

ELEVATOR GUIDE RAIL OILING DEVICE

BACKGOURND OF THE INVENTION

1. Field of the Invention

[0001]

The present invention relates to an elevator guide rail oiling device for supplying lubricating oil to a guide surface of a guide rail of an elevator.

2. Description of the Background Art

[0002]

A background-art elevator guide rail oiling device has a case which is attached to a place moving up/down in connection with a cage, and a sheet-like oil holding member which is received in the case and impregnated with lubricating oil so that the oil holding member can slide against a guide surface of a guide rail to apply the lubricating oil to the guide surface.

[0003]

As this type device, there is a guide rail oiling device disclosed in JP-A-2000-16719. In this guide rail oiling device, a worker injects lubricating oil to the top of the oil holding member in the case to supply the lubricating oil to the oil holding member when the oil holding member is short of the lubricating oil with which the oil holding member should be impregnated.

[0004]

JP-A-2007-15782 has disclosed another elevator guide rail lubricating device. This guide rail lubricating device has an oil tank and an oil feeding member in addition to the configuration of the aforementioned guide rail oiling device in order to supply the lubricating oil to the oil holding member efficiently. The oil tank reserves the lubricating oil. The oil feeding member has one end disposed in the oil tank, and the other end disposed on the top of the oil holding member. The oil feeding member is a material with a microscopic hollow structure, such as wool yarn or gauze. That is, the elevator guide rail lubricating device disclosed in JP-A-2007-15782 can feed the lubricating oil reserved in the oil tank to the oil holding member due to capillary action of the oil feeding member. Thus, the frequency with which the worker supplies the lubricating oil to the guide rail lubricating device can be reduced on a large scale.

[0006]

However, in the guide rail lubricating device disclosed in JP-A-2007-15782, it is difficult to grasp the upper limit of the height position of the oil level of the lubricating oil in the oil tank when the lubricating oil is to be injected into the oil tank.

SUMMARY OF THE INVENTION

[0007]

The present invention was developed in consideration of the aforementioned circumstances. An object of the invention is to provide an elevator guide rail oiling device in which the upper limit of the amount of injected lubricating oil can be visually recognized easily.

[0008]

In order to attain the aforementioned object, an elevator guide rail oiling device according to the invention is configured as follows.

[0009]

(1) An elevator guide rail oiling device according to the invention includes: a case which is attached to a predetermined place moving up/down in connection with up/down movement of a cage; a reservation portion which is provided in the case so as to reserve lubricating oil; an oiling unit which is received in the case and which is permeable by the lubricating oil, a part of the oiling unit sliding against a guide surface of a guide rail of an elevator to apply the lubricating oil to the guide surface; and a suction member which has one end impregnated with the lubricating oil in the reservation portion and the other end provided in contact with the oiling unit so that the suction member can suck up the lubricating oil from the reservation portion so as to supply the lubricating oil to the oiling unit; wherein: the guide rail oiling device further includes an oil level indicating portion which

indicates an upper limit of a height position of an oil level of the lubricating oil in the reservation portion, and which is provided to protrude upward from a bottom portion of the reservation portion so that a height position of a tip of the oil level indicating portion is set to be as high as the upper limit of the height position of the oil level of the lubricating oil.

[0010]

According to the guide rail oiling device described in the paragraph (1), it can be visually recognized that the height position of the oil level of the lubricating oil reaches the upper limit when the oil level indicating portion is buried in the lubricating oil during the injection of the lubricating oil into the reservation portion. As a result, even when the case is placed closely to feet of a worker on the cage, the worker can visually recognize whether the height position of the oil level of the lubricating oil has reached the upper limit or not, right from above without bending down to peer.

[0011]

(2) According to the invention, there is provided an elevator guide rail oiling device described in the paragraph (1), wherein: the oil level indicating portion is formed into an upward tapered shape.

[0012]

According to the guide rail oiling device described in

the paragraph (2), the oil level indicating portion is formed into an upward tapered shape so that the condition that the oil level indicating portion is being buried in the lubricating oil during the injection of the lubricating oil into the reservation portion can be recognized visually easily and right from above the case. Thus, the visibility as to whether the height position of the oil level of the lubricating oil has reached the upper limit or not can be improved.

[0013]

(3) According to the invention, there is provided an elevator guide rail oiling device described in the paragraph (1) or (2), wherein: a convex mark protruding upward is provided in the tip of the oil level indicating portion.

[0014]

In the guide rail oiling device described in the paragraph (3), only the mark of the oil level indicating portion is not buried in the lubricating oil when the oil level of the lubricating oil reaches the upper limit. It is therefore easy to visually recognize that the oil level of the lubricating oil has reached the same height position as the tip of the oil level indicating portion. Accordingly, the visibility about the state in which the height position of the oil level of the lubricating oil has reached the upper limit can be improved.

[0015]

(4) According to the invention, there is provided an elevator

guide rail oiling device described in the paragraph (1), (2) or (3), wherein: a fixing component for attaching the case to the predetermined place is provided in the case, while a protrusion portion formed for setting the fixing component is provided in a bottom portion of the reservation portion, and the oil level indicating portion is provided to be closer to the suction member than the protrusion portion.

[0016]

In the guide rail oiling device described in the paragraph (4), in order to allow the worker to inject lubricating oil into the reservation portion while visually recognizing the oil level indicating portion, one end portion of the suction member is disposed more closely to the oiling unit than the oil level indicating portion so that the oil level indicating portion can be visually recognized. Thus, the one end portion of the suction member can be prevented from being disposed to overhang the protrusion portion, so that the suction member can be prevented from moving up away from the bottom portion of the reservation portion. That is, the lubricating oil can be sucked up by the suction member till almost all the lubricating oil in the reservation portion is used up.

[0017]

According to the elevator guide rail oiling device according to the invention, it is possible to achieve an

elevator guide rail oiling device in which the upper limit of the amount of injected lubricating oil can be visually recognized as described previously. It is therefore possible to improve the efficiency in the work of supplying the lubricating oil into the guide rail oiling device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 is an exploded perspective view of a guide rail oiling device according to an embodiment of the invention;

Fig. 2 is a sectional view taken on a cutting-plane line II-II in Fig. 1, in which components shown in Fig. 1 have been assembled;

Fig. 3 is a sectional view taken on a cutting-plane line III-III in Fig. 1, in which components shown in Fig. 1 have been assembled; and

Fig. 4 is a perspective view of a body of an oiling unit shown in Fig. 1.

DETAILED DESCRIPTION OF THE INVENTION

[0019]

A guide rail oiling device according to an embodiment of the invention will be described with reference to Figs. 1 to 4.

[0020]

As shown in Fig. 1, the guide rail oiling device according to this embodiment has a case 1 and an oiling unit 20. The

case 1 is attached to a place moving up/down in connection with a cage (not shown). The oiling unit 20 is received in an upper portion of the case 1. The case 1 is a bottomed vessel opened in the top. The case 1 serves as a reservation portion for reserving lubricating oil. In the case 1, a suction member 30 is put between the lubricating oil reserved in the case 1 and the oiling unit 20.

[0021]

The case 1 has a groove-like wall portion which forms a rail insertion concave portion 2 shaped like a groove and extending in the up/down direction. A guide surface of a guide rail is inserted into the rail insertion concave portion 2. A cover (not shown) is openably provided in the top of the case 1. The upward movement of the oiling unit 20 and the suction member 30 is regulated by the cover. A rail insertion concave portion shaped like a groove is also provided in the cover and on an upward extension of the rail insertion concave portion 2 of the case 1.

[0022]

Three positioning protrusions 3 to 5, oil impermeable sheet upstanding pieces 6 to 9 and suction member upstanding pieces 10 and 11 are provided in an inner bottom portion of the case 1. The positioning protrusions 3 to 5 are formed into columnar shapes protruding upward, so that the positioning protrusions 3 to 5 can define the horizontal position of the

oiling unit 20 in the case 1. The oil impermeable sheet upstanding pieces 6 to 9 are formed like folds protruding upward, so that the oil impermeable sheet upstanding pieces 6 to 9 can define the height position of the oiling unit 20 in the case 1. The oil impermeable sheet upstanding pieces 6 to 9 and the suction member upstanding pieces 10 and 11 are located away from each other.

[0023]

The oil impermeable sheet upstanding pieces 6 are provided along an inner surface 1a of the case 1 so as to protrude from the inner surface 1a toward the inside of the case 1. A reception surface 6a for receiving an oil impermeable sheet 23B is provided in a top portion of each oil impermeable sheet upstanding piece 6. Of two step-different surfaces which are provided in the top portion of each oil impermeable sheet upstanding piece 6 and one of which is one step lower on the inner side of the case 1 than the other, the lower surface serves as the reception surface 6a. The oil impermeable sheet upstanding piece 7 protrudes from the inner surface 1a of the case 1 toward the inside of the case 1. A top portion of the oil impermeable sheet upstanding piece 7 serves as a reception surface for receiving the oil impermeable sheet 23B. The oil impermeable sheet upstanding piece 8 is located substantially at the center of the case 1. A top portion of the oil impermeable sheet upstanding piece 8 serves

as a reception surface for receiving the oil impermeable sheet 23B. Each oil impermeable sheet upstanding piece 9 is formed into an L-shape in top view. The two oil impermeable sheet upstanding pieces 9 are located to be opposite to each other with interposition of a groove-like wall portion 2a. Top portions of the oil impermeable sheet upstanding pieces 9 also serve as reception surfaces for receiving the oil impermeable sheet 23B. On the other hand, the suction member upstanding piece 10 is located adjacently to the oil impermeable sheet upstanding piece 8 and on the opposite side to the rail insertion concave portion 2. A top portion of the suction member upstanding piece 10 serves as a reception surface for receiving an oil-feed-side portion 32 of the suction member 30. Each suction member upstanding piece 11 is located at a larger distance from the rail insertion concave portion 2 than the suction member upstanding piece 10. The suction member upstanding piece 11 protrudes from the inner surface 1a of the case 1 toward the inside of the case 1. A reception surface 11a for receiving the suction member 30 is provided in a top portion of the suction member upstanding piece 11. Of two step-different surfaces which are provided in the top portion of the suction member upstanding piece 11 and one of which is one step lower on the inner side of the case 1 than the other, the lower surface serves as the reception surface 11a.

[0024]

The height positions of the top portion (reception surface) of the suction member upstanding piece 10 and the reception surface 11a of the suction member upstanding piece 11 are set to be lower than the reception surfaces 6a of the oil impermeable sheet upstanding pieces 6, the top portion (reception surface) of the oil impermeable sheet upstanding piece 7, the top portion (reception surface) of the oil impermeable sheet upstanding piece 8 and the top portions of the oil impermeable sheet upstanding pieces 9 by the thickness of the oil-feed-side portion 32 of the suction member 30.

[0025]

Insert nuts 12 are provided in an outer bottom portion of the case 1. Therefore, protrusion portions 13 protruding upward are formed in the inner bottom portion of the case 1. The case 1 is fastened to a bracket (not shown) in the position of the insert nuts 12. The bracket is provided in a place which moves up/down in connection with the cage.

[0026]

The oiling unit 20 has a body 21 in which an oil permeable sheet 22 and oil impermeable sheets 23A and 23B are stitched and bundled so that the oil permeable sheet 22 is put between the oil impermeable sheets 23A and 23B in the up/down direction. The oil permeable sheet 22 is a member which is formed out of woven or nonwoven fabric, by which the lubricating oil can be absorbed due to capillary action of a microscopic hollow

structure thereof. In addition, the oil permeable sheet 22 is a member having oil resistance and flexibility. The oil impermeable sheets 23A and 23B are members which do not absorb the lubricating oil but have oil resistance and flexibility. [0027]

As shown in Fig. 4, a rail insertion concave portion 23a to which the guide surface of the guide rail will be inserted is formed in the oil impermeable sheet 23A. A rail insertion concave portion (not shown) having the same shape and the same dimensions as the rail insertion concave portion 23a is also formed in the oil impermeable sheet 23B. Tongue-like portions 22a to 22c are formed in the oil permeable sheet 22 so as to be located protruding from the rail insertion concave portion 23a in three directions in top view. As shown in Fig. 1, the tongue-like portions 22a to 22c are covered with contact sheets 27 to 29. These contact sheets 27 to 29 have an oil permeable property and wear resistance. The contact sheets 27 to 29 are stitched on the oil permeable sheet 22 and the oil impermeable sheets 23A and 23B. The place where each of the contact sheets 27 to 29 is stitched serves as one of the places where the oil permeable sheet 22 and the oil impermeable sheets 23A and 23B are bundled. The tongue-like portions 22a to 22c and the contact sheets 27 to 29 are brought into contact with the guide surface of the guide rail so as to form oiling bellows portions 20a to 20c for applying the lubricating oil to the guide surface,

respectively. The rail insertion concave portion 23a to which the guide surface of the guide rail will be inserted is formed inside the oiling bellows portions 20a to 20c.

[0028]

The oil permeable sheet 22 and the oil impermeable sheets 23A and 23B are set to have substantially the same shape and the same dimensions in top view, except the presence/absence of the tongue-like portions 22a to 22c.

[0029]

Positioning holes 24 to 26 penetrating the oil permeable sheet 22 and the oil impermeable sheets 23A and 23B in their lamination direction (up/down direction) are provided in the body 21. The oiling unit 20 is received into the case 1 in the state that the aforementioned three positioning protrusions 3 to 5 have been inserted into the three positioning holes 24 to 26 respectively.

[0030]

The suction member 30 is formed out of an oil permeable square sheet folded back in its intermediate portion and stitched therein. One side portion of the suction member 30 with respect to the intermediate portion serves as a suction-side portion 31 to be suspended toward the bottom portion of the case 1. The other side portion of the suction member 30 with respect to the intermediate portion serves as the sheet-like oil-feed-side portion 32 which is disposed

under the oiling unit 20 to overlap the oil impermeable sheet 23B of the oiling unit 20.

[0031]

A belt-like oil guide portion 22d is provided to protrude outward in the center of an edge portion of the oil permeable sheet 22 on the opposite side to the rail insertion concave portion 23a. The oil guide portion 22d is put on top of the oil-feed-side portion 32 of the suction member 30 in the state where the oil guide portion 22d is folded back around the edge portion of the oil impermeable sheet 23B. That is, the oil guide portion 22d is put between the oil-feed-side portion 32 and the oil impermeable sheet 23B and kept in contact with the oil-feed-side portion 32. The oil-feed-side portion 32 is stitched with the oil permeable sheet 22 and the oil impermeable sheets 23A and 23B of the oiling unit 20. The oil-feed-side portion 32 is provided with a positioning hole 33 disposed coaxially with the positioning hole 24 of the oiling unit 20.

[0032]

The oil permeable sheet 22 and the oil impermeable sheets 23A and 23B are set to have substantially the same shape and the same dimensions in top view, except the presence/absence of the tongue-like portions 22a to 22c and the oil guide portion 22d.

[0033]

The case 1 has an oil level indicating portion 40 which

is shaped to be tapered and which is provided to protrude upward in the bottom portion of the case 1. The oil level indicating portion 40 indicates the amount of protrusion from the bottom portion of the case 1 as the upper limit of the height position of the oil level of the lubricating oil in the case 1. The upper limit of the height position of the oil level of the lubricating oil is set at a height position L which is set to be lower than the height position in which the oiling unit 20 and the oil-feed-side portion 32 of the suction member 30 are disposed, and to be lower than the groove-like wall portion 2a forming the rail insertion concave portion 2 of the case 1, as shown by the two-dot chain line in Figs. 2 and 3. That is, the upper limit of the height position of the oil level of the lubricating oil is set at a height position where the oiling unit 20 and the oil-feed-side portion 32 of the suction member 30 can be prevented from touching the oil level of the lubricating oil and the lubricating oil can be prevented from leaking over the groove-like wall portion 2a.

[0034]

The oil level indicating portion 40 is formed to be tapered upward. A convex mark 41 showing a character string of "FULL" is provided at the tip of the oil level indicating portion 40.

[0035]

A lower end portion of the oil level indicating portion

40 is located more closely to the suction member 30 than each protrusion portion 13 in which the insert nut 12 is provided.

[0036]

The guide rail oiling device according to the embodiment configured thus is operated as follows.

[0037]

As shown in Fig. 2, to receive the oiling unit 20 and the suction member 30 in the case 1, a worker inserts the positioning protrusions 3 to 5 of the case 1 into the positioning holes 24 to 26 of the oiling unit 20 respectively while inserting the positioning protrusion 3 into the positioning hole 33 of the oil-feed-side portion 32 of the suction member 30. At the same time, the worker mounts the oiling unit 20 on the reception surfaces 6a of the oil impermeable sheet upstanding pieces 6, the top portion (reception surface) of the oil impermeable sheet upstanding piece 7, the top portion (reception surface) of the oil impermeable sheet upstanding piece 8 and the top portions (reception surfaces) of the oil impermeable sheet upstanding pieces 9, while mounting the oil-feed-side portion 32 of the suction member 30 on the top portion (reception surface) of the suction member upstanding piece 10 and the reception surfaces 11a of the suction member upstanding pieces 11. Thus, the oiling unit 20 and the suction member 30 are disposed in a higher position than the upper limit of the height position

of the oil level of the lubricating oil in the case 1.

[0038]

On this occasion, the suction-side portion 31 of the suction member 30 is hung down between the suction member upstanding pieces 11 and the oil level indicating portion 40 so as to be brought into contact with the bottom portion of the case 1.

[0039]

After the oiling unit 20 and the suction member 30 are received in the case 1 in this manner, the lubricating oil is injected into the case 1. The lubricating oil injected into the case 1 surrounds the oil level indicating portion 40 in top view. Since the oil level indicating portion 40 is tapered upward, the area of the oil level indicating portion 40 which does not soak in the lubricating oil in top view is reduced with increase in the amount of the lubricating oil injected into the case 1. As soon as the height position of the oil level of the lubricating oil reaches the upper limit, of the oil level indicating portion 40, only the mark 41 indicating the character string of "FULL" is rid of soaking in the lubricating oil. The worker observing this state can know the height position of the oil level of the lubricating oil has reached the upper limit. The worker closes the cover of the case 1 after injecting the lubricating oil into the case in this manner. Thus, the vertical movement of the oiling unit

20 can be regulated between the oil impermeable sheet upstanding pieces 6 to 9 and the suction member upstanding pieces 10 and 11 and the cover.

[0040]

The lubricating oil in the case 1 is sucked up by the suction-side portion 31 of the suction member 30 and supplied to the oil-feed-side portion 32. Next, the lubricating oil is sucked up from the oil-feed-side portion 32 by the oil guide portion 22d and supplied to the oil permeable sheet 22. Thus, the range of the oil permeable sheet 22 impregnated with the lubricating oil is expanded to the tongue-like portions 22a to 22c. When the oiling bellows portions 20a to 20c slide against the guide surface of the guide rail in this state in response to the up/down movement of the cage, the lubricating oil is permeated from the oiling bellows portions 20a to 20c and applied to the guide surface of the guide rail.

[0041]

The following effect can be obtained by the guide rail oiling device according to the embodiment.

[0042]

According to the guide rail oiling device in the embodiment, the oil level indicating portion 40 is formed into an upward tapered shape so that the condition that the oil level indicating portion 40 is being buried in the lubricating oil during the injection of the lubricating oil into the case 1

can be observed visually easily from above the case 1. It is therefore possible to improve the visibility about the fact that the height position of the oil level of the lubricating oil has reached its upper limit. As a result, even when the case 1 is placed closely to feet of a worker on the cage, the worker can visually recognize whether the height position of the oil level of the lubricating oil has reached the upper limit or not, without bending down to peer. It is therefore possible to improve the efficiency in the work of supplying the lubricating oil into the guide rail oiling device.

[0043]

In the guide rail oiling device according to the embodiment, the convex mark 41 showing the upper limit of the height position of the oil level is provided at the tip of the oil level indicating portion 40. As soon as the oil level of the lubricating oil reaches the upper limit, of the oil level indicating portion 40, only the mark 41 is rid of soaking in the lubricating oil. It is therefore easy to visually recognize the fact that the height position of the oil level of the lubricating oil has reached the same height as the tip of the oil level indicating portion 40. It is therefore possible to improve the visibility as to the state in which the height position of the oil level of the lubricating oil has reached the upper limit.

[0044]

In the guide rail oiling device according to the embodiment, the protrusion portions 13 in which the insert nuts 12 are provided are located at a longer distance from the suction-side portion 31 of the suction member 30 than the oil level indicating portion 40. In order to allow the worker to inject the lubricating oil into the case 1 while visually recognizing the oil level indicating portion 40, the suction-side portion 31 of the suction member 30 is disposed more closely to the oiling unit than the oil level indicating portion 40 so that the oil level indicating portion 40 can be visually recognized. Thus, the oil level indicating portion 40 can prevent the suction-side portion 31 of the suction member 30 from being disposed to overhang the protrusion portions 13 so that the suction-side portion 31 can be prevented from moving up away from the bottom portion of the case 1. That is, the lubricating oil can be sucked up by the suction member 30 till almost all the lubricating oil in the case 1 is used up.

[0045]

In the elevator guide rail oiling device according to the embodiment, the oil level indicating portion 40 and the convex mark 41 can be made to protrude in the direction in which the case 1 will be extracted when the case 1 is molded. Thus, the oil level indicating portion 40 and the mark 41 can be provided together with the case 1 by an inexpensive mold which does not have a complicated shape.

[0046]

In the aforementioned embodiment, the portion for holding the oiling unit 20 and the reservation portion for reserving the lubricating oil are formed integrally in the case 1. However, those portions may be formed separately.

What is claimed is:

1. An elevator guide rail oiling device comprising:
 - a case which is attached to a predetermined place moving up/down in connection with up/down movement of a cage;
 - a reservation portion which is provided in the case so as to reserve lubricating oil;
 - an oiling unit which is received in the case and which is permeable by the lubricating oil, a part of the oiling unit sliding against a guide surface of a guide rail of an elevator to apply the lubricating oil to the guide surface; and
 - a suction member which has one end impregnated with the lubricating oil in the reservation portion and the other end provided in contact with the oiling unit so that the suction member can suck up the lubricating oil from the reservation portion so as to supply the lubricating oil to the oiling unit;wherein:
 - the guide rail oiling device further includes an oil level indicating portion which indicates an upper limit of a height position of an oil level of the lubricating oil in the reservation portion, and which is provided to protrude upward from a bottom portion of the reservation portion so that a height position of a tip of the oil level indicating portion is set to be as high as the upper limit of the height position of the oil level of the lubricating oil.
2. An elevator guide rail oiling device according to Claim

1, wherein:

the oil level indicating portion is formed into an upward tapered shape.

3. An elevator guide rail oiling device according to Claim 1 or 2, wherein:

a convex mark protruding upward is provided in the tip of the oil level indicating portion.

4. An elevator guide rail oiling device according to Claim 1, 2 or 3, wherein:

a fixing component for attaching the case to the predetermined place is provided in the case, while a protrusion portion formed for setting the fixing component is provided in the bottom portion of the reservation portion; and

the oil level indicating portion is provided to be closer to the suction member than the protrusion portion.