CLAIMS

What is claimed is:

1. An inspection apparatus for a rail-transportation rolling stock, characterized in that the inspection apparatus is used to detect a vehicle to be detected which is parked on a railway (100), the railway is located on an inspection platform (200), an inspection pit (300) is formed in the inspection platform (200) along an extending direction of the railway (100), the inspection apparatus comprises:

an inspection robot (400);

a lift device group (500) comprising at least one lift device (501) disposed at a side of the railway (100), the lift device (501) has a liftable structure, and the lift device (501) is able to be engaged with the inspection pit (300) and be flush with a surface of the inspection platform (200) by descending and ascending;

a control device (600) communicatively connected to the inspection robot (400) and configured to control an operation of the inspection robot (400);

wherein the inspection robot (400) comprises:

an operation travelling device (410) comprising a vehicle body (411) having a receiving chamber (413) and a vehicle wheel (412) disposed at a bottom of the vehicle body (411);

a mechanical arm (420) disposed on the vehicle body (411) and communicatively connected to the control device (600), the mechanical arm (420) has a foldable structure and is able to be received in the receiving chamber (413).

2. The inspection apparatus for the rail-transportation rolling stock of claim 1, characterized in that the lift device group (500) comprises at least two lift devices (501) respectively disposed at two sides of the railway (100), the at least two lift devices (501) are able to be engaged and communicated with inspection pit (300) to form at least one passage.

3. The inspection apparatus for the rail-transportation rolling stock of claim 2, characterized in that the number of the railways (100) is at least 2, the number of the inspection pits (300) is at least 2, the number of the lift device groups (500) is at least 2;

each inspection pit (300) is corresponding to one railway (100);

each railway (100) is corresponding to one lift device group (500);

a plurality of lift devices (501) of the at least two lift device groups (500) are able to be engaged and communicated with the at least two inspection pits (300) to form at least one passage across the railways.

4. The inspection apparatus for the rail-transportation rolling stock of claim 1, characterized by further comprising an on-site working-condition detection device (700) for detecting a working condition of an inspection place, disposed at the railway (100), the inspection platform (200), and/or the inspection pit (300), and communicatively connected to the control device (600).

5. The inspection apparatus for the rail-transportation rolling stock of claim 4, characterized in that the on-site working-condition detection device (700) comprises at least one of a stagnant liquid detection mechanism (710), a to-be-detected vehicle in-position detection assembly (720), and an intrusion detection assembly (730);

the stagnant liquid detection mechanism (710) is disposed in the inspection pit (300), communicatively connected to the control device (600), and configured to detect a stagnant liquid condition in the inspection pit (300);

the to-be-detected vehicle in-position detection assembly (720) is disposed at the railway (100), communicatively connected to the control device (600), and configured to detect whether the vehicle to be detected is parked in position;

the intrusion detection assembly (730) is disposed at the railway (100), the inspection platform (200), and/or the inspection pit (300), communicatively connected to the control device (600), and configured to detect the presence of an intrusion in the inspection place.

~~6. The inspection apparatus for the rail-transportation rolling stock of claim 1, characterized in that the inspection robot (400) comprises:~~

~~an operation travelling device (410) comprising a vehicle body (411) having a receiving chamber (413) and a vehicle wheel (412) disposed at a bottom of the vehicle body (411);~~

~~a mechanical arm (420) disposed on the vehicle body (411) and communicatively connected to the control device (600), the mechanical arm (420) has a foldable structure and is able to be received in the receiving chamber (413).~~

~~7~~6. The inspection apparatus for the rail-transportation rolling stock of claim ~~6~~1, characterized in that the inspection robot (400) further comprises:

a detection device (430) disposed at an end of the mechanical arm (420) and communicatively connected to the control device (600).

~~8~~7. The inspection apparatus for the rail-transportation rolling stock of claim ~~7~~6, characterized in that the inspection robot (400) further comprises:

an engaging device (440) disposed on the vehicle body (411) and configured to be engaged with other devices.

~~9~~8. The inspection apparatus for the rail-transportation rolling stock of claim ~~7~~6, characterized in that the inspection robot (400) further comprises:

auxiliary charging terminal (450) disposed on the vehicle body (411).

~~10~~9. The inspection apparatus for the rail-transportation rolling stock of claim ~~9~~8, characterized by further comprising:

an auxiliary charging device (800) disposed at the railway (100), having a matched structure with the auxiliary charging terminal (450), and configured to provide electric power for the auxiliary charging terminal (450).

~~11~~10. The inspection apparatus for the rail-transportation rolling stock of claim ~~8~~7, characterized by further comprising an inspection auxiliary device (900) comprising:

auxiliary travelling device (910);

a tool rack (920) disposed on the auxiliary travelling device (910) and configured to place a replacing detection device thereon.

~~12~~11. The inspection apparatus for the rail-transportation rolling stock of claim ~~11~~10, characterized in that the inspection auxiliary device (900) further comprises:

a mechanical emergency device (941) disposed on the auxiliary travelling device (910), matched with the engaging device (440), and configured to be mechanically engaged with the inspection apparatus (400).

~~13~~12. The inspection apparatus for the rail-transportation rolling stock of claim ~~12~~11, characterized in that the detection device (430) is connected to the end of the mechanical arm (420) via a quick-coupling device (431);

the quick-coupling device (431) comprises a mechanical arm segment (433) connected to the mechanical arm (420) and a tool segment (435) connected to the detection device (430), the mechanical arm segment (433) and the tool segment (435) are able to be electrically and mechanically connected to each other in a plug-in manner;

the tool rack (920) of the inspection auxiliary device (900) places the replacing detection device, one end of the replacing detection device is connected with an additional tool segment (435), the additional tool segment (435) is configured to be connected to the mechanical arm segment (433), so that the replacing detection device is connected to the mechanical arm (420).

~~14~~13. The inspection apparatus for the rail-transportation rolling stock of claim 1, characterized by further comprising:

a reference datum (310) disposed at a side of the railway (100) along the extending direction of the railway (100);

a pose detection device (320) disposed on the inspection robot (400) and configured to detect distance information of the inspection robot (400) with respect to the reference datum (310);

a processing device (330) communicatively connected to the pose detection device (320) and configured to calculate a pose deviation of the inspection robot (400) with respect to a datum coordinate on basis of the distance information of the inspection robot (400) with respect to the reference datum (310).

~~15~~14. The inspection apparatus for the rail-transportation rolling stock of claim ~~14~~13, characterized in that the processing device (330) is communicatively connected to the control device (600), the control device (600) is further configured to control the travelling of the inspection robot (400) according to the pose deviation of the inspection robot (400) with respect to the datum coordinate.

~~16~~15. An inspection system for a rail-transportation rolling stock, characterized by comprising:

the inspection apparatus (100) for the rail-transportation rolling stock of any one of claims 1-~~15~~14, wherein the number of the inspection robots (400) is at least 2;

a scheduling device (20) communicatively connected to the inspection robots (400) to schedule the inspection robots (400).

~~17~~16. The inspection system for the rail-transportation rolling stock of claim ~~16~~15, characterized in that the at least two inspection robots (400) are respectively provided with different detection devices (430), and the scheduling device (20) is configured to control each of the inspection robots (400) to separately implement one detection item for a plurality of vehicles to be detected.