SUMMARY

Embodiments of the present invention seek to provide a rope cleaning device which can clean wire ropes efficiently to the inside of a short time.

According to an aspect of the present invention, there is provided a rope cleaning device which cleans a plurality of wire ropes arranged at intervals, the rope cleaning device comprising: a housing having a first case and a second case which are rotatably connected to each other via a hinge, a rope cleaning chamber which is defined between the first case and the second case and into which the wire ropes are inserted, and an opening end which communicates with the rope cleaning chamber on a side opposite to the hinge; a plurality of fasteners which extend between the first case and the second case so as to penetrate the rope cleaning chamber, connect the first case and the second case, and are removable from the first case and the second case; a side cover which is removably supported on the housing and blocks the opening end of the housing; a first supporting plate and a second supporting plate which are accommodated in the rope cleaning chamber so as to face each other across the wire ropes penetrating the rope cleaning chamber, and are removably supported on the housing via the fasteners; and a plurality of cleaning elements which are removably supported on the first supporting plate and the second supporting plate, slidably make contact with the wire ropes so as to sandwich all the wire ropes passing through the rope cleaning chamber in a radial direction, and thereby clean the wire ropes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view schematically showing a machine room-less elevator according to an embodiment.

FIG. 2 schematically shows the path of main ropes for suspending a car and a counterweight in a hoistway.

FIG. 3A is a side view showing the structure of each main rope used in the embodiment.

FIG. 3B is a cross-sectional view of each main rope used in the embodiment.

FIG. 4 is a perspective view showing a state in which a rope cleaning device is installed in the hoistway of the machine room-less elevator according to the embodiment.

FIG. 5 is a perspective view in which the rope cleaning device is seen from the side cover side according to the embodiment.

FIG. 6 is a perspective view in which the rope cleaning device is seen from the hinge side according to the embodiment.

FIG. 7 is a side view in which the rope cleaning device is seen from the hinge side according to the embodiment.

WHAT IS CLAIMED IS:

1. A rope cleaning device which cleans a plurality of wire ropes arranged at intervals, the rope cleaning device comprising:

a housing having a first case and a second case which are rotatably connected to each other via a hinge, a rope cleaning chamber which is defined between the first case and the second case and into which the wire ropes are inserted, and an opening end which communicates with the rope cleaning chamber on a side opposite to the hinge;

a plurality of fasteners which extend between the first case and the second case so as to penetrate the rope cleaning chamber, connect the first case and the second case, and are removable from the first case and the second case;

a side cover which is removably supported on the housing and blocks the opening end of the housing;

a first supporting plate and a second supporting plate which are accommodated in the rope cleaning chamber so as to face each other across the wire ropes penetrating the rope cleaning chamber, and are removably supported on the housing via the fasteners; and

a plurality of cleaning elements which are removably supported on the first supporting plate and the second supporting plate, slidably make contact with the wire ropes so as to sandwich all the wire ropes passing through the rope cleaning chamber in a radial direction, and thereby clean the wire ropes.

2. The rope cleaning device of Claim 1, wherein the cleaning elements are arranged at intervals in a direction of arrangement of the wire ropes and an axial direction of the wire

ropes.

3. The rope cleaning device of Claim 1 or Claim 2, wherein

each of the wire ropes comprises a core wire, a plurality of strands twisted at a predetermined pitch around the core wire, and a plurality of strand grooves helically twisted between the adjacent strands, and

the cleaning elements are provided in the rope cleaning chamber in accordance with an inclination angle of the strand grooves.

4. The rope cleaning device of Claim 1, wherein the first case and the second case are rotatable between a first position at which the first case and the second case face each other so as to define the rope cleaning chamber and a second position at which the first case and the second case are separated from each other so as to open the rope cleaning chamber.

5. The rope cleaning device of Claim 1, wherein

the housing comprises a first rope insertion hole open in the rope cleaning chamber, and a second rope insertion hole open in the rope cleaning chamber on a side opposite to the first rope insertion hole, and

a scraper which scrapes grease off the wire ropes by the cleaning elements is provided in each of the first rope insertion hole and the second rope insertion hole.

6. The rope cleaning device of Claim 1 or Claim 2, wherein

the first supporting plate and the second supporting plate have a plurality of slits provided at intervals in a direction of arrangement of the wire ropes, respectively, and the slits are linear cuts from an edge of the first supporting plate

toward an edge of the second supporting plate, and

the cleaning elements have linear channel portions which are removably fitted respectively in the slits, and brush members which are removably supported on the channel portions, and the brush members protrude from the first supporting plate and the second supporting plate toward the wire ropes.

7. The rope cleaning device of Claim 6, wherein

the channel portions of the cleaning elements have end portions, and the end portions protrude from the slits of the first supporting plate and the slits of the second supporting plate toward the first case and the second case, and

in a state where the first case and the second case are secured to the first position by the fasteners, the end portions of the channel portions strike against the first case and the second case.

8. The rope cleaning device of Claim 4, wherein

the first case and the second case are secured to the first position by the fasteners, and

a pressure for pressing the cleaning elements onto the wire ropes is determined based on tightening of the fasteners.

9. The rope cleaning device of Claim 4, wherein one of the first and second supporting plates comprises a stopper portion protruding toward the other one of the first and second supporting plates, and

the stopper portion prevents the cleaning elements from being excessively pressed onto the wire ropes by making contact with the other one in a state where the first case and the second case are secured by the fasteners.

10. The rope cleaning device of Claim 1, wherein

the wire ropes extend along a hoistway of an elevator, and

the housing is supported on the hoistway such that the housing is rotatable around a perpendicular axis so as to follow a rope draw of the wire ropes, the rope draw changing in the hoistway.