underframe and connected to the travel wheels for driving a rotation of the travel wheels;

the processor is communicatively connected to the lift driving device and the travel driving device.