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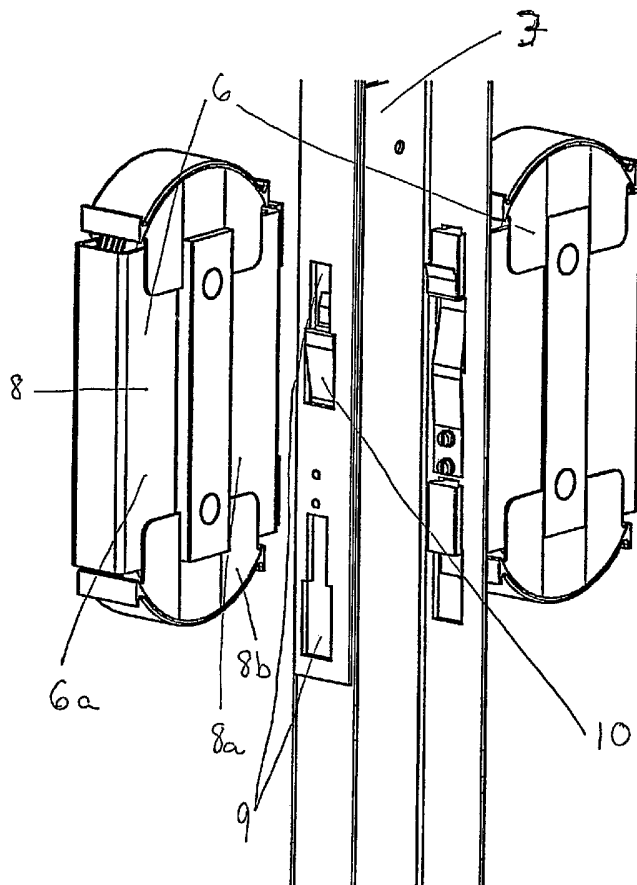
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(54) Title: ELEVATOR ARRANGEMENT



(57) Abstract: The invention relates to a method for installing/securing at least one diverting pulley of an elevator or equivalent comprising at least one rope pulley. According to the method, the diverting pulley together with the ropes or in a rigged state is arranged near the elevator or in the elevator shaft and the diverting pulley is placed on a mounting point by using a quick coupling. The invention also relates to an elevator or equivalent comprising at least one rope pulley (5) mounted in place by means of a frame structure (3) and a set of ropes (7, 7a, 7b) consisting of a number of ropes, the passage of which has been arranged using at least one set of diverting pulleys (6) in such manner that the set of diverting pulleys (6) has been arranged to be detachably mounted by means of a quick coupling. In addition, the invention relates to the use of a quick coupling for placing a set of diverting pulleys (6) on a fastening point in an elevator or equivalent.



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ELEVATOR ARRANGEMENT

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5 The present invention relates to a method as defined in the preamble of claim 1, to an elevator produced by the method, to an elevator as defined in the preamble of claim 5 and to a use as defined in the preamble of claim 12.

10 At present, a problem in the installation of elevators is tightness of space, because the aim is to make as efficient use of the cross-sectional area of the shaft as possible. Especially in the case of elevators without counterweight, this leads to a very small distance
15 between the car wall and the shaft wall. Moreover, minimizing the shaft spaces both above and below the elevator car leads to problems regarding both installation and construction of the elevator.

20 In prior-art solutions, for example the diverting pulleys are fixedly mounted e.g. on the car, the counterweight or the frame structure or equivalent. In such solutions, the diverting pulleys have to be removed in connection with both installation of the elevator and
25 maintenance work to be carried out on it.

However, there are considerable drawbacks associated with prior art. In an elevator constructed as described above, both the spaces needed during installation and the spaces needed during maintenance are narrow.
30 In addition, simultaneous removal of the diverting pulleys is about impossible when prior-art devices are used. This leads to difficulties and delays in the installation and maintenance of the elevator.

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The object of the present invention is to overcome these drawbacks and achieve a completely new type of

solution. The object of the present invention is to enable easy installation of diverting pulleys, sets of diverting pulleys and/or rope pulleys and thus also to allow the use of this solution during maintenance.

5

The invention is based on a concept according to which the method of installing and/or mounting at least one diverting pulley comprises at least one rope pulley. According to such a method, the diverting pulley together with the ropes is placed near the elevator in the elevator shaft, whereupon the diverting pulley is attached by a quick coupling to a fastening point. Alternatively, the rigged diverting pulley can be placed near the elevator or in the elevator shaft, whereupon the diverting pulley is attached by a quick coupling to a fastening point.

According to the above-described method, the diverting pulley is detached by releasing the quick coupling. When necessary, the elevator car is suspended for maintenance preferably so that it is supported by a tackle or equivalent. Alternatively, the car can be locked in place by other means.

By the method of the invention, an elevator can be installed in a reliable, fast and economical manner. Furthermore, in addition to new buildings, the method of the invention can also be used in modernization projects, and the method is not restricted to any specific elevator type; instead, the method can be used both in elevators without counterweight and in elevators with counterweight. In addition, the method can be utilized in other hoisting arrangements according to need.

35

The invention also relates to an installation arrangement according to the preamble of the claim in an ele-

vator comprising at least one diverting pulley mounted in place by means of a frame structure and a roping consisting of a number of ropes, the passage of which has been arranged using at least one set of diverting pulleys. Such an arrangement comprises at least one set of diverting pulleys, which has been arranged to be detachably mounted by means of a quick coupling. The mounting used may be the frame structure, the car, the counterweight, the elevator shaft or equivalent according to need. A releasable set of diverting pulleys is a very advantageous solution because the space available for the pulleys is very small. Therefore, it is very advantageous to have a possibility to move the set of diverting pulleys to a place where there is more space, where it can be released and fastened safely and quickly. It is possible to provide such a space e.g. above the car.

The set of diverting pulleys according to the arrangement consists of at least one diverting pulley and a frame structure or box part and preferably the frame structure or box part consists of at least one box part or part. The box part has preferably been arranged to be detachably secured to at least one diverting pulley. If the box part is composed of more than one part, these can also be advantageously fastened together.

The set of diverting pulleys according to the arrangement preferably comprises an even number of diverting pulleys. In a particularly preferable case, the number of diverting pulleys is two. In such a case, the opposite forces acting on the diverting pulleys advantageously about cancel each other. What remains is preferably only the difference between the opposite forces. Due to its structure, the set of diverting pulleys according to this solution can withstand even

large moment forces, such as e.g. the forces caused by the upper and lower riggings, because in practice these almost cancel each other due to the advantageous diverting pulley structure.

5

Arranged in the frame structure or box part of the set of diverting pulleys of the invention are a mounting element that can be detachably fastened to its counterpart and at least one diverting pulley mounted on the frame structure by means of a quick coupling. The quick coupling in question may be e.g. a so-called key-hole joint lockable by a spring. The spring prevents the frame structure from escaping from the part of the keyhole part of a preferably narrow shape.

15

It is also possible to attach a detachable guard element to the set of diverting pulleys of the invention to guide the ropes. Alternatively, the guard element also keeps the ropes in position. In addition, the guard element, which is made of any material, preferably e.g. plastic, prevents the entry of rubbish or the like into the set of diverting pulleys, especially into the gap part between the box parts.

25 The invention also concerns the use of a quick coupling in an elevator, comprising at least one rope pulley mounted in place by means of at least one frame structure and a set of ropes consisting of a number of ropes, the passage of which has been arranged using at least one set of diverting pulleys.

30

In more precise terms, the method and apparatus of the invention are characterized by what is disclosed in the characterization parts of claims 1, 5 and 12.

35

In the following, the invention will be described in detail with reference to the attached drawings, which

illustrate an installation and/or mounting method and an elevator according to the invention.

The invention will now be examined in greater detail
5 with reference to the attached drawings, wherein

Fig. 1 presents a solution according to the invention in situation where the elevator is being installed or operated
10

Fig. 2 represents a solution according to the invention for use during maintenance of an elevator,

Fig. 3 illustrates the structure of set of diverting pulleys in a dismounting situation,
15

Fig. 4 illustrates the structure of the set of diverting pulleys in a dismounting situation as seen from another direction
20

Fig. 5a presents the structure of the set of diverting pulleys in a so-called exploded view,

Fig. 5b presents a control signal view of the set of
25 diverting pulleys, and

Fig. 6 present the structure of the set of diverting pulleys in a so-called exploded view.

30 Fig. 1 presents an elevator car 1 with a frame structure 3 in an elevator shaft 2. The figure also shows a hoisting machine 4, rope pulleys 5 and sets of diverting pulleys 6. The ropes themselves are not shown to simplify the figure. In this example, the sets of diverting pulleys 6 are mounted on the frame structure
35 3. Alternatively, the sets of diverting pulleys 6 may naturally be mounted on the guide rail.

In Fig. 2, the elevator car 1 with a frame structure 3 is presented in a maintenance situation where a set of diverting pulleys 6a has been driven along the ropes 7 to a maintenance position, allowing a serviceman to carry out the maintenance operations safely while standing on the top 8 of the elevator car 1. A corresponding situation can naturally be utilized when the elevator is being installed. The elevator car may preferably be narrower in its upper part, allowing other devices in the shaft, such as e.g. the hoisting machine, which are not shown in the figure, to be more easily disposed in relation to the elevator car.

Fig. 3 shows the sets of diverting pulleys 6 and the frame structure 3. In the figure, set of diverting pulleys 6a has been detached from the frame structure. The figure also shows the box part 8 of the set of diverting pulleys 6. The box part in the figure consists of more than one part 8a and 8b. In addition, the figure also shows a hole 9, which preferably is narrower at one edge. The figure shows two holes 9, with a tightening element 10, preferably a spring, mounted in one of them. A so-called keyhole joint as presented in the figure enables easy quick coupling of the set of diverting pulleys even without separate tools. The counterparts on the set of diverting pulleys, which are presented in detail in Fig. 4, are placed in the holes 9 and the spring 10 tightens the set of diverting pulleys in position. Thus, no separate fastening elements such as bolts are needed at all and the installation can be performed considerably faster.

4 shows the set of diverting pulleys 6 as seen from another direction. The mounting hole 9 and the spring 10 can now be seen from the other side and in addition the figure shows a counterpiece 8c, which is provided

on the set of diverting pulleys and is placed in the hole 9 in the quick coupling. In this embodiment, the counterpiece 8c is preferably an integral part of the box part 8, but naturally it may also be a separate fastening element attached the box part 8. Between the box parts 8a and 8b is formed a so-called gap 15, which in undesirable conditions may permit the entry of rubbish into the box, which might impede the operation of the set of diverting pulleys.

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Fig. 5a illustrates the assembly of the set of diverting pulleys 6, wherein the box part 8 is composed of several different parts. Box part 8a is provided with a counterpart 8c integrated with it, and the separate box part 8b is provided with a guard element 8d integrated with it, which naturally may also consist of a separate and detachable guard element 8d. The guard element 8d functions as a gap protector and it both prevents the entry of impurities into the set of diverting pulleys 6 and guides the ropes, which are not shown in the figure. The diverting pulley 11 is mounted on an axle 12 by means of another axle 13, preferably a sleeve and preferably a retainer screw 14. In this way, a compact set of diverting pulleys 6 is achieved that is easy and economical to both manufacture and install.

Fig. 5b presents a sectional view of a set of diverting pulleys 6 in which, in addition to the pulleys 11, are also shown the upper ropes 7a, which pass around pulley 11a, and the lower ropes 7b, which pass around pulley 11b. As can be seen from the figure, the set preferably comprises an even number of diverting pulleys, here two pulleys, so the forces produced by the upper and lower ropes advantageously cancel each other and only their difference preferably remains on the set of diverting pulleys.

Fig. 6 presents an assembly view of the rope pulley 5, wherein the box part 8 has preferably been made from a profiled element. In addition, the figure shows both
5 the pulley 11 and the axle 12, axle 13 preferably a sleeve and retainer screw 14 needed for the mounting of the pulley. If necessary, it is also possible to add a required number of spacers 15 to the structure.

10 The method and arrangement of the invention are characterized by what is disclosed in the characterization parts of claims 1, 5 and 12. Other embodiments of the invention are characterized by what is disclosed in the other claims. Inventive embodiments are also pre-
15 sented in the description part of the present application. The inventive content disclosed in the application can also be defined in other ways than is done in the claims below. The inventive content may also consist of several separate inventions, especially if the
20 invention is considered in the light of expressed or implicit sub-tasks or in respect of advantages or sets of advantages achieved. Some of the attributes contained in the claims below may be superfluous from the point of view of separate inventive concepts.

25 It is obvious to the person skilled in the art that the invention is not limited to the embodiments described above, in which the invention has been described by way of example, but that different embodi-
30 ments of the invention are possible within the scope of the inventive concept defined in the claims presented below.

CLAIMS

1. A method for installing/securing at least one diverting pulley of an elevator or equivalent having
5 at least one rope pulley, **characterized** in that
- the diverting pulley together with the ropes or in a rigged state is arranged near the elevator or in the elevator shaft,
 - the diverting pulley is placed on a mounting
10 point by using a quick coupling.
2. A method according to claim 1, **characterized** in that detachment of the diverting pulley is performed by releasing the quick coupling.
15
3. A method according to claim 1 or 2, **characterized** in that the car of the elevator is suspended for maintenance so that it is supported preferably by a tackle or equivalent or alternatively the car is
20 locked in place by other means.
4. An elevator or equivalent installed by a method as defined in any one of the preceding claims.
- 25 5. An elevator or equivalent, comprising at least one rope pulley (5) mounted in place by means of a frame structure (3) and a set of ropes (7, 7a, 7b) consisting of a number of ropes, the passage of which has been arranged using at least one set of
30 diverting pulleys (6), **characterized** in that the set of diverting pulleys (6) has been arranged to be detachably mounted by means of a quick coupling.
- 35 6. An elevator or equivalent according to claim 5, **characterized** in that the set of diverting pulleys (6) consists of at least one diverting pulley (11, 11a, 11b) and a frame structure (8).

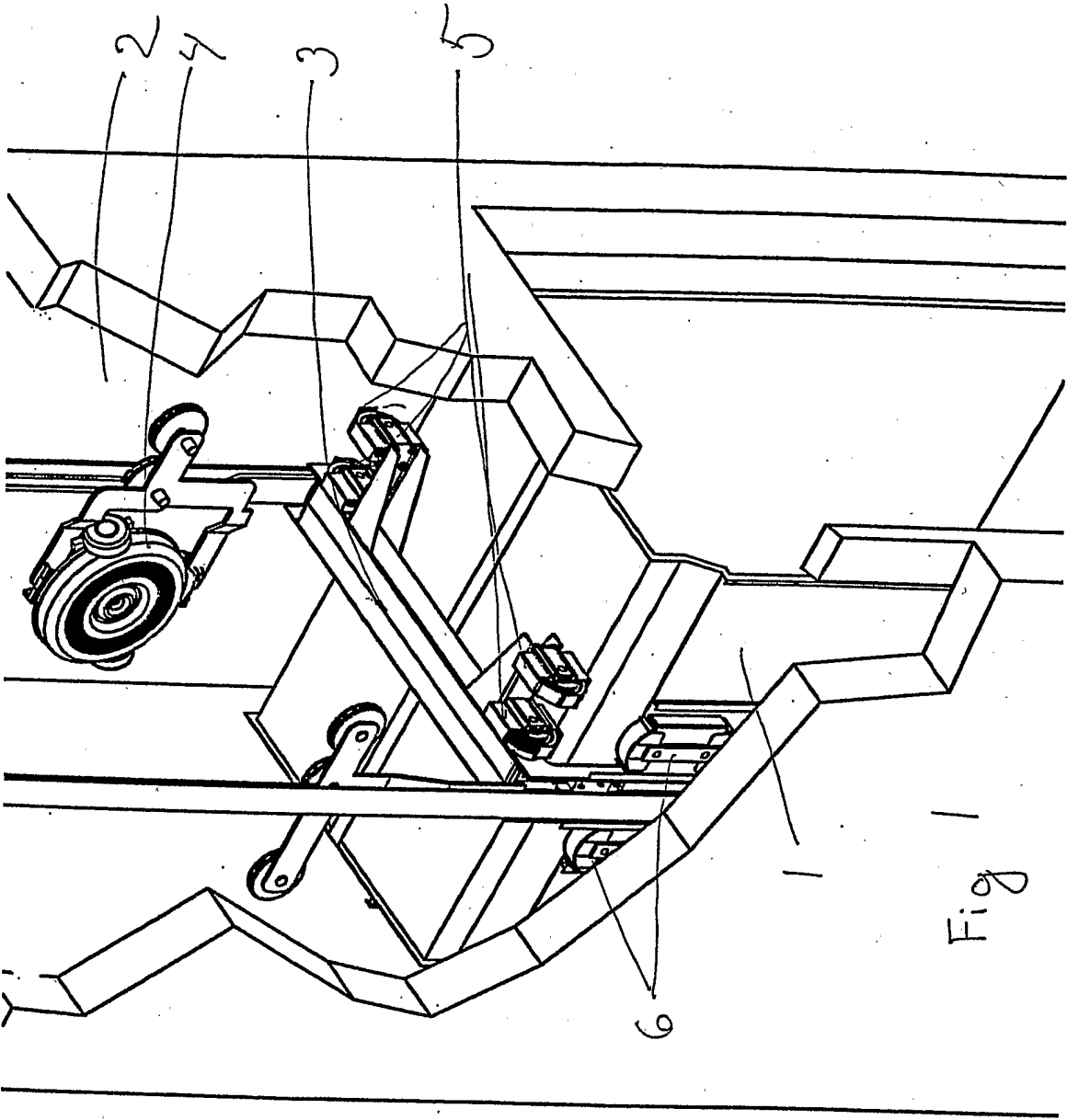
7. An elevator or equivalent according to claim 5 or 6, **characterized** in that the number of diverting pulleys (11, 11a, 11b) is an even number, preferably two.
8. An elevator or equivalent according to any one of claims 5-7, **characterized** in that the opposite forces acting on the diverting pulleys (11, 11a, 11b) have preferably been arranged to about cancel each other.
9. An elevator or equivalent according to claim 5-8, **characterized** in that the frame structure (8) consists of at least one box part (8, 8a, 8b, 8c, 8d), which have been arranged to be detachably secured to at least one diverting pulley (11, 11a, 11b) and/or to each other.
10. An elevator or equivalent according to claim 9, **characterized** in that it comprises a fastening element (9, 10, 12, 13, 14, 15) that has been arranged on the frame structure (3, 8) and can be detachably secured to its counterpart (8, 8c) and at least one diverting pulley (6, 8, 11, 11a, 11b) fastened to the frame structure (3, 8) by means of a quick coupling.
11. An elevator or equivalent according to any one of claims 5-10, **characterized** in that it comprises a detachable guard element (8d) secured to the frame structure (8) to guide the ropes (7, 7a, 7b) and/or to keep them in position and/or advantageously to prevent rubbish or the like from entering into the set of diverting pulleys.

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12. Use of a quick coupling for placing a set of diverting pulleys (6) on a fastening point in an elevator or equivalent.

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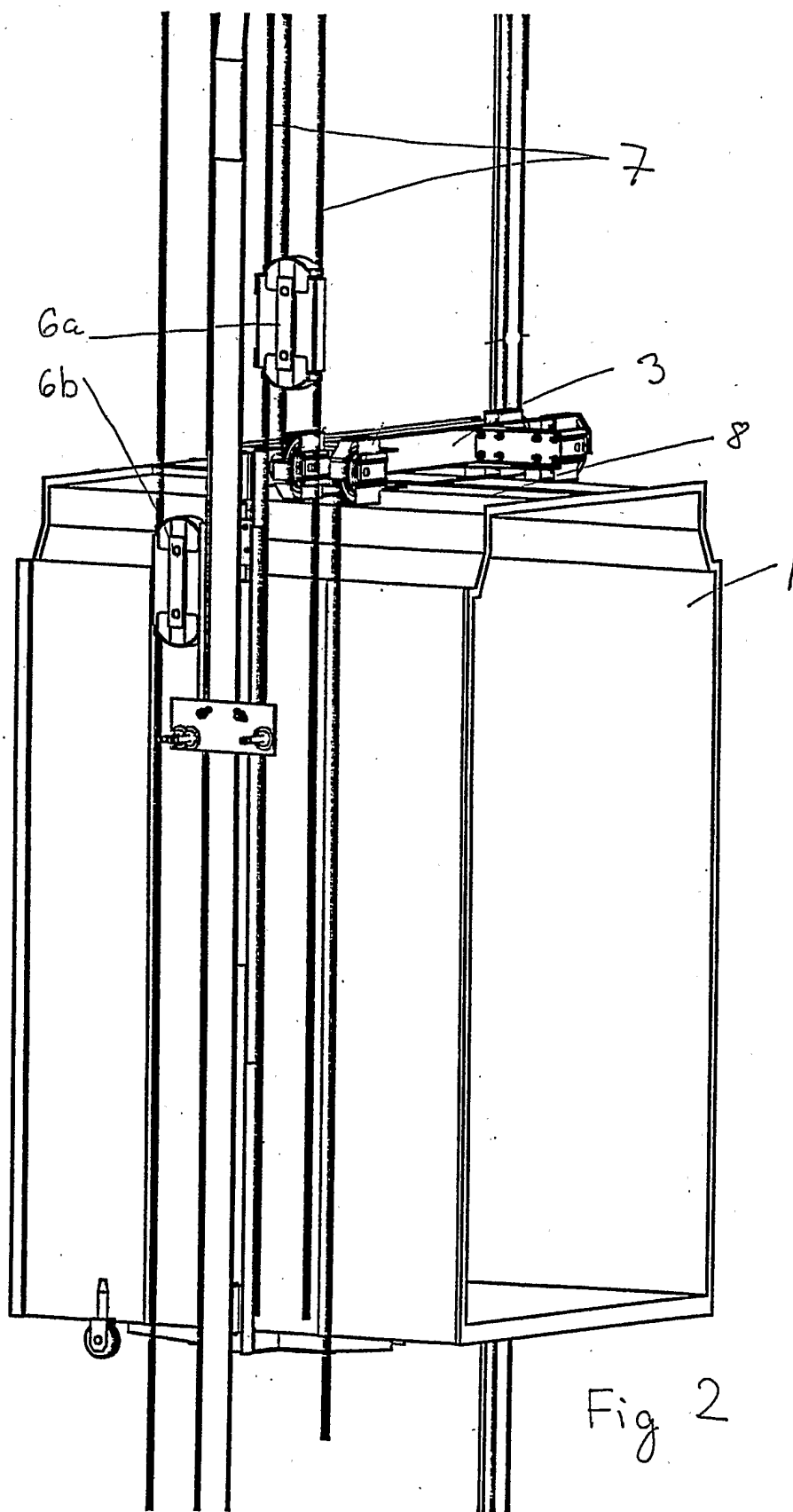


Fig 2

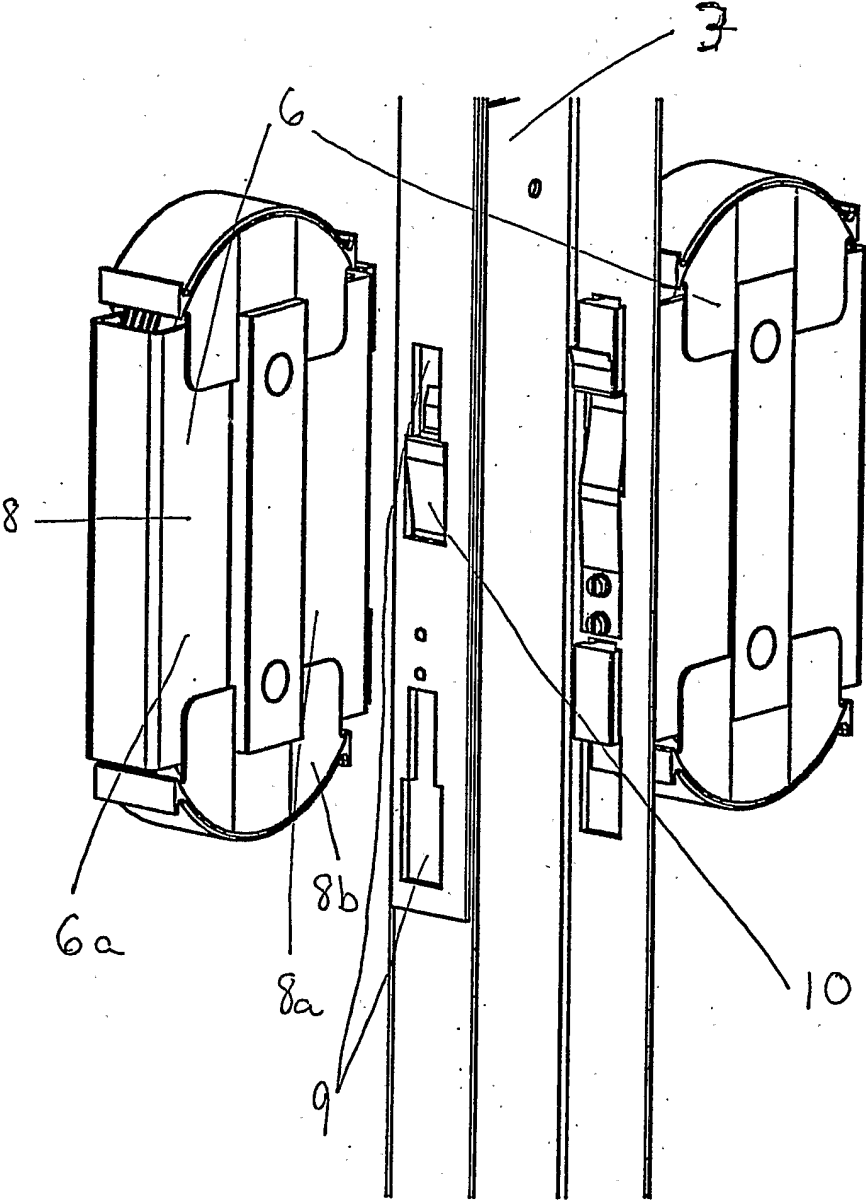


Fig 3

