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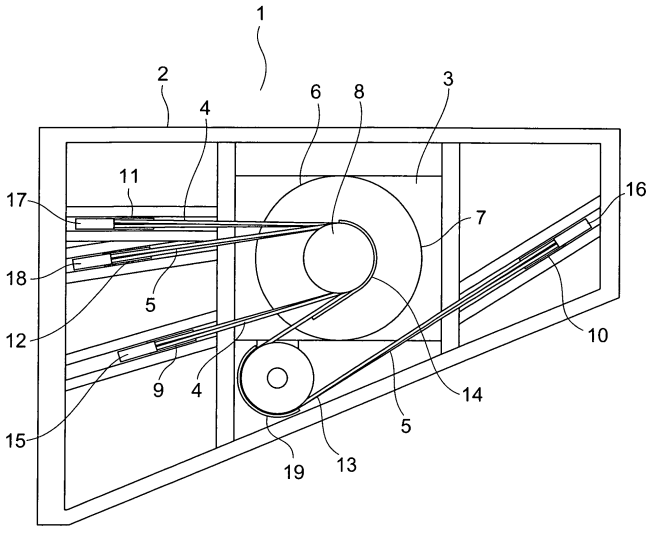
(54) HOIST UNIT FOR ELEVATOR INSTALLATION, AND ROPE MOUNTING METHOD FOR ELEVATOR

(57) A hoisting machine unit for installing an elevator is provided with an attachment frame, a hoisting machine having a driving sheave and provided on the attachment frame, a leader strip which is looped around the driving sheave and pulls and moves a main rope for suspending a car, for looping the main rope around the driving sheave, and a holding device for holding both ends of the leader strip with respect to the attachment frame. Accordingly, it is possible to maintain a state in which the leader strip is looped around the driving sheave. As a result, it is possible to prevent the leader strip from coming off from the driving sheave in conveying the hoisting machine unit for installing the elevator.

FIG. 1



EP 1 953 110 A1

Description

Technical Field

[0001] The present invention relates to a hoisting machine unit for installing an elevator, which is mounted with a hoisting machine for raising/lowering a car and a counterweight, and to a method of looping a main rope for the elevator.

Background Art

[0002] In a conventional elevator, with a view to looping a main rope around a driving sheave of a hoisting machine within a housing, there is proposed a method in which a flat band-shaped leader strip made of an elastic material is coupled to the main rope, thrust into the housing from an entrance hole thereof, moved along an inner surface of the housing, and then pulled out from an exit hole of the housing to loop the main rope around the driving sheave. In the conventional elevator, the main rope is looped around the driving sheave after the hoisting machine has been installed in a hoistway (see Patent Document 1).

[0003] Patent Document 1: JP 2002-362851 A

Disclosure of the Invention

Problem to be solved by the Invention

[0004] However, in the case where the hoisting machine is installed at a certain spot, components provided, for example, on an inner wall surface of the hoistway or within the hoistway may cause obstruction to an extent of making the operation of passing the leader strip into a casing difficult. Accordingly, the operation of looping the main rope around the driving sheave requires a great deal of time and effort.

[0005] The present invention has been made to solve the above-mentioned problem, and it is therefore an obj ect of the present invention to obtain a hoistingmachine unit for installing an elevator and a method of looping a main rope for an elevator which make it possible to loop the main rope around a sheave with ease.

Means for solving the Problem

[0006] A hoisting machine unit for installing an elevator according to the present invention includes: an attachment frame; a hoisting machine having a driving sheave and provided on the attachment frame; a leader strip, which is looped around the driving sheave, for pulling and moving a main rope for suspending a car to loop the main rope around the driving sheave; and a holding device for holding both ends of the leader strip with respect to the attachment frame.

Brief Description of the Drawings

[0007]

Fig. 1 is a plan view showing a hoisting machine unit for installing an elevator according to Embodiment 1 of the present invention.
Fig. 2 is a partial lateral view showing a state in which the hoisting machine unit for installing the elevator shown in Fig. 1 is installed in the upper portion within the hoistway.
Fig. 3 is an enlarged view showing the connection portion of Fig. 2.
Fig. 4 is an enlarged view showing another example of a portion for connecting a first leader strip and a first main rope of Fig. 3 to each other.
Fig. 5 is an enlarged view showing another example of a portion for connecting a first leader strip and a first main rope of Fig. 3 to each other.
Fig. 6 is a partial lateral view showing a hoisting machine unit for installing an elevator according to Embodiment 2 of the present invention.
Fig. 7 is a partial lateral view showing a state in which the hoisting machine unit 1 for installing an elevator according to Embodiment 3 of the present invention is installed in the upper portion within the hoistway.
Fig. 8 is a plan view showing the guide device of Fig. 7.

Best Modes for carrying out the Invention

[0008] Preferred embodiments of the present invention will be described hereinafter with reference to the drawings.

Embodiment 1

[0009] Fig. 1 is a plan view showing a hoisting machine unit for installing an elevator according to Embodiment 1 of the present invention. Referring to Fig. 1, a hoisting machine unit 1 for installing an elevator is installed in an upper portion within a hoistway in setting up the elevator. A car (not shown) and a counterweight (not shown) are suspended within the hoistway by means of a plurality of first main ropes and a plurality of second main ropes after the hoisting machine unit 1 for installing the elevator has been installed in the upper portion within the hoistway.

[0010] The hoisting machine unit 1 for installing the elevator has an attachment frame 2, a unit-mounted component 3 provided on the attachment frame 2, a plurality of first leader strips 4 for conducting the respective first main ropes to the unit-mounted component 3, and a plurality of second leader strips 5 for conducting the respective second main ropes to the unit-mounted component 3.

[0011] The unit-mounted component 3 has a hoisting machine 6, a first car-side return sheave 9, a second car-side return sheave 10, a first counterweight-side return sheave 11, a second counterweight-side return sheave

12, and a turning sheave 13. The hoisting machine 6 has a hoisting machine body 7 including a motor, and a driving sheave 8 that is rotated by the hoisting machine body 7. The hoisting machine 6 is designed as a low-profile hoisting machine having a structure in which the driving sheave 8 is larger in radial dimension than in axial dimension. The first car-side return sheave 9, the second car-side return sheave 10, the first counterweight-side return sheave 11, the second counterweight-side return sheave 12, and the turning sheave 13 are designed as driven sheaves that are rotated as the driving sheave 8 rotates when the first main ropes and the second main ropes are attached to the unit-mounted component 3.

[0012] Respective rotational shafts of the first car-side return sheave 9, the second car-side return sheave 10, the first counterweight-side return sheave 11, and the second counterweight-side return sheave 12 are disposed perpendicularly to a rotational shaft of the driving sheave 8.

[0013] A plurality of groove portions are provided in an outer peripheral portion of each of the sheaves 8 to 13 along a rotational direction thereof. Main rope latches 14 to 19, which face the outer peripheral portions of the sheaves 8 to 13, respectively, are attached to the sheaves 8 to 13, respectively.

[0014] The respective first leader strips 4 and the respective second leader strips 5 are selectively looped around the respective sheaves 8 to 13 to be attached to the unit-mounted component 3. The respective first leader strips 4 are continuously looped around the first counterweight-side return sheave 11, the driving sheave 8, and the first car-side return sheave 9 in the stated order. The respective second leader strips 5 are continuously looped around the second counterweight-side return sheave 12, the driving sheave 8, the turning sheave 13, and the second car-side return sheave 10 in the stated order. The respective first leader strips 4 and the respective second leader strips 5 are lower in bending rigidity than the respective main ropes for suspending the car and the counterweight.

[0015] Fig. 2 is a partial lateral view showing a state in which the hoisting machine unit 1 for installing the elevator shown in Fig. 1 is installed in the upper portion within the hoistway. Referring to Fig. 2, the attachment frame 2 is fixed to an inner wall surface of a hoistway 20. The hoisting machine 6 is disposed horizontally so that the rotational shaft of the driving sheave 8 extends vertically. Also, the hoisting machine 6 is disposed such that the driving sheave 8 is located at a position higher than the hoisting machine body 7. Thus, the driving sheave 8 faces a ceiling surface within the hoistway 20.

[0016] To conduct each of first main ropes 21 placed at a landing 31 to the unit-mounted component 3, an end of the first main rope 21 is connected to one end of a corresponding one of the first leader strips 4 via a connection portion 22. The first leader strip 4 is moved by being pulled in such a direction as to conduct the first main rope 21 to the unit-mounted component 3. That is, the first leader strip 4 is moved while the other end thereof is pulled. Thus, the first leader strip 4 tows the first main rope 21 in such a manner as to conduct the first main rope 21 to the unit-mounted component 3. The first main rope 21 is moved together with the first leader strip 4 to be continuously looped around the first counterweight-side return sheave 11, the driving sheave 8, and the first car-side return sheave 9 in the stated order.

[0017] To conduct each of the second main ropes to the unit-mounted component 3, an end of the second main rope is connected to one end of a corresponding one of the second leader strips 5 via a connection portion. The second leader strip 5 is moved by being pulled in such a direction as to conduct the second main rope to the unit-mounted component 3, so the second main rope is continuously looped around the second counterweight-side return sheave 12, the driving sheave 8, the turning sheave 13, and the second car-side return sheave 10 in the stated order.

[0018] Fig. 3 is an enlarged view showing the connection portion 22 of Fig. 2. Referring to Fig. 3, the first leader strip 4 has a bendable core cable (e.g., a wire or the like) 23, and a covering material (e.g., rubber or the like) 24 for covering the core cable 23. The core cable 23 is exposed from the covering material 24 at one end of the first leader strip 4. The exposed portion of the core cable 23 is annularly bent and swaged by a swaging member 25 to be made into a leader strip-side annular portion 26.

[0019] The first main rope 21 is manufactured by twisting a plurality of strands 27. The respective strands 27 are loosened at the end of the first main rope 21. That one of the respective strands 27 which is located at a central portion of the first main rope 21 is passed through the leader strip-side annular portion 26. The portion of the strand 27 passed through the leader strip-side annular portion 26 is annularly bent and swaged by a swaging member 28 to be made into a main rope-side annular portion 29. In this manner, the first leader strip 4 and the first main rope 21 are connected to each other. The connection portion 22 has the leader strip-side annular portion 26 and the main rope-side annular portion 29.

[0020] In conducting the second main rope to the unit-mounted component 3 as well, the same connection portion as described above is constructed to connect the second leader strip 5 and the second main rope to each other.

[0021] Next, a procedure followed in setting up the elevator will be described. In a plant, the hoisting machine unit 1 for installing the elevator has been assembled in advance. The hoisting machine unit 1 for installing the elevator is assembled by attaching the hoisting machine 6, the first car-side return sheave 9, the first counterweight-side return sheave 10, the second car-side return sheave 11, the second counterweight-side return sheave 12, and the turning sheave 13 to the attachment frame 2 at predetermined positions thereof, respectively, looping the plurality of the first leader strips 4 around the first counterweight-side return sheave 11, the driving sheave

8, and the first car-side return sheave 9 in succession, and then looping the plurality of the second leader strips 5 around the second counterweight-side return sheave 12, the driving sheave 8, the turning sheave 13, and the second car-side return sheave 10 in succession (in a unit assembling process).

[0022] After that, the hoisting machine unit 1 for installing the elevator is conveyed to a place where the elevator is to be set up, and is then installed in the upper portion within the hoistway 20. In this case, the attachment frame 2 is fixed within the hoistway 20 such that the driving sheave 8 faces the ceiling surface within the hoistway 20 (in a unit installing process).

[0023] After that, the plurality of the first main ropes 21 and the plurality of the second main ropes are prepared at the landing 31 of the uppermost floor. Then, the end of each of the first main ropes 21 is connected to one end of a corresponding one of the first leader strips 4, and the end of each of the second main ropes is connected to one end of a corresponding one of the second leader strips 5. In this case, the connection portion 22 between each of the first leader strips 4 and the corresponding one of the first main ropes 21 is formed by passing the strand 27 at the end of the first main rope 21 through the leader strip-side annular portion 26, which is provided in advance at one end of the first leader strip 4, to form the main rope-side annular portion 29. The same connection portion as described above is also formed between each of the second leader strips 5 and the corresponding one of the second main ropes (in a connection process).

[0024] After that, while the driving sheave 8 is rotated at a low speed through the driving of the hoisting machine body 7, the other end side of each of the first leader strips 4 and the other end side of each of the second leader strips 5 are pulled simultaneously. Thus, the respective first leader strips 4 and the respective second leader strips 5 are moved, so the first main ropes 21 and the second main ropes are moved by being towed by the first leader strips 4 and the second leader strips 5, respectively. After that, the respective first leader strips 4 and the respective second leader strips 5 are pulled out from the unit-mounted component 3 to replace the first leader strips 4 with the first main ropes 21, respectively, and replace the second leader strips 5 with the second main ropes, respectively. Thus, the respective first main ropes 21 are successively looped around the first counterweight-side return sheave 11, the driving sheave 8, and the first car-side return sheave 9 in the stated order, and the respective second main ropes are successively looped around the second counterweight-side return sheave 12, the driving sheave 8, the turning sheave 13, and the second car-side return sheave 10 in the stated order. In this manner, the respective first main ropes 21 and the respective second main ropes are attached to the unit-mounted component 3 (in a main rope looping process).

[0025] In the main rope looping process of this example, the operation of looping the respective first main ropes 21 and the operation of looping the respective second main ropes are performed simultaneously. However, itisalso appropriate to firstloop either the respective first main ropes 21 or the respective second main ropes and then loop the other main ropes.

[0026] After that, both the ends of each of the first main ropes 21 and both the ends of each of the second main ropes are brought down, and the car and the counterweight within the hoistway 20 are suspended by means of the respective first main ropes 21 and the respective second main ropes.

[0027] In the method of looping the main rope for the elevator as described above, the first leader strips 4 and the second leader strips 5 are looped in advance around the driving sheave 8 of the hoisting machine 6 provided on the attachment frame 2, the first main ropes 21 and the second main ropes are connected to the first leader strips 4 and the second leader strips 5, respectively, after the hoisting machine unit 1 for installing the elevator has been installed within the hoistway 1, and the first leader strips 4 and the second leader strips 5 are pulled to be moved, so the first main ropes 21 and the second main ropes are looped around the driving sheave 8. It is therefore possible to perform the operation of looping the first leader strips 4 and the second leader strips 5 around the driving sheave 8 outside the hoistway 20. Accordingly, the components and the like on the inner wall surface of the hoistway 20 and within the hoistway 20 do not cause obstruction in looping the first leader strips 4 and the second leader strips 5 around the driving sheave 8, so it is possible to perform the operation of looping the first leader strips 4 and the second leader strips 5 with ease.

[0028] The first main ropes 21 and the second main ropes are conducted to the outer peripheral portion of the driving sheave 8 by the first leader strips 4 and the second leader strips 5, respectively, even after the hoisting machine unit 1 for installing the elevator has been installed within the hoistway 20, so it is possible to loop the first main ropes 21 and the second main ropes around the driving sheave 8 with ease without removing the main rope latch 14, which faces the outer peripheral portion of the driving sheave 8, from the driving sheave 8. Thus, there is no need to readjust the dimension of the gap between the outer peripheral portion of the driving sheave 8 and the main rope latch 14, so it is possible to further facilitate the operation of looping the first main ropes 21 and the second main ropes.

[0029] The attachment frame 2 is provided with the first car-side return sheave 9, the first counterweight-side return sheave 10, the second car-side return sheave 11, the second counterweight-side return sheave 12, and the turning sheave 13 in addition to the hoisting machine 6, and the first leader strips 4 and the second leader strips 5 are looped around the respective sheaves 8 to 13 selectively and successively. Therefore, even in the case where the attachment frame 2 is provided with a plurality of sheaves, it is possible to perform the operation of suc-

cessively looping the first main ropes 21 and the second main ropes around the respective sheaves with ease.

[0030] In the foregoing example, each of the first leader strips 4 and the second leader strips 5 is made by covering the core cable 23 with the covering member 24. However, the construction of the first leader strips 4 and the second leader strips 5 is not limited thereto as long as the first leader strips 4 and the second leader strips 5 are lower in bending rigidity than the first main ropes 21 and the second main ropes, respectively. For example, as shown in Fig. 4, the first leader strip and the second leader strip may each be manufactured by twisting a plurality of strands 32.

[0031] In this case, the first leader strip 4 and the first main rope 21 are connected to each other by twisting the strands 27 of the first leader strip 4 and the strands 32 of the first main rope 21 together. That is, at the end of the first main rope 21, two of the plurality of the strands 27 are removed to form strand grooves 33. At one end of the first leader strip 4, only two of the plurality of the strands 32 are left while the other of the strands 32 are cut off. The two remaining strands 32 are fitted along the strand grooves 33 formed at the end of the first main rope 21, respectively. Thus, the strands 32 are twisted together with the strands 27, so the first leader strip 4 and the first main rope 21 are connected to each other (Fig. 4). The second leader strip 5 and the second main rope are also connected to each other in the same manner.

[0032] In the foregoing example, the strand 27 at the end of the first main rope 21 is passed through the leader strip-side annular portion 26 provided at one end of the first leader strip 4, and the strand 27 thus passed therethrough is annularly bent to form the main rope-side annular portion 29, so the first leader strip 4 and the first main rope 21 are connected to each other. However, as shown in Fig. 5, the first leader strip 4 and the first main rope 21 may be connected to each other via a universal joint 34.

[0033] In this case, the universal joint 34 has a base shaft 35, and a pair of ring members 36 and 37 provided through the base shaft 35 to be rotatable about an axial direction of the base shaft 35. The core cable 23 is passed through the ring member 36, the strand 27 is passed through the ring member 37, and the passed portions of the core cable 23 and the strand 27 are each tied with a wire or the like so as to assume an annular shape. In this manner, the first main rope 21 is rotated with respect to the second leader strip 4. It is therefore possible to prevent the first main rope 21 from being wrenched with respect to the first leader strip 4 even when the first main rope 21 is looped around a plurality of sheaves continuously. As a result, it is possible to prevent the connection portion between the first leader strip 4 and the first main rope 21 from being wrenched to a rupture.

Embodiment 2

[0034] Fig. 6 is a partial lateral view showing a hoisting machine unit for installing an elevator according to Embodiment 2 of the present invention. Referring to Fig. 6, the attachment frame 2 is provided with a plurality of holding devices 41 for holding both ends of each of the first leader strips 4 and both ends of each of the second leader strips 5 with respect to the attachment frame 2, respectively. In this example, the respective holding devices 41 are disposed within an outside dimension of the attachment frame 2 (within the attachment frame 2). By being held by the respective holding devices 41, both the ends of each of the first leader strips 4 and both the ends of each of the second leader strips 5 are also disposed within the outside dimension of the attachment frame 2 (within the attachment frame 2). Mentionable as the holding devices 41 are, for example, adhesive tapes for sticking both the ends of each of the first leader strips 4 and both the ends of each of the second leader strips 5 to the attachment frame 2, respectively, hold-down plates for holding down both the ends of each of the first leader strips 4 and both the ends of each of the second leader strips 5 onto the attachment frame 2, respectively, and the like.

[0035] Each of the holding devices 41 holds both the ends of a corresponding one of the first leader strips 4 and both the ends of a corresponding one of the second strips 5, so a predetermined tensile force is applied to each of the first leader strips 4 and the second leader strips 5. Even when the hoisting machine unit 1 for installing the elevator is tentatively placed on a floor surface 42, the first leader strips 4 and the second leader strips 5 are held by the hoisting machine unit 1 for installing the elevator while remaining apart from the floor surface 42. Embodiment 2 of the present invention is identical to Embodiment 1 of the present invention in other constructional details.

[0036] In the hoisting machine unit 1 for installing the elevator constructed as described above, the attachment frame 2 is provided with the holding devices 41 for holding both the ends of each of the first leader strips 4 and both the ends of each of the second leader strips 5 with respect to the attachment frame 2, respectively, so the predetermined tensile force can be applied to each of the first leader strips 4 and the second strips 5. Thus, it is possible to prevent the first leader strips 4 and the second leader strips 5 from slacking to come off from the sheaves. Accordingly, it is possible to allow the hoisting machine unit 1 for installing the elevator to be conveyed and installed within the hoistway 20 more reliably.

[0037] By being held by the holding devices 41, both the ends of each of the first leader strips 4 and both the ends of each of the second leader strips 5 are disposed within the outside dimension of the attachment frame 2. It is therefore possible to prevent the first leader strips 4 and the second leader strips 5 from being wedged between the attachment frame 2 and the floor surface 42 to be indented when the hoisting machine unit 1 for installing the elevator is tentatively placed on the floor surface 42. Accordingly, it is possible to prevent the first

leader strips 4 and the second leader strips 5 from decreasing in tensile strength. As a result, it is possible to prevent the first leader strips 4 and the second leader strips 5 from being ruptured.

Embodiment 3

[0038] Fig. 7 is a partial lateral view showing a state in which the hoisting machine unit 1 for installing an elevator according to Embodiment 3 of the present invention is installed in the upper portion within the hoistway 20. Referring to Fig. 7, the attachment frame 2 is provided with a guide device 51 for guiding the first leader strips 4 and the first main ropes 21 such that the first leader strips 4 and the first main ropes 21 are moved along the outer peripheral portion of the first counterweight-side return sheave 11, and a guide device 52 for guiding the first leader strips 4 and the first main ropes 21 such that the first leader strips 4 and the first main ropes 21 are moved along the outer peripheral portion of the first car-side return sheave 9.

[0039] The guide device 51 is disposed below the first counterweight-side return sheave 11. The guide device 52 is disposed below the first car-side return sheave 9. That is, the guide device 51 is disposed on the side where the first main ropes 21 are led into the unit-mounted component 3, and the guide device 52 is disposed on the side where the first main ropes 21 are led out from the unit-mounted component 3. The guide devices 51 and 52 are attached to the attachment frame 2 via attachment members 53 and 54, respectively. The attachment members 53 and 54 are removable from the attachment frame 2.

[0040] Provided at the landing 31 of the uppermost floor are a main rope hold-down device 55 for holding down the first main ropes 21 or the second main ropes that are pulled up from the landing 31 to be led into the unit-mounted component 3, and a turning device 56 for changing the direction of the first leader strips 4 or the second leader strips 5, which are led out from the unit-mounted component 3 to be pulled down, into an upward direction.

[0041] The main rope hold-down device 55 has a guide roller 57 that is rotated as the first main ropes 21 or the second main ropes are moved. The turning device 56 has a guide roller 58 that is rotated as the first leader strips 4 or the second leader strips 5 are moved.

[0042] A plurality of rotary tables 59 for placing the first main ropes 21 and the second main ropes thereon respectively are provided at the landing 31 of the uppermost floor. In leading the first main ropes 21 and the second main ropes into the unit-mounted component 3, the first main ropes 21 and the second main ropes are reeled out while the respective rotary tables 59 are rotated.

[0043] The attachment frame 2 is also provided with guide devices (not shown) for guiding the second main ropes and the second leader strips 5 such that the second main ropes and the second leader strips 5 are moved along the outer peripheral portions of the second car-side return sheave 10 and the second counterweight-side return sheave 12.

[0044] That is, in attaching the respective first main ropes 21 and the respective second main ropes to the unit-mounted component 3, the first main ropes 21 and the second main ropes are placed on the rotary tables 59. The first main ropes 21 are passed through the main rope hold-down device 55 and the guide device 51 in the stated order and are then connected to the first leader strips 4, respectively. The second main ropes are passed through the main rope hold-down device 55 and the guide device (not shown) in the stated order and then connected to the second leader strips 5 respectively. The first leader strips 4 led out from the unit-mounted component 3 are passed through the guide device 52 and the turning device 56 in the stated order and are then pulled up at the other end sides thereof, respectively. The second leader strips 5 led out from the unit-mounted component 3 are passed through the guide device (not shown) and the turning device 56 in the stated order and then pulled up at the other end sides thereof, respectively.

[0045] Fig. 8 is a plan view showing the guide device 51 of Fig. 7. The guide device 51 has an annular body 60 through which the first main ropes 21 are passed, a support portion 61 fixed to the attachment member 53 to support the annular body 60, and a plurality of rollers 62 provided rotatably on the annular body 60. The respective rollers 62 are disposed in the circumferential direction of the annular body 60. The guide device 52 is also constructed in the same manner. Embodiment 3 of the present invention is identical to Embodiment 1 of the present invention in other constructional details.

[0046] Next, a procedure followed in setting up the elevator will be described. After the guide devices 51 and 52 have been attached to the attachment frame 2, the hoisting machine unit 1 for installing the elevator is installed in the upper portion within the hoistway 20.

[0047] After the hoisting machine unit 1 for installing the elevator has been installed within the hoistway 20, the respective first main ropes 21 are passed through the main rope hold-down device 55 and the guide device 51 in the stated order, and the end of each of the first main ropes 21 is connected to one end of a corresponding one of the first leader strips 4. The respective second main ropes are passed through the main rope hold-down device 55 and the guide device (not shown) in the stated order, and the end of each of the second main ropes is connected to one end of a corresponding one of the second leader strips 5. In this case, the other end of the first leader strip 4 is passed through the guide device 52 and the turning device 56 in the stated order, and the other end of the second leader strip 5 is passed through the guide device (not shown) and the turning device 56 in the stated order.

[0048] After that, the other end of each of the first leader strips 4 and the other end of each of the second leader strips 5 are simultaneously pulled up while the driving

sheave 8 is rotated at a low speed through the driving of the hoisting machine body 7. Thus, the first leader strips 4 and the second leader strips 5 are moved together with the first main ropes 21 and the second main ropes, respectively. At this time, the movement of the first main ropes 21 causes the corresponding ones of the rotary tables 59 to rotate, so the first main ropes 21 are reeled out from spots on those rotary tables 59, respectively. The movement of the second main ropes causes the corresponding ones of the rotary tables 59 to rotate, so the second main ropes are reeled out from spots on those rotary tables 59, respectively.

[0049] Thus, the first main ropes 21 replace the first leader strips 4, respectively, and are successively looped around the first counterweight-side return sheave 12, the driving sheave 8, and the first car-side return sheave 9 in the stated order. The second main ropes replace the second leader strips 5, respectively, and are successively looped around the second counterweight-side return sheave 12, the driving sheave 8, and the second car-side return sheave 10 in the stated order.

[0050] After that, the guide devices 51 and 52 as well as the attachment members 53 and 54 are removed from the attachment frame 2, and the first leader strips 4 are disconnected from the first main ropes 21, respectively. The guide devices (not shown) are also removed from the attachment frame 2, and the second leader strips 5 are also disconnected from the second main ropes, respectively. The subsequent procedure is the same as in Embodiment 1 of the present invention.

[0051] In this example, the operation of looping the respective first main ropes 21 and the operation of looping the respective second main ropes are performed simultaneously. However, the operation of looping the respective first main ropes 21 and the operation of looping the respective second main ropes may also be performed separately.

[0052] In the hoisting machine unit 1 for installing the elevator constructed as described above, the attachment frame 2 is provided with the guide devices 51 and 52 for guiding either the first leader strips 4 or the first main ropes 21 such that the first leader strips 4 or the first main ropes 21 are moved along the outer peripheral portions of the first car-side return sheave 9 and the first counterweight-side return sheave 11, respectively. It is therefore possible to prevent the first leader strips 4 and the first main ropes 21 from being inclined with respect to the first car-side return sheave 9 and the first counterweight-side return sheave 11. Thus, it is possible to prevent the first leader strips 4 or the first main ropes 21 from being wedged between the main rope latch 15 and the first car-side return sheave 9 or between the main rope latch 17 and the first counterweight-side return sheave 11. As a result, it is possible to prevent the occurrence of an inconvenience such as ruptures of the first leader strips 4 or the first main ropes 21.

[0053] The attachment frame 2 is provided with the guide devices for guiding either the second leader strips 5 or the second main ropes such that the second leader strips 5 or the second main ropes are moved along the outer peripheral portions of the second car-side return sheave 10 and the second counterweight-side return sheave 12, respectively. It is therefore possible, in the same manner as described above, to prevent the second leader strips 5 or the second main ropes from being wedged between the main rope latch 16 and the second car-side return sheave 10 or between the main rope latch 18 and the second counterweight-side return sheave 12. As a result, it is possible to prevent the occurrence of an inconvenience such as ruptures of the second leader strips 5 or the second main ropes.

[0054] In leading the first main ropes 21 or the second main ropes into the unit-mounted component 3 (in the main rope looping process), each of the main ropes to be lead into the unit-mounted component 3 is placed on the corresponding one of the rotary tables 59 provided at the landing 31 of the uppermost floor, and then reeled out while the rotary table 59 is rotated. It is therefore possible to prevent the main ropes from becoming tangled. As a result, it is possible to achieve an improvement in operation efficiency.

[0055] The turning device 56 for changing the direction of the first leader strips 4 or the second leader strips 5 that have been led out from the unit-mounted component 3 is provided at the landing 31 of the uppermost floor. It is therefore possible to change the direction of the first leader strips 4 or the second leader strips 5 into such a direction that makes it easy for an operator to pull the first leader strips 4 or the second leader strips 5 at the landing 31. As a result, it is possible to achieve a further improvement in operation efficiency.

Claims

1. A hoisting machine unit for installing an elevator, comprising:

   an attachment frame;
   a hoisting machine having a driving sheave and provided on the attachment frame;
   a leader strip, which is looped around the driving sheave, for pulling and moving a main rope for suspending a car to loop the main rope around the driving sheave; and
   a holding device for holding both ends of the leader strip with respect to the attachment frame.

2. A hoisting machine unit for installing an elevator according to Claim 1, wherein the attachment frame is provided with a driven sheave that is separate from the driving sheave of the hoisting machine, and
   the leader strip is continuously looped around the driving sheave and the driven sheave.

3. A hoisting machine unit for installing an elevator according to Claim 2, further comprising a guide device for guiding at least one of the leader strip and the main rope so that the at least one of the leader strip or the main rope is moved along an outer peripheral portion of the driven sheave.

4. A hoisting machine unit for installing an elevator according to any one of Claims 1 to 3, wherein both the ends held by the holding device are disposed within the attachment frame.

5. A method of looping a main rope for an elevator, comprising:

a unit assembling process of looping a leader strip around a driving sheave of a hoisting machine provided on an attachment frame to assemble a hoistingmachine unit for installing the elevator;
a unit installing process of installing the hoisting machine unit for installing the elevator within a hoistway;
a connection process of connecting an end of the main rope, which serves to suspend a car, to an end of the leader strip; and
a main rope looping process looping the main rope around the driving sheave by pulling the leader strip and moving the leader strip and the main rope.

6. A method of looping a main rope for an elevator according to Claim 5, wherein the main rope looping process includes a step of placing the main rope on a rotary table provided at a landing and reeling out the main rope while rotating the rotary table.

7. A method of looping a main rope for an elevator according to Claim 5 or 6, wherein the leader strip is pulled in a direction that is changed by a turning device provided at the landing.

FIG. 1

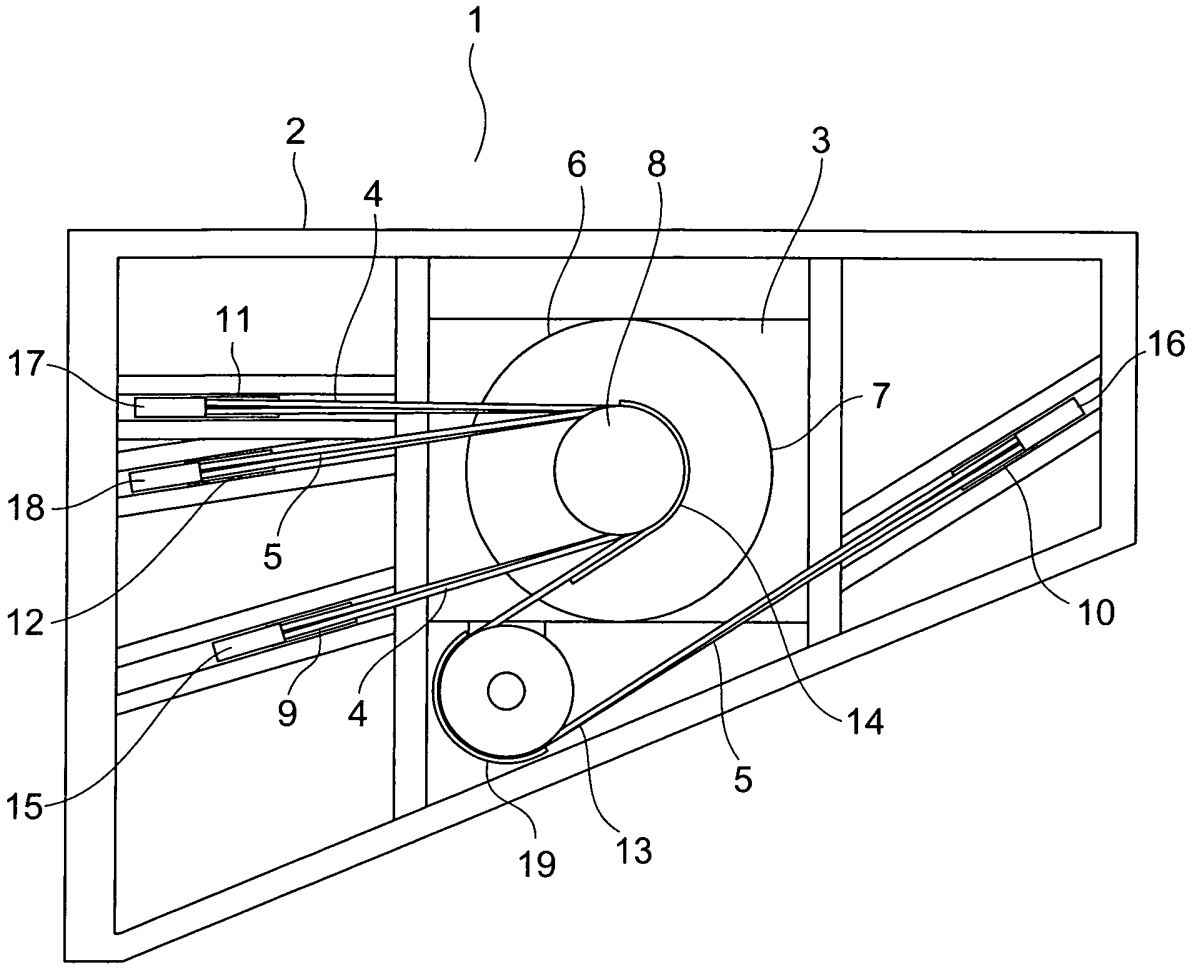


FIG. 2

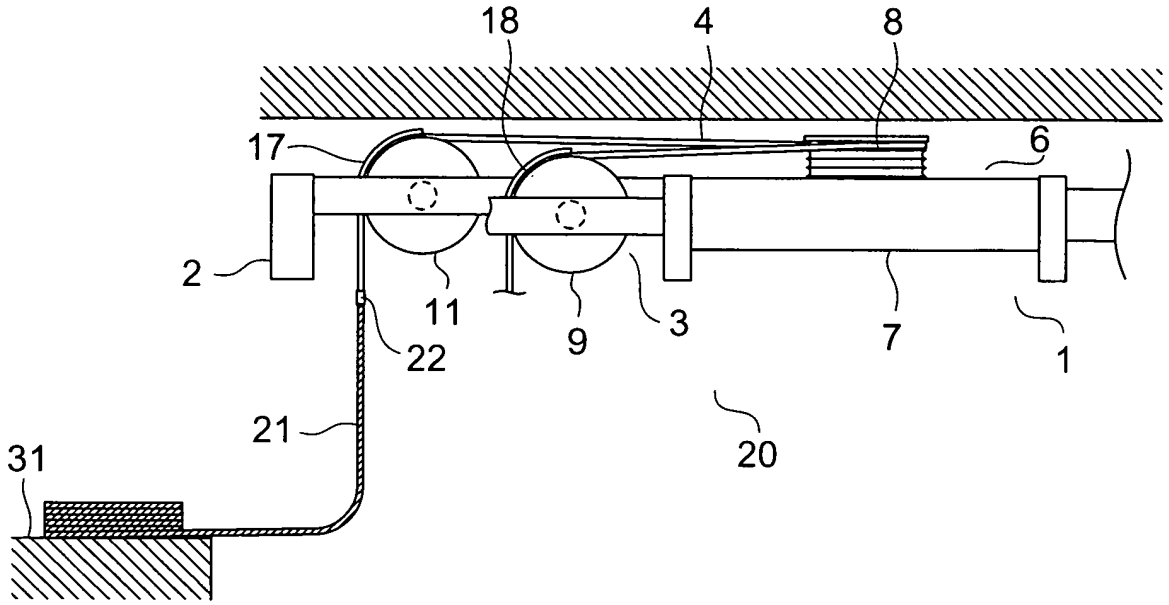


FIG. 3

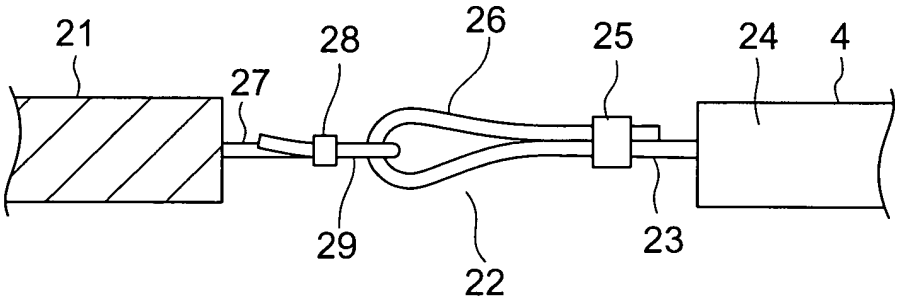


FIG. 4

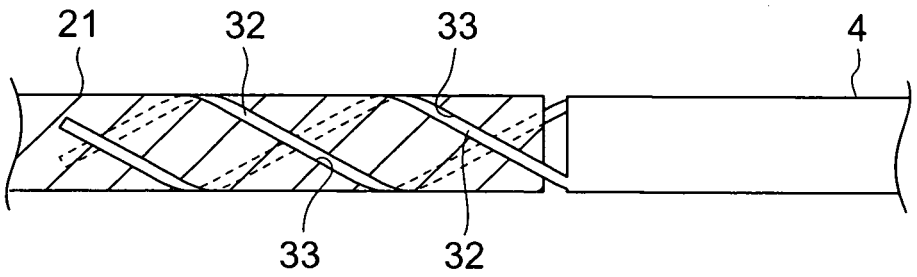


FIG. 5

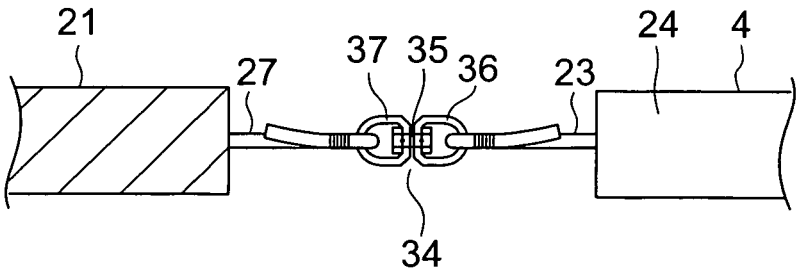


FIG. 6

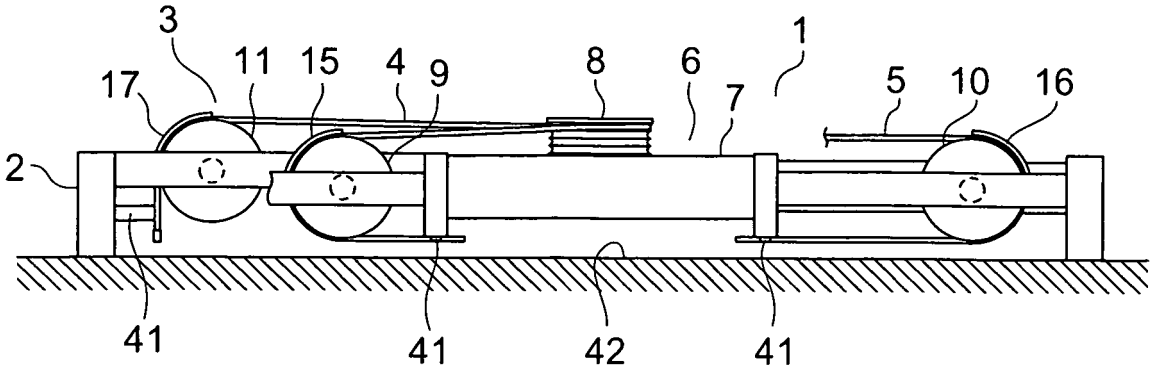

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FIG. 7

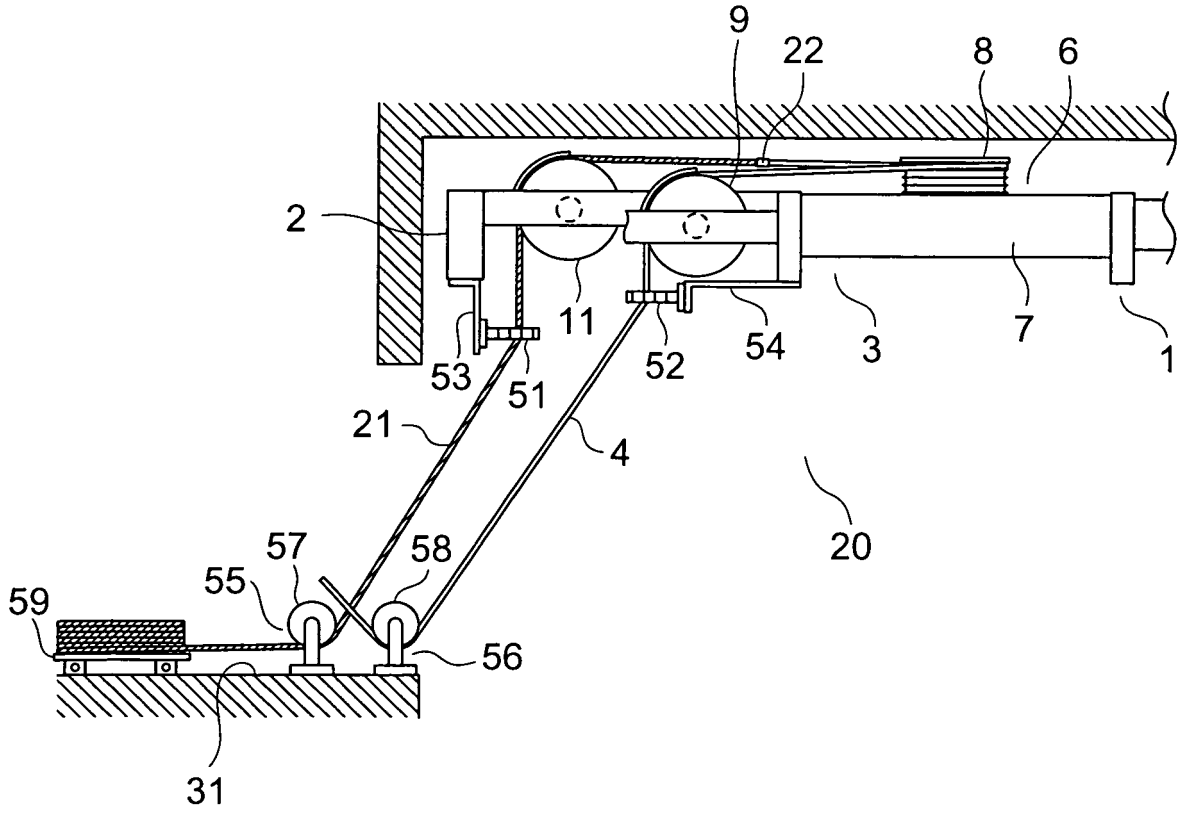
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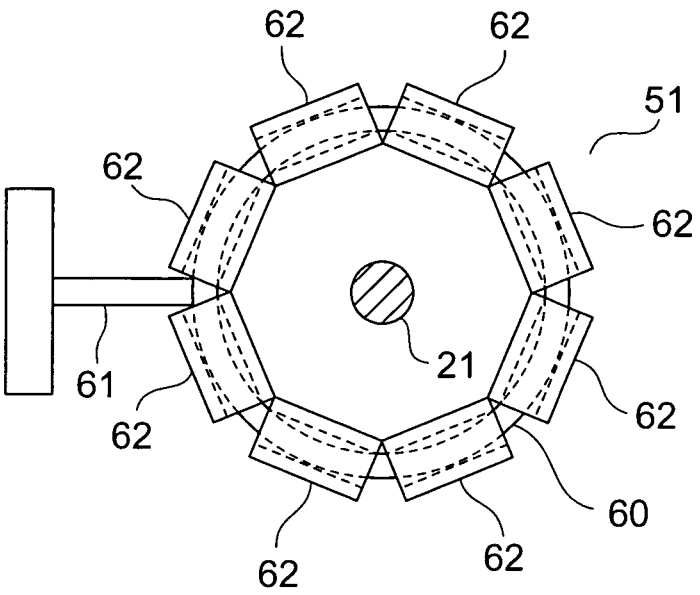
FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2005/021441

A. CLASSIFICATION OF SUBJECT MATTER
B66B7/06(2006.01)i, *B66B7/00*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B66B7/00-B66B7/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2006
Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2002-362851 A (Mitsubishi Electric Corp.), 18 December, 2002 (18.12.02), Par. Nos. [0011] to [0015]; Figs. 1 to 5 (Family: none)	1-7
A	JP 2004-315137 A (Hitachi Building Systems Co., Ltd.), 11 November, 2004 (11.11.04), Par. Nos. [0011] to [0017]; Fig. 1 (Family: none)	1-7
A	JP 2004-51242 A (Mitsubishi Electric Corp.), 19 February, 2004 (19.02.04), Par. Nos. [0007] to [0020]; Figs. 1 to 5 (Family: none)	6

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
07 August, 2006 (07.08.06)	22 August, 2006 (22.08.06)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2005/021441

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 6-156931 A (Kabushiki Kaisha Hitachi Building System Service), 03 June, 1994 (03.06.94), Fig. 1 (Family: none)	7

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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