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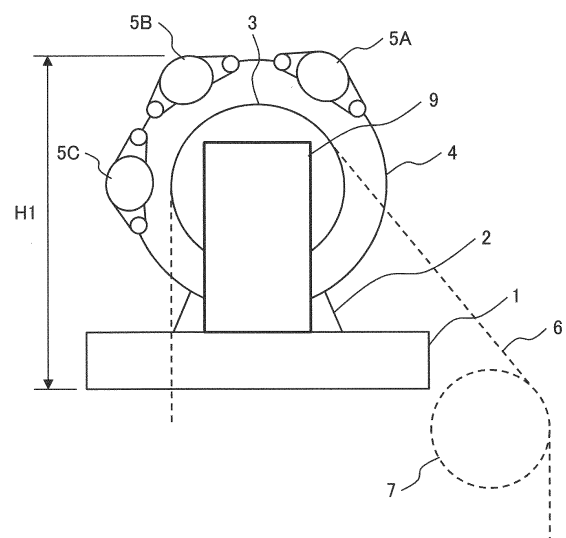
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(54) **ELEVATOR**

(57) In a case where three disk brake devices are used for a hoisting machine, restriction on maneuverability of a main rope occurs due to a positional relation thereof with a deflector wheel. There is provided an elevator in which the three disk brakes are asymmetrically arranged with a vertical line passing through the center of a rotary shaft of a sheave set as a center line, one disk brake is arranged on the side where the deflector wheel is arranged and two disk brakes are arranged on the other.

FIG. 1



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Description

Technical Field

[0001] The present invention relates to an elevator.

Background Art

[0002] As a background art of the present technical field, a hoisting machine for elevator that brake devices which are three in number in total are left-right asymmetrically arranged is described in Patent Literature 1. In addition, an example that an axial-direction length of the brake device reaches an upper part of a driving sheave is described in Patent Literature 2.

Citation List

Patent Literature

[0003]

PTL 1: Chinese Patent Application Laid-Open No. 102275791

PTL 2: Japanese Patent Application Laid-Open No. 2016-37336

Summary of Invention

Technical Problem

[0004] However, in a case of trying to adopt such a configuration that a brake device is positioned over a sheave as in Patent Literature 2 when the plurality of brake devices are to be attached to the hoisting machine as in Patent Literature 1, it is feared that the brake device may interfere with a rope which is wound on the sheave. In particular, in a case where a deflector wheel is provided near the hoisting machine, the possibility that the rope on the deflector wheel side and the brake device will interfere with each other is high.

Solution to Problem

[0005] There is provided an elevator including a car, a hoisting machine which drives the car, a rope which is wound on a sheave of the hoisting machine and connects the car with a counterweight, and a deflector wheel which guides the rope, in which the hoisting machine is equipped with a motor frame, a motor which is supported and indicated by the motor frame, the sheave which is coupled to a rotary shaft of the motor, a brake disk which is larger than the sheave in diameter and is arranged coaxially therewith, and three disk brakes which are correspondingly arranged on an outer peripheral part of the brake disk and grip the brake disk and give braking force thereto, and the three disk brakes are asymmetrically arranged with a vertical line passing through the center

of a rotary shaft of the sheave as a center line, one disk brake of the three disk brakes is arranged on the side where the deflector wheel is arranged and two disk brakes of the three brake disks are arranged on the other.

Advantageous Effects of Invention

[0006] According to the hoisting machine for elevator device of the present invention, restriction on maneuverability of the main rope can be partially removed. Incidentally, problems, configurations and effects other than the above will become apparent from the following description of an embodiment.

15 Brief Description of Drawings

[0007]

Figure 1 is a front view of a hoisting machine for elevator device according to one example.

Figure 2 is a front view illustrating a maintenance state of the hoisting machine for elevator device illustrated in Figure 1.

Figure 3 is a front view illustrating the maintenance state of the hoisting machine for elevator device by another configuration for the purpose of comparison therewith.

Figure 4 is a side view of the hoisting machine for elevator device according to one example.

Figure 5 is a front view of the hoisting machine for elevator device according to one example in a case of using a deflector wheel.

Figure 6 is a front view of the hoisting machine for elevator device in a case of placing the deflector wheel on the side which is opposite to that in Figure 5. Description of Embodiments

[0008] In the following, an example of the present invention will be described on the basis of the drawings.

Example 1

[0009] Figure 1 is a front view illustrating a hoisting machine for elevator device according to one example of the present invention.

[0010] The hoisting machine for elevator device is installed on a machine base 1 and a drive motor (not illustrated) which is supported by a motor frame 2, a sheave 3 which is coupled to a rotary shaft of the drive motor, a brake disk 4 which is larger than the sheave 3 in diameter are coaxially arranged on the machine base 1. Three disk brakes 5A, 5B, 5C are attached to the motor frame 2 respectively. A main rope 6 which is coupled to a car (not illustrated) is wound on the sheave 3 and is stretched over a deflector wheel 7 which is attached to a support frame on which the machine base 1 is placed. Accordingly, the main rope 6 which is wound on the sheave 3 is inclined on the side where the deflector wheel is pro-

vided and, on the other hand, hangs down vertically on the other.

[0011] The respective disk brakes 5A, 5B, 5C are the same as one another in configuration and have generally known structures and therefore detailed description thereof is omitted. The respective disk brakes 5A, 5B, 5C are configured in such a manner that after cutting off electric conduction to the drive motor, the disk brakes 5A, 5B, 5C are brought into non-excited states, brake shoes are pressed against both surfaces of the brake disk 4 with spring force so as to apply braking force to the brake disk 4.

[0012] In the three disk brakes 5A, 5B, 5C, the disk brake 5A which is arranged on the deflector wheel 7 side and the disk brake 5B which is arranged on an intermediate part are arranged at the almost same level avoiding the top part which is located on the uppermost part of the brake disk 4. The disk brake device 5C which is arranged on the opposite side of the deflector wheel 7 is arranged adjacent to the disk brake 5A or 5B. Accordingly, when virtualizing a vertical line which passes through the center line of a rotary shaft of the sheave 3, the three disk brakes 5A, 5B, 5C are arranged avoiding this virtual vertical line and are asymmetrically arranged. In addition, there are a case where the deflector wheel 7 is arranged on the disk brake 5A side and a case where it is arranged on the disk brake 5B side depending on the shape of a hoistway and so forth. In the present example, the deflector wheel 7 is arranged on the disk brake 5A side and the disk brake 5C is arranged in the form of being adjacent to the other disk brake 5B. However, since there are also cases where the disk brake 5C is arranged next to the disk brake 5A depending on the arrangement of the deflector wheel 7, it is preferable to perform processing on or to attach a device to the motor frame 2 for attachment of the disk brake 5C next to the disk brake 5A. By configuring in this way it is possible to easily cope with either arrangement of the deflector wheel simply by changing an attachment position of the disk brake 5C.

[0013] A height H1 of the entire hoisting machine for elevator device can be made low by arranging the disk brakes 5A, 5B, 5C in this way and thereby by not arranging them on the uppermost part. In addition, interference between the disk brake 5C and the main rope 6 can be prevented with ease by arranging the disk brake 5C on the opposite side of the deflector wheel 7. Figure 2 is a front view illustrating a state where the disk brake 5B is opened at the time of maintenance. The disk brake 5B is attached to the motor frame 2 with a plurality of support pins 8 similarly to the other disk brakes 5A, 5C. At the time of maintenance of the disk brake 5B, work is performed by removing one of the support pins and rotating it around the remaining support pin 8 as illustrated in the drawing. When performing this work, part of the disk brake 5B reaches a maximum height which is a height H2 in the illustrated state.

[0014] In a case where the inside of a machine room is renewed and the hoisting machine is to be replaced

with a newly installed product, since the height of the machine room itself cannot be increased, it is necessary to restrain the height of the newly installed hoisting machine. When configuring the newly installed hoisting machine by arranging the three disk brakes 5A, 5B, 5C as illustrated in Figure 1, the height H2 can be restrained. When comparing this with a case where a vertical line passing through the center line of the rotary shaft of the sheave 3 is virtualized and the disk brake device 5B arranged on the intermediate part in the three disk brakes 5A, 5B, 5C is arranged on this virtual vertical line just like the hoisting machine which is illustrated in Figure 3 for reference, it can be restricted so as to become sufficiently lower than a height H3 at that time.

[0015] Figure 4 is a side view of the hoisting machine for elevator device according to one example. The sheave 3 and the disk brake 5 are in a relation that they overlap each other when viewing from the side. The disk brake 5 is configured such that an axial length of the rake device protrudes to an upper part of the sheave 3 in the axial direction, and overlaps the sheave 3 in a radial direction of the sheave 3. Thereby, when, in a case where the main rope 6 which is wound on the sheave 3 obliquely falls by the deflector wheel 7, the disk brake 5C is arranged on the lateral of the hoisting machine on the side that the deflector wheel 7 is present, the main rope 6 interferes with the disk brake 5C. Accordingly, the interference thereof with the main rope 6 can be prevented by arranging the disk brake 5C on the opposite side of the deflector wheel 7.

[0016] Figure 5 is a front view of the hoisting machine for elevator device according to one example. In addition, a rope guard 10 which is not illustrated in Figure 1 is connected to a pedestal 9 and is arranged between the disk brake 5B and the disk brake 5C. This rope guard 10 is arranged on the side that the disk brake 5C is present, that is, on the opposite side of the deflector wheel 7. It is desirable that the position of the rope guard 10 be above a central axis of the sheave 3 and it be provided upward within 45 degrees with a horizontal-position height of the central axis of the sheave 3 set as 0 degree. This rope guard is a component which prevents the main rope 6 from getting out of a sheave groove when shaking in an earthquake. Ordinary-time interference between the main rope 6 and the rope guard 10 can be prevented while preventing the main rope 6 from getting out of the sheave groove by arranging the present rope guard 10 on the side that the deflector wheel 7 is not present and which is the same as that of the disk brake 5C.

[0017] Figure 6 is a front view of the hoisting machine for elevator device in a case where the deflector wheel is placed on the side which is opposite to that in Figure 5. The disk brake 5C is arranged on the side of the motor frame 2 that the deflector wheel 7 is not arranged, and the rope guard is connected to the pedestal 9 and is arranged on the side that the deflector wheel 7 is not arranged and between the disk brake 5A and the disk brake 5C.

[0018] Incidentally, the present invention is not limited to the above-described example and various modified examples are included. For example, the above-described example is described in detail for explaining the present invention intelligibly and is not necessarily limited to the one which is equipped with all the configurations that are described.

Reference Signs List

[0019]

3	sheave	
4	brake disk	
5A to 5C0	disk brake	15
6	main rope	
7	deflector wheel	
10	rope guard	

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Claims

1. An elevator comprising: a car; a hoisting machine which drives the car; a rope which is wound on a sheave of the hoisting machine and connects the car with a counterweight; and a deflector wheel which guides the rope, wherein the hoisting machine is equipped with a motor frame, a motor which is supported and indicated by the motor frame, the sheave which is coupled to a rotary shaft of the motor, a brake disk which is larger than the sheave in diameter and is arranged coaxially therewith, and three disk brakes which are correspondingly arranged on an outer peripheral part of the brake disk and grip the brake disk and give braking force thereto, and the three disk brakes are asymmetrically arranged with a vertical line passing through the center of a rotary shaft of the sheave set as a center line, one disk brake of the three disk brakes is arranged on the side where the deflector wheel is arranged and two disk brakes of the three brake disks are arranged on the other. 25
2. The elevator according to claim 1, wherein the three disk brakes overlap the sheave in a radial direction of the sheave. 45
3. The elevator according to claim 2, wherein the three disk brakes are connected to the motor frame, and connection parts for the disk brakes are provided on the motor frame at every two positions, four positions in total with the vertical line passing through the center line of the rotary shaft of the sheave set as the center line. 50
4. The elevator according to claim 3, wherein the hoisting machine is equipped with a rope 55

guard, and the rope guard is arranged between the two disk brakes, of the three disk brakes, which are arranged on the side where the deflector wheel is not arranged.

5. The elevator according to claim 2, wherein the three disk brakes are arranged avoiding the vertical line passing through the center of the rotary shaft of the sheave.

FIG. 1

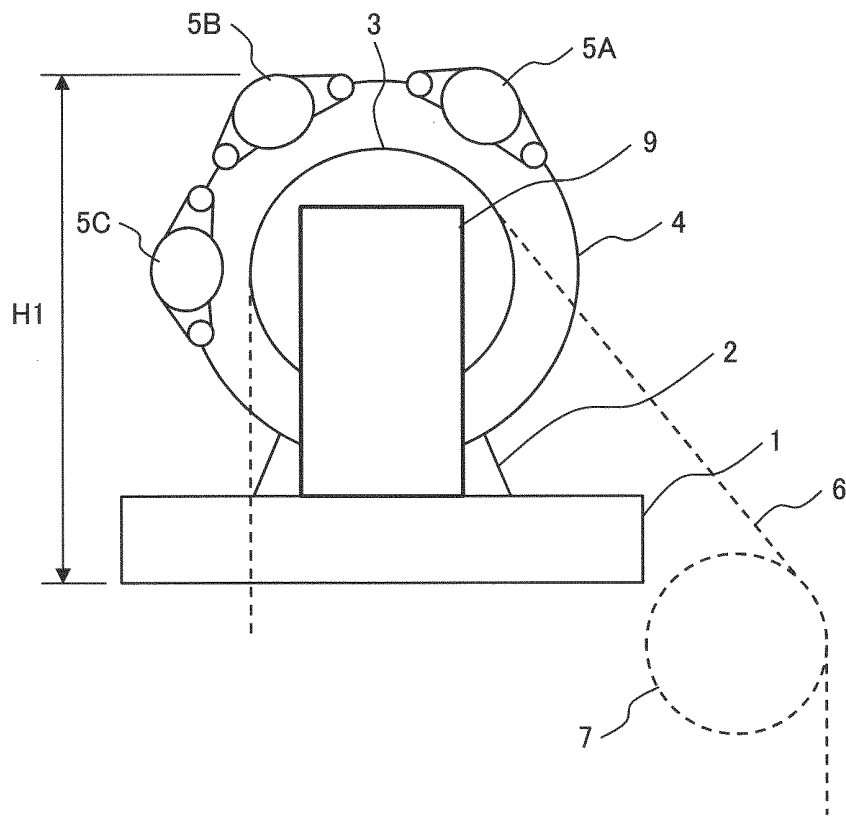


FIG. 2

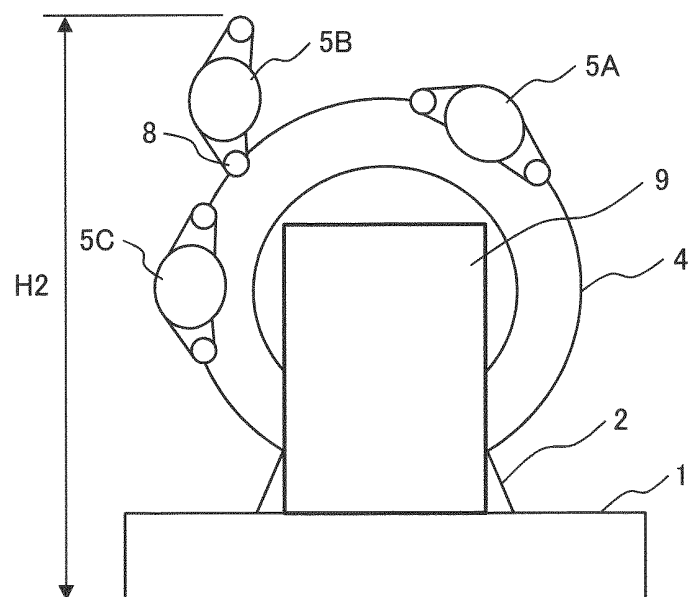


FIG. 3

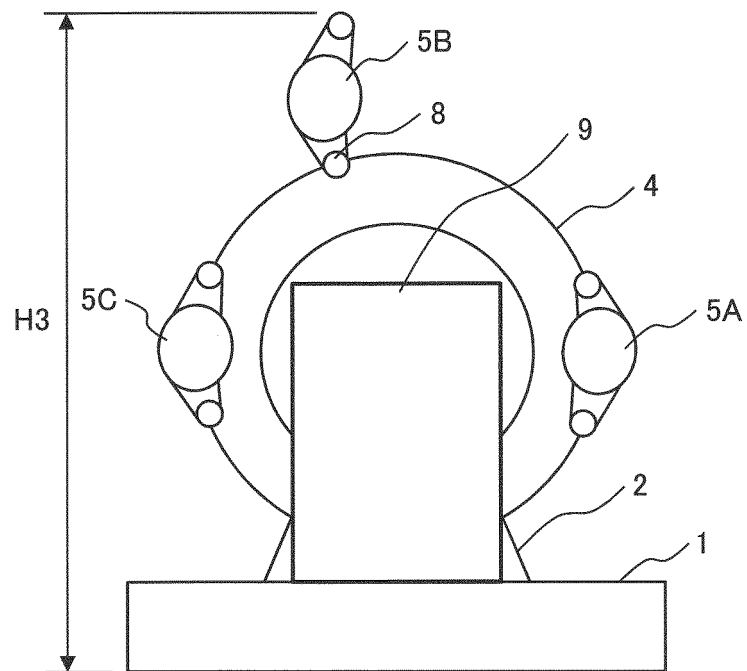


FIG. 4

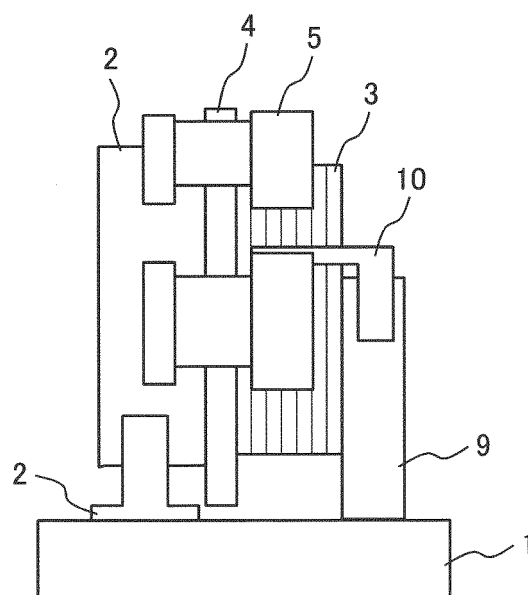


FIG. 5

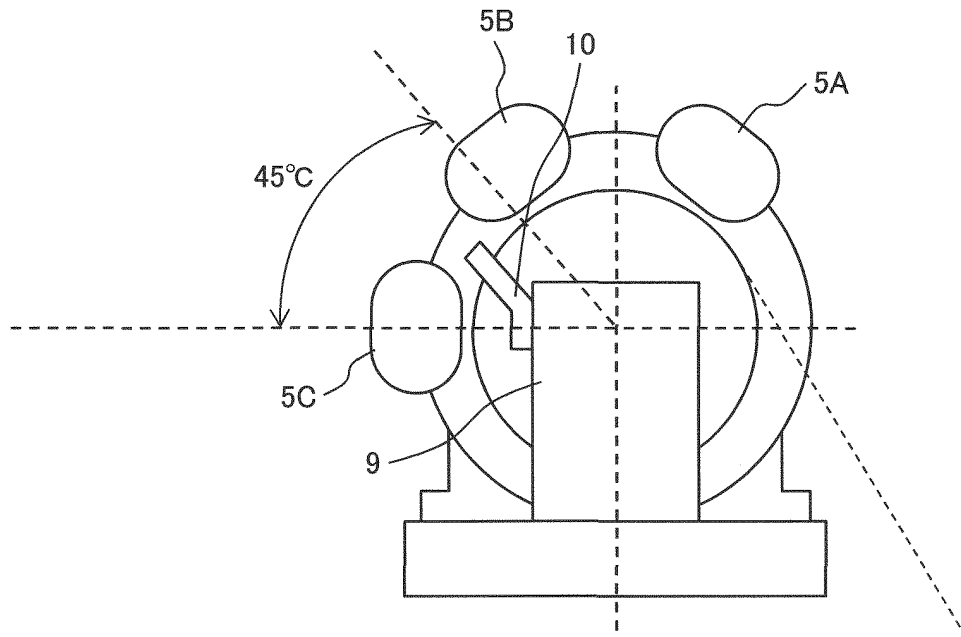
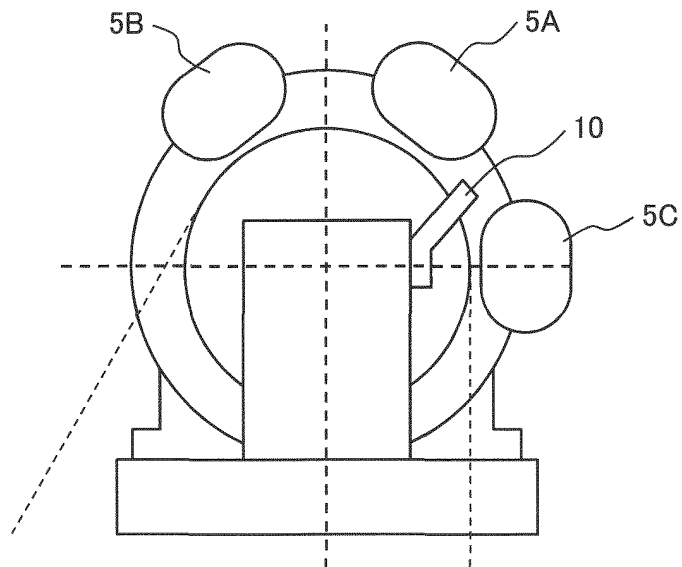


FIG. 6



IN A CASE WHERE HANGING DIRECTION
IS REVERSE

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/016331

A. CLASSIFICATION OF SUBJECT MATTER

B66B11/08(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)

B66B11/04-11/08, F16D49/00-71/04

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 1996-2017

Kokai Jitsuyo Shinan Koho 1971-2017 Toroku Jitsuyo Shinan Koho 1994-2017

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.
Y A	JP 2016-37336 A (Hitachi, Ltd.), 22 March 2016 (22.03.2016), paragraphs [0019] to [0020], [0025] to [0030]; fig. 1 to 2, 6 & CN 106185563 A	1-2, 5 3-4
Y	CN 102275791 A (SUZHOU FUSHI ELEVATOR CO., LTD.), 14 December 2011 (14.12.2011), paragraph [0016]; fig. 1 (Family: none)	1-2, 5

☒ 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

25 July 2017 (25.07.17)

Date of mailing of the international search report

08 August 2017 (08.08.17)

Name and mailing address of the ISA/

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Authorized officer

Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/016331

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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- JP 2016037336 A [0003]