

Steel Cable Anti-Stripping Device for Elevator Speed Limiter and Elevator Speed Limiter Having such Device

Technical Field

The present invention relates to a steel cable anti-stripping device for an elevator speed limiter, and an elevator speed limiter having such a steel cable anti-stripping device.

Background

With the rapid development of high-rise buildings, elevators have been widely used as vehicles in the buildings. According to information provided by the China Elevator Association, as of 2011, the total number of elevators in use nationwide has exceeded 1 million units, making it the country with the largest total number of elevators in the world. As a means of transportation, the elevators have become an indispensable part of people's daily lives. In terms of so many elevators, even if a very small part of them has problems in operation, it will become a very difficult thing. How to reduce the probability of elevator problems to a minimum and quickly solve their problems has become a new demand for elevators.

During elevator operation, the control failure, insufficient traction force, braking failure or insufficient braking force, overload drag, broken traction rope and other reasons will cause the car to overspeed and fall, so reliable protection measures must be taken.

The speed limiter is one of the above protection measures, which is a device that limits the operating speed of the elevator. The speed limiter is generally installed in the machine room, which monitors and controls the speed of the car at any time. When an overspeed situation occurs, i.e., generally exceeding 115% of the rated speed of the elevator, it can send a signal in time, and then generate a mechanical action to cut off the power supply circuit, so as to brake the traction machine. Both ends of the speed limiter rope are connected to the safety gear link on the car frame through a speed limiter cable wheel and a tension wheel, so the running speed of the car is transmitted to the speed limiter cable wheel through the speed

limiter steel cable. When the elevator overspeed reaches the limit value, the speed limiter acts to brake the speed limiter steel cable, and continues to move downward as the car, so that the speed limiter steel cable operates the safety gear link, and clamps the safety gear on the guide rails to stop the car.

This type of speed limiter device is generally installed in the uppermost machine room of the lifting channel. There are the following precautions during its use: 1) the direction of action of the speed limiter should be consistent with the direction of lowering of the car to ensure that the safety gear works; 2) the speed limiter steel cable must not be rubbed or contacted with the rope clamp during normal operation; and 3) the speed limiter steel cable must not have any dead bends, and the rope head is securely fastened with a rope clamp.

In other words, the steel cable is in a normal position during operation, which plays a key role in the normal operation of the speed limiter. However, since the steel cable is coiled on the speed limiter cable wheel, there is a risk that the steel cable will be detached from the cable wheel.

In the prior art, in order to prevent such detachment, a groove is provided in the outer circumference of the cable wheel where the steel cable is coiled, but in this way separation of the steel cable cannot be completely avoided, which will cause a great safety hazard to operation of the elevator.

Contents of the Invention

Thus, the purpose of the present invention is to provide a steel cable anti-stripping device for an elevator speed limiter and an elevator speed limiter, which can eliminate the risk of steel cable disengagement and improve the overall reliability of the elevator.

In order to solve the above problem, the steel cable anti-stripping device according to the present invention is characterized in that: the steel cable anti-stripping device is fixedly installed on a base, on which a cable wheel that is wound with a steel cable inside its cable groove is rotatably installed; and the steel cable anti-stripping device is so configured that a portion thereof covers the outer peripheral of the cable wheel, so as to prevent the steel cable

from moving out of the cable groove of the cable wheel.

With the steel cable anti-stripping device of the above structure, it is difficult for the steel cable to move out of the cable groove, thereby ensuring the reliability of the elevator speed limiter and improving the safety of the elevator system.

The steel cable anti-stripping device according to the present invention is characterized in that: there are two steel cable anti-stripping devices corresponding to an entrance where the steel cable enters the groove and an exit where the steel cable leaves the groove, wherein the entrance is a place where the steel cable enters the cable groove, and the exit is a place where the steel cable comes out of the cable groove.

With the steel cable anti-stripping device of the above structure, a small number of anti-stripping devices can reliably realize the anti-stripping function, simplifying the installation work.

The steel cable anti-stripping device according to the present invention is characterized in that: a gap between the steel cable anti-stripping device and the outermost surface of the outer peripheral portion of the cable wheel is 2 mm or less.

With the steel cable anti-stripping device of the above structure, it is possible to further enhance the anti-stripping effect, thereby further improving the safety.

The steel cable anti-stripping device according to the present invention is characterized in that: a gap between the steel cable anti-stripping device and the outer surface of the outermost steel cable is 3 mm or less.

With the steel cable anti-stripping device of the above structure, it is possible to further enhance the anti-stripping effect, thereby further improving the safety.

The steel cable anti-stripping device according to the present invention is characterized in that: the steel cable anti-stripping device is provided on a flange arranged on the base.

The steel cable anti-stripping device with the above structure can make easier the installation of the anti-stripping device, and since the installation position is determined in advance, the on-site operation and processing are more convenient, and hence the working efficiency of on-site processing is improved.

The steel cable anti-stripping device according to the present invention is characterized in that: the steel cable anti-stripping device is formed to have an L-shaped cross section, one side of the L-shape being fixed to the base by a fixing mechanism.

The steel cable anti-stripping device with the above structure can be an anti-stripping device with a simple structure and easy installation, which can simplify the manufacturing process and reduce the manufacturing cost, and can easily and inexpensively constitute a steel cable anti-stripping device.

The elevator speed limiter according to the present invention is used an elevator, characterized by comprising: a base; a speed limiter cable wheel rotatably mounted on the base; an actuating switch of the speed limiter; a steel cable wrapped in the cable groove of the speed limiter cable wheel; and the above-mentioned steel cable anti-stripping device mounted on the base.

With the elevator speed limiter of the above structure, it is difficult for the steel cable to move out of the cable groove, thereby ensuring the reliability of the elevator speed limiter and improving the safety of the elevator system.

Effects of the invention:

Thanks to the present invention, the risks of steel cable disengagement and speed limiter failure are eliminated, thereby improving the overall reliability of the elevator speed limiter and enhancing the overall safety of the elevator system.

Description of the Drawings

FIG. 1 is a perspective view of an elevator speed limiter equipped with a steel cable anti-stripping device of the present invention;

FIG. 2 is a partially enlarged perspective view of the steel cable anti-stripping device of the present invention; and

FIG. 3 is a perspective view of an elevator speed limiter in the prior art.

List of reference signs:

- 10: elevator speed limiter;
- 1: speed limiter cable wheel;
- 2: base;
- 3: actuating switch;
- 4: steel cable anti-stripping device;
- 5: steel cable;
- 6: cable groove

Embodiments

The specific embodiments of the invention will be described hereinafter with reference to FIGS. 1 to 3. FIG. 1 is a perspective view of an elevator speed limiter equipped with a steel cable anti-stripping device of the invention. FIG. 2 is a partially enlarged perspective view of the steel cable anti-stripping device of the invention. FIG. 3 is a perspective view of the prior art elevator speed limiter.

In the building's hoistway, the car is suspended by the main rope. The main rope is hung on a hoist installed in the machine room at the uppermost part of the hoistway. By driving the hoist, the car moves up and down along the guide rails.

Further, a speed limiter device 10 is installed in the machine room at the uppermost part of the hoistway. As shown in FIG. 3, the prior art speed limiter device 10 comprises a base 2, a speed limiter cable wheel 1 rotatably mounted on the base 2, an actuating switch 3 of the speed limiter, and a steel cable 5 wound on the speed limiter cable wheel 1.

The above base 2 is fixedly installed on the load-bearing beam in the machine room, is used to install and fix each component on the speed limiter device 10, and is generally made of a metal material.

The speed limiter cable wheel 1 is the main part of the speed limiter, and a clamping mechanism is attached to the speed limiter cable wheel. A cable groove 6 is recessed into the middle of the outer peripheral surface of the speed limiter cable wheel, and a steel cable 5 is wound in the cable groove 6.

When the speed of the speed limiter cable wheel 1 exceeds the set speed, an actuating switch 3 of the speed limiter will be triggered, so that the elevator safety circuit will be disconnected to realize the function of limiting the elevator running speed by the speed limiter.

In the speed limiter device 10 of the above structure, the steel cable 5 is wound in the cable groove 6 of the speed limiter cable wheel, but sometimes the steel cable will detach from the cable groove 6, causing the risk of speed limiter failure.

In order to prevent this dangerous situation, the inventors adjust the base structure of the speed limiter. As shown in FIG. 1, on the basis of the original base 2, the parts of the base 2 close to the entrance and exit of the steel cable 5 are drilled with holes, and the steel cable anti-stripping device 4 also drilled with holes is fixed to the base 2 by a fixing mechanism such as bolts.

The detailed structure of the steel cable anti-stripping device 4 is shown in FIG. 2, and FIG. 2 is a partially enlarged perspective view of the steel cable anti-stripping device 4 of the present invention. In FIG. 2, two steel cable anti-stripping devices 4 are added to the prior art speed limiter device 10, which are installed on the left and right sides of the base 2 close to the entrance and exit of the steel cable 5.

The inventor found that the out-of-groove accident is most likely to occur at the entrance where the steel cable 5 enters the cable groove 6 and at the exit where the steel cable leaves the cable groove 6. Thus, the steel cable anti-stripping devices 4 are mounted on the base near these two locations, and so it can securely ensure that it is possible to prevent the steel cable 5 from being disengaged from the cable groove at the entrance and exit of the speed limiter steel cable 5.

In the present invention, the steel cable anti-stripping device 4 is formed from a sheet metal stamped into an "L" shape in section, wherein one side of the "L" shape is fixed to the base 2 by screws or the like, and the other side of the "L" shape is parallel to the outer circumferential surface of the cable wheel 1, and further its width is formed to be able to completely cover the width above the anti-stripping device.

However, the amount of the steel cable anti-stripping device 4 is not limited to two, but one or more is also possible, and also its position is not limited to the entrance and the exit.

In addition, in order to achieve the better anti-stripping effect, the inventors found through repeated research that as illustrated in FIG. 2, the anti-stripping effect is the best and it is possible to effectively prevent disengagement of the steel cable, if the gap α between the other side of the "L" shape of the steel cable anti-stripping device 4 and the outermost surface of the outer peripheral portion of the cable wheel 1 is 2 mm or less, and the gap β between the other side of the "L" shape and the outer surface of the outermost steel cable 5 is 3 mm or less, taking into account factors such as the diameter of the steel cable.

Further, in order to facilitate the installation of the steel cable anti-stripping device 4, a flange 7 for installing the steel cable anti-stripping device 4 may also be specially provided on the frame of the base 2. However, the flange 7 may not be specifically provided, and the frame of the existing base 2 may be directly drilled for installation, so that the speed limiter in the existing elevator apparatus can be easily modified.

In addition, in the above specific embodiment, the example in which the steel cable anti-stripping device 4 is applied to the speed limiter of an elevator has been described, but this anti-stripping device can also be applied to other structures having cable wheels.

Although the specific embodiments of the present invention have been described above, the specific embodiments are only presented as examples and are not intended to limit the scope of the invention. These new embodiments can be implemented in other various ways, and various omissions, substitutions, and changes can be made without departing from the gist of the invention. These embodiments and their modifications are included in the scope and gist of the invention, and also included in the appended claims and their equivalents.

CLAIMS

1. A system comprising an elevator speed limiter (10) and a steel cable anti-stripping device (4), characterized in that,

the elevator speed limiter (10) comprises a base (2), a cable wheel (1) and a steel cable (5), wherein the steel cable anti-stripping device (4) is fixedly installed on the base (2) of the elevator speed limiter (10), and the cable wheel (1) that is wound with the steel cable (5) inside its cable groove (6) is rotatably installed on the base (2); and the steel cable anti-stripping device (4) is so configured that a portion thereof covers an outer peripheral portion of the cable wheel (1), so as to prevent the steel cable (5) from moving out of the cable groove (6) of the cable wheel (1),

a gap between the steel cable anti-stripping device (4) and an outermost surface of the outer peripheral portion of the cable wheel (1) is 2 mm or less, and

a gap between the steel cable anti-stripping device (4) and an outer surface of an outermost steel cable (5) is 3 mm or less, wherein the gap between the steel cable anti-stripping device (4) and the outermost surface of the outer peripheral portion of the cable wheel (1), is smaller than the gap between the steel cable anti-stripping device (4) and the outer surface of the outermost steel cable (5).

2. The system as claimed in claim 1, characterized in that,

there are two steel cable anti-stripping devices (4) corresponding to an entrance where the steel cable (5) enters the cable groove (6) and an exit where the steel cable leaves the cable groove (6), wherein the entrance is a place where the steel cable (5) enters the cable groove (6), and the exit is a place where the steel cable (5) comes out of the cable groove (6).

3. The system as claimed in any one of claim 1 or 2, characterized in that,

the steel cable anti-stripping device (4) is provided on a flange (7) arranged on the base (2) of the elevator speed limiter (10).

4. The system as claimed in any one of claim 1 or 2, characterized in that,
the steel cable anti-stripping device (4) is formed to have an L-shaped cross section, one side of the L-shape being fixed to the base (2) of the elevator speed limiter (10) by a fixing mechanism.

5. The system as claimed in any one of claims 1-4, wherein the elevator speed limiter (10) further comprises an actuating switch (3).