

A LOW PROFILE TRACTION MACHINE FOR ELEVATORS

Background of the Invention

The present invention relates to a low profile traction machine for elevator devices.

Generally, a control device for a motor and a traction machine, which serve to
5 have a car of an elevator device going up and down, a speed governor used for emergency
braking when a car over speeds and the like are mounted in a machine room provided at a
topmost of a building. However, elevator devices provided with no machine room, so-called
machine room-less elevator devices are spread in the field of elevator devices, in which a car is
comparatively slow in elevational speed. With such machine room-less elevator devices, all
10 equipment having been conventionally mounted in a machine room is mounted in a hoistway and
a traction machine is also mounted in the hoistway. Various arrangements, in which a traction
machine is mounted in a hoistway, include one, in which a traction machine is mounted in a
manner to partially overlap a section of a car, for example, at a lowermost or uppermost of a
hoistway, one, in which a traction machine is mounted in a clearance between a car and a
15 hoistway wall at an intermediate portion of a hoistway in a heightwise direction, or the like.
Usually, since a clearance between a car and a hoistway wall is in the order of several hundreds
mm, a low profile traction machine is needed in order to mount a traction machine in the
clearance.

Generally, a low profile traction machine is mounted in a clearance in the order of
20 several hundreds mm between a hoistway and a car to face a hoistway wall and a counterweight
is frequently arranged laterally of the traction machine. That is, a low profile traction machine
is mounted in a manner to have four sides thereof surrounded by hoistway walls, a car, and a
counterweight. Accordingly, when a low profile traction machine can be made small in size, a
hoistway can be decreased in section and freedom of layout of equipments mounted in the
25 hoistway can be enlarged. Therefore, there arises an important, technical problem of
miniaturization of a low profile traction machine used in machine room-less elevator devices, in
particular, shortening of an axial dimension of a whole traction machine, that is, thinning.

Also, bearings are used in a rolling mechanism part of a traction machine and
grease is frequently used as a lubricant. While various sealing structures such as labyrinth
30 seals, oil seals, etc. are provided in a grease storage part in many cases, grease sometimes leaks
from a sealing structure part when the grease storage part is unexpectedly increased in pressure,

when the sealing structure is lowered in function due to aged deterioration, or the like. Since grease as leaked is responsible for pollution in a traction machine and other elevator equipments, the traction machine functions in many cases to recover grease as leaked and it is well-known that an oil receiver is mounted (see, for example, JP-A-2009-280380).

5 However, conventional, low profile traction machines for elevator devices include only an oil receiver for recovering grease as leaked, but cannot materialize quickly accommodating a high possibility that some failure is generated in a sealing structure in the case where grease accumulated in an oil receiver is abnormally large in quantity, and cannot accomplish thinning, which is most important in a low profile traction machine for machine
10 room-less elevator devices.

Summary of the Invention

It is an object of the invention to provide a low profile traction machine for elevator devices, which can accumulate grease leaked in the case of some failure in a sealing structure, can quickly accommodate such leakage, and can be shortened in axial length.

15 In order to attain the object, the invention provides a low profile traction machine for elevator devices, comprising a housing, which receives therein a stator and a stator winding, a main shaft supported on and fixed to the housing in a cantilever manner, a bearing housing rotatably mounted to an end of the main shaft through a bearing, a sheave formed integral with the bearing housing, and a rotor of a motor formed integral with the sheave and including a
20 plurality of permanent magnets opposed to the stator, characterized in that a side of the bearing housing, in which the bearing is arranged, opposite to the housing is closed by a bearing cover, an oil dripped space is formed below a clearance between opposite portions of the housing and the bearing housing, and an oil reservoir is formed on an opposite end surface of the housing to the sheave to be positioned below and communicated to the oil dripped space.

25 With the above-described low profile traction machine for elevator devices, while the housing is restricted in thickness to make the low profile traction machine further thin, accumulation in the oil reservoir can be made possible even in the event of leakage of grease from the clearance between opposite portions of the housing and the bearing housing. Since the oil reservoir is formed on the opposite side of the housing to the sheave, it can be simply
30 inspected from the side of the car at the time of maintenance and recovery can be made at need.

Also, the invention is characterized in that a window is formed on an upper portion of the oil reservoir to enable the oil reservoir to be visually observed from an opposite side of the housing to the sheave.

With the above-described low profile traction machine for elevator devices, a worker can visually observe an interior of the oil reservoir through the window at the time of maintenance and visually determine the presence of generation of leakage and the need for recovery.

5 Also, the invention is characterized in that an annular projection is provided on an outer peripheral side of the bearing housing to be made integral with the housing, an oil receiving cover is mounted to the annular projection to be positioned toward the sheave relative to the clearance between the opposite portions of the housing and the bearing housing, and the oil dripped space is formed between a portion of the oil receiving cover positioned inside the
10 annular projection and the housing.

 With the above-described low profile traction machine for elevator devices, while the oil dripped space can be formed so as to prevent leakage to the side of the bearing housing owing to a shape of the housing provided by cutting work or the like, the oil receiving cover is fixed to the annular projection formed on the side of the housing toward the bearing housing and
15 positioned toward the sheave relative to the clearance between the opposite portions of the housing and the bearing housing, so that when the oil receiving cover is made use of to form the oil dripped space on an opposed portion thereof to the housing, the oil dripped space can receive grease leaked and dripping from the clearance between the opposed portions of the housing and the bearing housing. Also, the housing for formation of the oil dripped space is readily worked.

20 Also, the invention is characterized in that an annular projection is provided on an outer peripheral side of the bearing housing to be made integral with the housing, an annular oil receiving cover is mounted to the annular projection to be positioned toward the sheave relative to the clearance between the opposite portions of the housing and the bearing housing, the oil dripped space is formed between a portion of the oil receiving cover positioned inside the
25 annular projection and the housing, and connecting electrical wires for mutual connection of the stator windings are arranged between the oil receiving cover positioned outside the annular projection and the housing.

 With the above-described low profile traction machine for elevator devices, the oil receiving cover is arranged to have an outside diameter portion thereof extended to an outer
30 peripheral side of the annular projection, the connecting electrical wires for mutual connection of the stator windings can be arranged in a space formed on a side of the extended portion toward the housing, and the annular projection and the oil receiving cover for formation of the oil dripped space are made use of to enable forming the space, in which the connecting electrical wires are arranged, so that it is possible to simply receive the connecting electrical wires without

damage to the connecting electrical wires by the sheave being rotated. Besides, as compared with the case where the connecting electrical wires are arranged on a side of the stator and the stator windings toward the sheave, the housing and the sheave can be arranged close to each other, so that it is possible to make the low profile traction machine thinner.

5 Further, the invention is characterized in that a dented portion is formed centrally of the housing on an opposite side of the housing to the sheave except a portion thereof for fixation of the main shaft, a plurality of ribs are provided on and formed integral with the dented portion to reinforce the housing in strength, and an oil receiving cover is sealingly fixed on the housing in the vicinity of the ribs to form the oil reservoir.

10 With the above-described low profile traction machine for elevator devices, the oil reservoir can be readily formed on a side of the housing toward the car by cutting work or the like and it is possible to provide an appropriate volume with the oil reservoir by sealing a front surface portion of the oil reservoir by the oil receiving cover, and it is possible to visually confirm the quantity of oil accumulated in the oil reservoir through the oil dripped space by
15 forming an open window on an upper portion of the oil receiving cover.

According to the low profile traction machine for elevator devices of the invention, it is possible to constrict the thickness of the housing to make the low profile traction machine thinner and even when leakage of grease from a clearance between the opposite portions of the housing and the bearing housing occurs, it is possible to accumulate the leaked
20 grease into the oil reservoir. Since the oil reservoir is formed on the side of the housing toward the car, it is possible to simply inspect from the side of the car at the time of maintenance and to recover at need.

Brief Description of the Drawings

Fig. 1 is a cross sectional view of a low profile traction machine for elevator
25 devices according to an embodiment of the invention.

Fig. 2 is a front view of the low profile traction machine for elevator devices, shown in Fig. 1.

Fig. 3 is a side view of the low profile traction machine for elevator devices, shown in Fig. 1.

30 Fig. 4 is a cross sectional view of an elevator device using the low profile traction machine for elevator devices, shown in Fig. 1.

Description of the Preferred Embodiments

An embodiment of the invention will be described hereinafter with reference to the drawings.

Fig. 4 is a cross sectional view of an elevator device using a low profile traction machine for elevator devices according to an embodiment of the invention. In a hoistway 1, a car 2 and a counterweight 3, which are connected to each other by a main cable (not shown), are arranged so that they can go up and down. A low profile traction machine 4 is mounted in a clearance of about several hundreds mm between the hoistway 1 and the car 2 so as to face a hoistway wall. The low profile traction machine 4 comprises a housing 5, which receives therein a stator constituting a motor, and a sheave 6, which is provided integrally with a rotor core of the motor arranged in opposition to the stator and round which the main cable is wound, and the low profile traction machine is structured to rotate the sheave 6 together with the rotor core of the motor to move the car 2 up and down by means of the main cable. Since the low profile traction machine 4 is usually inspected from a side of the car 2, the housing 5 is arranged to be directed toward the car 2.

As shown in the cross sectional view of Fig. 1, in the low profile traction machine 4, the housing 5 is integrally formed with a boss portion 8, centrally of which a main shaft 7 is inserted, and stationary parts of the motor, such as a stator 9 and stator windings 12 of the motor, are received in the housing 5. Against this, on an inserted tip end of the main shaft 7, rotating parts such as a bearing housing 18, a rotor core 10 of the motor, the sheave 6, etc., which are integrally provided with each other, are supported rotatably relative to the main shaft 7 through a bearing 17.

The housing 5 is manufactured by machining of only portions, for which dimensional accuracy is needed, after forming of cast iron or the like into a general shape, and comprises the hollow boss portion 8 which is integrally formed with the housing at a center thereof and a storage recess 11 at an outer periphery thereof, and the storage recess is bottomed and substantially cylindrical-shaped to enable positioning therein the stator 9, the rotor core 10, etc. as described hereinafter. The stator 9 is fitted into and fixed to an interior of the storage recess 11, but fixation thereof may be accomplished by other measures such as bolting, or the like. The stator 9 comprises a stator iron core formed by laminating magnetic steel sheets, the three-phase stator windings 12 consisting of U-phase, V-phase, and W-phase, insulating members, etc. An annular projection 13 extending toward the sheave 6 is formed integral with the housing 5, which is positioned toward the boss portion 8 from the storage recess 11, and an annular oil receiving cover 14 is mounted to a top of the annular projection 13 toward the sheave 6 by means of bolts.

A shape and a height of the annular projection 13 are selected so that the oil receiving cover 14 is positioned toward the sheave 6 from opposed portions of the boss portion 8 of the housing 5 and the bearing housing 18. An oil dripped space 15 is formed inside and below the annular projection 13 between the oil receiving cover 14 and the housing 5 opposed thereto, a space, in which connecting electrical wires 16 are arranged, is formed outside the annular projection 13, and the housing 5 may be positively subjected to cutting work to form these spaces. The oil receiving cover 14 has a thickness in the order of 1 mm and a larger outside diameter than, for example, an inside diameter of the stator 9 so as to enable receiving therein the connecting electrical wires 16 for mutual connection of the stator windings 12, and the oil receiving cover 14 has an inside diameter such that it is not contact with the bearing housing 18 but extends to the neighborhood thereof.

In addition, the annular projection 13 provided on the housing 5 is formed integral with the housing 5, but it may be a separate member which is fixed by means of bolts. In this case, it is desired that a sealant such as a gasket or an O-ring be provided on a contact surface with the housing 5. Also, the same is with contact surfaces of the oil receiving cover 14 and the annular projection 13.

The connecting electrical wires 16 arranged in the space surrounded by the oil receiving cover 14 on a side of the annular projection 13 toward the stator 9 serves as mutually connection of the stator windings 12 and comprise a U-phase winding, a V-phase winding, and a W-phase winding, which are connected mutually in series or in parallel in an electric circuit manner, whole junction circuits being made a star connection, the number of which is four in total, including one at a neutral point and each one for U-phase, V-phase, and W-phase. The whole junction circuits may be made a delta connection, in which case the connecting electrical wire at a neutral point is unnecessary.

The main shaft 7 is supported on and fixed to the boss portion 8 of the housing 5 in a cantilever manner and the bearing housing 18 formed of cast iron is rotatably mounted through a plurality of bearings 17 to the inserted tip end of the main shaft 7. The sheave 6 and the rotor core 10 of the motor positioned at an outer periphery side of the sheave 6 are formed integral with the bearing housing 18, and the rotor core 10 is arranged in the storage recess 11 of the housing 5 to be opposed to the stator 9. A plurality of permanent magnets 19 are stuck and fixed to an inner peripheral surface of the rotor core 10 whereby a rotor of a surface magnet motor is formed. In this case, it is required that the rotor core 10 comprise a magnetic material, and the rotor core together with the bearing housing 18 and the sheave 6 are formed integrally from a magnetic material.

Since instead of being made of an integral product, the bearing housing 18, the sheave 6, and the rotor core 10 may be manufactured from separate products capable of split and then fixed together by means of bolt or fit, however, the rotor core 10 may be formed from a member, which is separate from the bearing housing 18 and the sheave 6 to be able to split
5 therefrom, a magnetic material being a separate member from the rotor core 10 may be mounted to an inner peripheral surface of the rotor core 10 and the permanent magnets 19 may be stuck to an inner peripheral surface of the magnetic material being a separate member from the rotor core 10 in the case where a material is a non-magnetic material such as stainless steel, in the case where the rotor core cannot function adequately although being formed from a magnetic
10 material, in the case where a magnetic path section required for a motor cannot be ensured, for example, since the rotor core is small in thickness, and in the case where a material is bad in magnetization characteristic. In addition, a magnetic material being a separate member from the rotor core 10 desirably comprises laminated magnetic steel sheets for the purpose of restriction of iron loss. Also, in the case where a magnetic material being a separate member
15 from the rotor core 10 comprises laminated magnetic steel sheets, the permanent magnets 19 may be embedded in the magnetic steel sheets to form a rotor of a so-called embedded motor. It is general to work laminated magnetic steel sheets by means of punch press or the like, in which case hole drilling for embedding of the permanent magnets 19 is facilitated.

With the permanent magnets 19 arranged inside the rotor core 10 as described
20 above, N poles and S poles are arranged alternately in a peripheral direction, N poles and S poles are the same in number, and the number is the half of the number of poles. Such rotor is arranged outside and opposed diametrically to the stator 9 fixed to the housing 5 with an air gap therebetween to constitute a so-called outer rotor motor. Torque generated in the motor part is transmitted to the sheave 6 through the rotor core 10 to drive the main cable, such as plural ropes
25 (not shown), wound round the sheave 6.

The bearing housing 18 connected to the main shaft 7 through the bearings 17 is a cylindrical-shape to have a bearing portion thereof filled with a lubricant such as grease, etc., one end thereof is enclosed by a bearing cover 20, on which a sealant such as a liquid gasket, or an O-ring is provided, and the other end thereof is enclosed by an oil seal 21 arranged between the
30 main shaft 7 and the bearing housing 18. Grease leaked from the oil seal 21 drips downward from opposed end surfaces of the boss portion 8 and the bearing housing 18 and then is recovered by the disk-shaped oil receiving cover 14 mounted to the housing 5 and the oil dripped space 15 formed by cutting work. The oil dripped space 15 is sealed by the disk-shaped oil receiving cover 14, which is provided in a position in no contact with an end surface of the

bearing housing 18 toward the housing 5, and the grease flows through a communication part 22 into an oil reservoir 23 positioned downward from the communication part 22.

The oil reservoir 23 is formed on a side of the housing 5 toward the car by cutting work and has its front surface portion thereof sealed by an oil receiving cover 24 to have an appropriate volume, and an open window 25 is formed on an upper portion of the oil receiving cover 24 whereby it is made possible to visually confirm the quantity of oil accumulated in the oil dripped space 15 and the oil reservoir 23 through the communication part 22.

Fig. 2 is a front view showing the housing 5 as viewed from car side. A recess 28 for the oil reservoir 23 is formed on an outer periphery of the boss portion 8, centrally of which the main shaft 7 is inserted, by means of cutting work or the like while ribs 26, 27 are left, and the oil receiving cover 24 is mounted to a front surface of the recess 28 by means of bolts to form the oil reservoir 23. Since a surface of the housing 5 toward the car is subjected to cutting work to form the recess 28, it is possible to form the oil reservoir 23 while restricting the housing 5 in thickness. Grease leaked through the communication part 22 from the oil dripped space 15 shown in Fig. 1 is accumulated in the oil reservoir 23.

Incidentally, a central portion of an opposite side of the housing 5 to the sheave 6 is shaped to be dented concavely except the boss portion 8 for fixation of the main shaft 7. With that machine chamber-less elevator device, in which the low profile traction machine 4 is used, a contact angle of a rope wound round the sheave 6 is usually about 180° and it is general that the rope wound round the sheave 6 runs substantially vertically upward or downward as viewed from the traction machine. That is, since a load of the car 2 and the counterweight 3, that is, a so-called suspended load acts on the sheave 6 upward or downward and the load is transmitted to the housing 5 through the main shaft 7, the housing 5 is required to bear an upward or downward load provided by the suspended load and to have rigidity to prevent the suspended load from inclining the sheave 6 or the rotor core 10 much.

With respect to the rigidity, instead of shaping the central portion of the opposite side of the housing 5 to the sheave 6 to dent the same concavely except the boss portion 8 for fixation of the main shaft 7, a solid structure makes it possible to readily ensure the strength and the rigidity. Hereupon, however, recesses 30, 31 are provided on the portion and the plurality of ribs 26, 27 made integral with the housing 5 are formed in the vicinity of the recesses 30, 31 for the purpose of reinforcing the strength of or increasing the rigidity of the housing 5. The ribs 26, 27 are formed to make end surfaces thereof substantially flush with the outer surface of the housing 5 toward the car, and the ribs 26, 27 are formed four in total, that is, two, respectively, above and below the boss portion 8 for fixation of the main shaft 7 to bear an

upward or downward load acting on the housing 5.

The oil receiving cover 24 having a thickness of about 1 mm is fixed to ends of the lower ribs 27 to be brought into contact with the housing 5, and the oil reservoir 23 is formed by the ribs 27, the housing 5, and the oil receiving cover 24. The oil reservoir 23 is positioned below the oil dripped space 15 and connected by the communication part 22 formed outside an annular end surface of the boss portion 8. When the oil receiving cover 24 is to be fixed, it is desirable to provide a sealant such as a liquid gasket, or a sealing material such as rubber packing.

Since the boss portion 8 of the housing 5 for fixation of the main shaft 7 is formed in a position dented from the end surfaces of the ribs 26, 27 by the recesses 30, 31 and the ribs 26, 27 are partially connected to the boss portion 8, the thin plate of the oil receiving cover 24 can be stuck only to vertical portions of the ribs 26, 27 and the window 28 can be formed above the oil receiving cover 24. Also, the structure can be made to enable visually observing and washing the oil reservoir 23 readily from obliquely above with the window 28. Also, since the housing 5 is centrally dented and the dented portion is made use of to form the window 28 and the oil reservoir 23, the oil reservoir 23 is prevented from projecting much toward the car from the housing 5, so that it is possible to further shorten the axial length of the low profile traction machine 4, or it is possible to form the oil reservoir 23 having a large capacity without increasing the axial length of the low profile traction machine 4.

Also, the neighborhood of the ribs 26, 27 is subjected to cutting work to form the recesses 30, 31 on a side of the boss portion 8 toward the car and a hole extending through the housing 5 is formed thereon. Terminals of the stator windings 12 are subjected to insulation process with insulation tubes to be connected to the connecting electrical wires 16 through a clearance between the oil receiving cover 14 and the stator 9, and the other ends of the connecting electrical wires 16 are taken out through the hole 29 and connected to a control unit or the like to enable driving the motor. Besides, since the hole 29 is formed on the dented portion of the housing 5 formed by cutting work, the wirings taken out of the housing 5 have the low profile traction machine 4 not projecting toward the car.

The housing 5 is restricted in thickness by the structure, in which the oil dripped space 15 permitting grease for the bearings 17 to drip thereinto is formed between the oil receiving cover 14 fixed to the annular projection 13 shown in Fig. 1 and the housing 5 facing the oil receiving cover 14 as described above. Besides, since the communication part 22 formed in the housing 5 provides communication between the oil dripped space 15 and the oil reservoir 23, the structure can be made simple without an increase in the number of parts, while

the housing 5 is restricted in thickness.

As shown in the plan view of Fig. 3, four legs 32 extending toward the sheave 6 are provided at four corners of the housing 5, and in mounting the traction machine 4 in the hoistway 1, the respective legs 32 are fixed to a traction machine fixation member mounted in the hoistway 1. At this time, the respective legs 32 are fixed to the traction machine fixation member through vibration proof rubbers directed to inhibition of vibration.

When the low profile traction machine 4 thus constructed is used, the structure of the bearing cover 20 and the oil seal 21 prevents grease for the bearings 17 from leaking outside, and the structure on a side of the bearing cover 20 serves as a very tight leakage prevention and is less possibly decreased by secular influences in leakage preventing function. Since the structure on a side of the oil seal 21 is such that the oil seal 21 and the bearing housing 18 rotate relative to and contact with each other, the oil seal 21 or the bearing housing 18 wears to be possibly decreased in leakage preventing function. Also, since the main material of the oil seal 21 comprises rubber, secular degradation in material characteristics or deformation is generated to lead to a possible decrease in leakage preventing function.

Incidentally, the main cause for leakage of grease resides in a secular decrease of the oil seal 21 in leakage preventing function due to the cause described above, or an unimagined increase in internal pressure in an interior of the bearing housing 18 due to some reason. While it is general that pressure rise in the bearing housing 18 occurs when the rotational frequency of the bearings and the quantity of grease as filled increase, an increase in the rotational frequency is not generated owing to various safety functions in elevator traction machines but it is possible that an increase in quantity of grease is generated due to human-initiated mistake or a mechanical trouble.

Thus, the oil seal 21, the main material of which is rubber, is weak in pressure as compared with the bearing cover 20 formed from steel and rubber deforms much upon application of an unimagined pressure, so that there is a possibility of loss of leakage preventing function. That is, grease possibly leaks from the side of the oil seal 21 rather than from the side of the bearing cover 20 and so it is desirable to provide an oil reservoir on the side of the oil seal 21.

In this respect, according to the low profile traction machine for elevator devices of the invention, since the bearing cover 20 seals an opposite side of the bearing housing 18, in which the bearings 17 are arranged as shown in Fig. 1, to the housing 5, the oil dripped space 15 is formed in a position, into which grease or the like drips from a clearance between opposite portions of the boss portion 8 of the housing 5 and the bearing housing 18, the oil reservoir 23 is

formed on the side of the housing 5 toward the car by cutting work, and the communication part 22 formed on the housing 5 provides communication between the oil dripped space 15 and the oil reservoir 23, accumulation in the oil reservoir 23 can be made possible even in case of leakage from the oil seal 21 while restricting the housing 5 in thickness to make the low profile traction machine 4 thinner. Since the oil reservoir 23 is formed on the side of the housing 5 toward the car, it can be simply inspected from the side of the car at the time of maintenance and recovery can be made at need.

Also, since the window 25 is formed on an upper portion of the oil reservoir 23, a worker can visually observe an interior of the oil reservoir 23 through the window 25 at the time of maintenance and visually determine the presence of generation of leakage and the need for recovery.

While owing to the shape of the housing 5 provided by cutting work, the oil dripped space 15 can be formed so as to prevent leakage to the side of the bearing housing 18, the oil receiving cover 14 is fixed to the annular projection 13 formed on the side of the housing 5 toward the bearing housing 18 and positioned toward the sheave 6 relative to the clearance between the opposite portions of the boss portion 8 of the housing 5 and the bearing housing 18, so that when the oil receiving cover 14 is made use of to form the oil dripped space 15 on an opposed portion thereof to the housing 5, the oil dripped space 15 can receive grease leaked and dripping from the clearance between the opposite portions of the boss portion 8 of the housing 5 and the bearing housing 18 and cutting work of the housing 5 for formation of the oil dripped space 15 is facilitated.

Here, when an inside diameter of the oil receiving cover 14 is made slightly larger than an outside diameter of that portion of the bearing housing 18, which is in contact with the oil seal 21, grease can be prevented from going along an outer peripheral portion of the bearing housing 18 and leaking outside the oil dripped space 15. When an annular-shaped oil groove is provided on the outer peripheral portion of the bearing housing 18 in a space interposed between the housing 5 and the oil receiving cover 14, it is possible to heighten the effect of preventing grease from going along the outer peripheral portion of the bearing housing 18 and leaking outside the oil dripped space 15. On the other hand, when the oil receiving cover 14 is increased in outside diameter so as to be positioned between the stator 9 and the sheave 6, it is possible to provide a clearance, through which a terminal of the stator winding 12 subjected to insulation process with an insulation tube or the like extends, specifically, a clearance in the order of 10 mm.

Also, since an outside diameter portion of the oil receiving cover 14 is extended

to an opposite portion of the housing 5 to the sheave 6 to be arranged there and the connecting electrical wires 16 for mutual connection of the stator windings 12 are arranged in a space formed on a side of the extended portion toward the housing 5, the annular projection 13 and the oil receiving cover 14 for formation of the oil dripped space 15 are made use of to enable
5 receiving the connecting electrical wires 16 without damage to the connecting electrical wires 16 by the rotating sheave 6. Besides, as compared with the case where the connecting electrical wires 16 are arranged on a side of the stator 9 and the stator windings 12 toward the sheave 6, the housing 5 and the sheave 6 can be arranged close to each other, so that it is possible to make the low profile traction machine 4 thinner.

CLAIMS

1. A low profile traction machine for elevator devices, comprising: a housing, which receives therein a stator and a stator winding; a main shaft supported on and fixed to the housing in a cantilever manner; a bearing housing rotatably mounted to an end of the main shaft through a bearing; a sheave formed integral with the bearing housing; and a rotor of a motor formed integral with the sheave and including a plurality of permanent magnets opposed to the stator, characterized in that
 - a side of the bearing housing, in which the bearing is arranged, opposite to the housing is closed by a bearing cover,
 - an oil dripped space is formed below a clearance between opposite portions of the housing and the bearing housing,
 - an oil reservoir is formed on an opposite end surface of the housing to the sheave to be positioned below and communicated to the oil dripped space,
 - a window is formed on an upper portion of the oil reservoir to enable the oil reservoir to be visually observed from an opposite side of the housing to the sheave,
 - an annular projection is provided on an outer peripheral side of the bearing housing to be made integral with the housing, an oil receiving cover is mounted to the annular projection to be positioned toward the sheave relative to the clearance between the opposite portions of the housing and the bearing housing, and the oil dripped space is formed between a portion of the oil receiving cover positioned inside the annular projection and the housing, and
 - an annular projection is provided on an outer peripheral side of the bearing housing to be made integral with the housing, an annular oil receiving cover is mounted to the annular projection to be positioned toward the sheave relative to the clearance between the opposite portions of the housing and the bearing housing, the oil dripped space is formed between a portion of the oil receiving cover positioned inside the annular projection and the housing and connecting electrical wires for mutual connection of the stator windings are arranged between the oil receiving cover positioned outside the annular projection and the housing.

2. The low profile traction machine for elevator devices according to claim 1, characterized in that a dented portion is formed centrally of the housing on an opposite side of the housing to the sheave except a portion thereof for fixation of the main shaft, a plurality of ribs are provided on and formed integral with the dented portion to reinforce the housing in strength, and an oil receiving cover is sealingly fixed on the housing in the vicinity of the ribs to form the oil reservoir.