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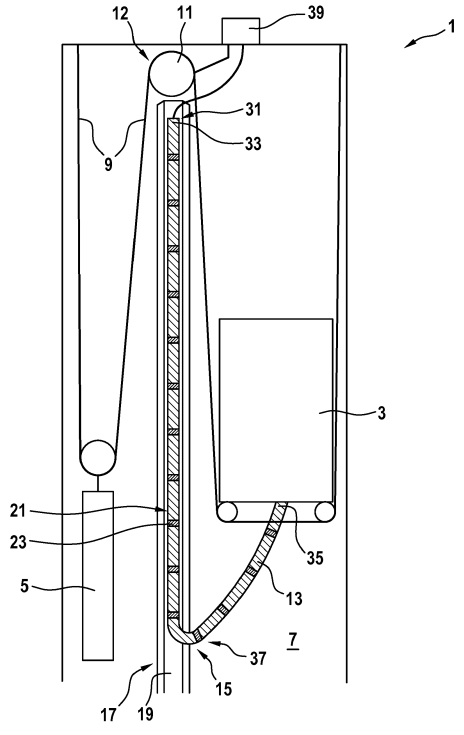
(54) ARRANGEMENT FOR MAGNET-BASED HINDERING OF LATERAL SWAY OF A ROPE IN AN ELEVATOR HOISTWAY

(57) A rope sway reducing arrangement (15) for hindering a lateral sway of an elongate rope-like means (13) in an elevator hoistway (7) in an elevator system (1) is proposed. Therein, one end (35) of the rope-like means (13) is attached to a movable component (3, 5) to be displaced within the hoistway (7) and another end of the rope-like means (13) is attached to a fixed position (31) within the hoistway (7). The rope sway reducing arrangement (15) comprises an elongate guide arrangement (17) such as a guide rail (19) and a magnet arrangement (21) such as a multitude of magnets (23). The elongate guide arrangement (17) is fixedly attached within the hoistway (7) and extends in a longitudinal direction of the hoistway (7). The magnet arrangement (21) is adapted and arranged such as to generate forces onto the rope-like means (13) for attracting the rope-like means (13) towards the guide arrangement (17). For example, multiple permanent magnets (23) may be attached to the rope-like means (13). Thereby, the rope-like means (13) may be held e.g. in releasable magnetic adherence to the guide arrangement (17) thereby preventing excessive lateral sway in all directions of e.g. an otherwise loosely hanging portion (37) of the rope-like means (13).

Fig. 1



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Description

[0001] The present invention relates to an elevator system comprising a loose rope-like means. Particularly, the present invention relates to a rope sway reducing arrangement for hindering a lateral sway of such elongate rope-like means in an elevator hoistway.

[0002] Elevators are generally used for transporting passengers and/or goods within a building, typically in a vertical direction. Therein, a movable component such as an elevator car or a counterweight is displaced within a hoistway. Typically, the car and/or the counterweight are suspended by a suspension traction means (STM) such as one or more ropes or belts which may be driven by a driving means such as an electric engine driving a traction sheave.

[0003] Additionally to the suspension traction means which has to carry the weight of the movable components and is therefore generally tense, the elevator system may comprises additional rope-like means which typically do not have to carry substantial weight, except for their own weight. Such additional rope-like means may be used for example for supplying electric energy to the movable elevator car and/or for transmitting signals between the movable elevator car and for example a component such as an elevator control being fixedly installed within the building comprising the elevator hoistway. Generally, one end of such rope-like means is attached to the movable component whereas the other end of the rope-like means is attached to a fixed position within the hoistway.

[0004] As such additional rope-like means does not have to carry substantial loads, a portion of the rope-like means is generally hanging downwards from the movable component in a relatively loose manner. If not prevented by specific measures, such loose portion of the rope-like means may freely swing or sway within the elevator hoistway.

[0005] For example, high-rise buildings may sway during windy days such that the entire hoistway comprised in the building substantially sways thereby inducing swaying of the loose portion of the rope-like means. Alternatively or additionally, high-speed elevators used in high-rise buildings may generate air turbulences within the hoistway upon moving its movable components and such air turbulences may induce swaying of the loose portion of the rope-like means.

[0006] Lateral swaying of the loose portion of the rope-like means is generally undesirable as it may for example stress the rope-like means and/or may produce noise and vibrations or other discomfort to passengers of the elevator.

[0007] Various sway damping solutions have been presented. For example, WO 2011/117458 describes disposing a detachable damping means producing a mass effect to be supported by a top surface of a bottom loop of a rope-like means for damping lateral sways of the rope-like means. EP 2 765 110 A2 describes an arrangement for damping lateral sways of rope-like means fixed to an elevator unit, the arrangement comprising a freely hanging damping means supported on a top surface of a bottom loop of the rope-like means, the damping means comprising a device for measuring acceleration and/or twisting of the rope-like means.

[0008] There may be a need for an alternative approach for hindering a lateral sway of a rope-like means in an elevator hoistway. Particularly, there may be a need for an alternative rope sway reducing arrangement which may be implemented in a simple, reliable and/or cost-effective manner.

[0009] Such need may be met with the subject-matter of the independent claims of the present application. Advantageous embodiments are described in the dependent claims as well as in the following specification.

[0010] According to a first aspect of the present invention, a rope sway reducing arrangement for hindering a lateral sway of an elongate rope-like means in an elevator hoistway is presented. Therein, one end of the rope-like means is attached to a movable component to be displaced within the hoistway and another end of the rope-like means is attached to a fixed position within the hoistway. The arrangement comprises an elongate guide arrangement fixedly attached within the hoistway and extending in a longitudinal direction of the hoistway. Furthermore, the arrangement comprises a magnet arrangement. This magnet arrangement is specifically adapted and arranged, i.e. is configured, such as to generate forces onto the rope-like means for attracting the rope-like means towards the guide arrangement.

[0011] Without limiting the scope of the invention in any way, principles and features of embodiments of the present invention may be understood as being based on the following ideas and observations.

[0012] Generally and broadly spoken, it is proposed herein to reduce any swaying of a loose portion of an elongate rope-like means in the elevator hoistway by providing a specific rope sway reducing arrangement (hereinafter partly abbreviated as "RSR arrangement") which comprises a guide arrangement and a magnet arrangement which interact in such manner such as to generate magnetically induced forces onto the loose portion of the rope-like means in a manner and direction such that this loose portion of the rope-like means is attracted towards the guide arrangement. Accordingly, due to such magnetically induced forces, lateral swaying of the loose portion of the rope-like means may significantly be hindered, i.e. a swaying distance covered by the swaying rope-like means may be significantly reduced, for example by at least 20%, 50% or even 80% when compared to a non-hindered lateral sway of the rope-like means.

[0013] Therein, according to an embodiment, the magnet arrangement may be adapted and arranged such as to generate forces onto the rope-like means, such forces having a magnitude being sufficient for attracting a portion of the rope-like means hanging loosely downwards from the movable component towards the guide arrangement into releasable physical adherence with the guide

arrangement.

[0014] In other words, the magnet arrangement may be adapted and arranged such as to interact with the loosely downward-hanging portion of the rope-like means such that, due to forces induced by the magnet arrangement, this loose portion of the rope-like means is attracted towards the guide arrangement fixedly installed within the hoistway until the loose portion of the rope-like means comes into mechanical contact with the guide arrangement and, due to the magnetic attraction forces, adheres to the guide arrangement. Therein, such adherence of the rope-like means to the guide arrangement shall be releasable such that the loose portion of the rope-like means may be detached from the guide arrangement for example upon further motion of the movable component. Due to the physical adherence of the loose portion of the rope-like means to the guide arrangement induced by the magnet arrangement, any swaying of the loose portion of the rope-like means may be effectively suppressed.

[0015] According to an embodiment, the magnet arrangement is attached to the rope-like means.

[0016] In other words, the magnet arrangement may be fixedly joined to the rope-like means, particularly at the loose portion of the rope-like means. Accordingly, by for example magnetically interacting with the guide arrangement, the magnet arrangement itself may be attracted towards the guide arrangement and may thereby also attract the rope-like means to which it is attached towards the guide arrangement.

[0017] In principle, the magnet arrangement could also be attached to the guide arrangement or to another location within the elevator hoistway in order to generate magnetically induced forces onto the rope-like means. In such implementation, the rope-like means should comprise some ferromagnetic components to be attracted by the magnet arrangement.

[0018] According to an embodiment, the magnet arrangement comprises a multitude of magnets. Accordingly, not only one single magnet may provide for the desired magnetically induced forces but each of the multitude of magnets may contribute to inducing such magnetically induced forces onto the rope-like means.

[0019] Preferably, according to an embodiment, the magnets are attached to the rope-like means in a distributed manner along the length of the rope-like means. In other words, multiple magnets are attached to the rope-like means at various locations along the elongate extension of the rope-like means. Accordingly, magnetically induced forces may apply to the rope-like means along substantial sections thereof, preferably along an entire extension of the rope-like means. Thus, upon motion of the movable component within the hoistway and therefore upon motion of the rope-like means within the hoistway, the rope-like means may be attracted towards the guide arrangement independent of which portion of the rope-like means is currently the most sway-sensitive portion.

[0020] According to an embodiment, the magnets are attached to the rope-like means at several attachment positions along the length of the rope-like means, such attachment positions having a distance from each other of less than 10m, preferably less than 5m, less than 2m or even less than 1m.

[0021] By attaching multiple magnets to the rope-like means at relatively short intermediate distances, compared to an entire length of the rope-like means, the rope-like means may be attracted towards the guide arrangement in a relatively homogeneous manner along its elongate extension. Preferably, a distance between neighbouring magnets should be sufficiently short such that any non-attracted segment of the rope-like means between such neighbouring magnets may not be subject to substantial local swaying.

[0022] According to an embodiment, alternatively or additionally to providing multiple small magnets, the magnet arrangement may comprise one or more elongate magnets, such magnets being bendable in a bending direction of the rope-like means.

[0023] Such elongate magnet may be attached to the rope-like means such that its longitudinal direction coincides with the longitudinal direction of the rope-like means. For example, the elongate magnet may be attached to the rope-like means along a surface of the rope-like means. Particularly, the elongate magnet may extend along a substantial portion or, preferably, along an entire length of the rope-like means. Accordingly, attraction forces applied to the rope-like means may act along such substantial portions or along the entire length of the rope-like means.

[0024] Therein, the elongate magnet shall be bendable in the bending direction of the rope-like means such that it does not significantly hinder any bending of the rope-like means for example upon moving the rope-like means within the hoistway together with the movable component to which it is attached. For example, the elongate magnet may be composed of a multitude of small magnets being mechanically connected to each other in a row. Alternatively, the elongate magnet may be supplied as a bendable continuous member such as for example an elongate flexible member comprising a flexible material into which small magnets or magnetic particles are incorporated.

[0025] A magnet arrangement comprising one or more elongate magnets instead of a large number of shorter magnets may be installed, i.e. for example attached to the rope-like means, in a simple manner using for example only few attachment provisions. Furthermore, no precise distances between neighbouring single magnets have to be determined and kept during installation.

[0026] According to an embodiment, the magnet arrangement comprises permanent magnets. Such permanent magnets may permanently generate the desired forces onto the rope-like means. A strength of such magnetically induced forces may be determined by correctly dimensioning the permanent magnets and/or selecting

suitable magnetic material for the permanent magnets.

[0027] Alternatively, in principle, the magnet arrangement may comprise electromagnets, i.e. solenoids. Such electromagnets could provide for the desired generation of magnetically induced forces onto the rope-like means. Even a magnitude of such forces could be regulated by specifically adapting an electric current through such electromagnets. This could be used for example for specifically adapting the generated magnetically induced forces depending on for example whether the rope-like means shall be locally attracted towards the guide arrangement or whether the rope-like means shall be locally released from the guide arrangement. However, providing the magnet arrangement with electromagnets may require an additional electrical energy supply and/or an additional and potentially sophisticated control device for controlling electrical energy supply.

[0028] According to an embodiment, the guide arrangement comprises a ferromagnetic material. Such ferromagnetic material may be attracted by a magnet.

[0029] By providing the guide arrangement with a ferromagnetic material, magnets being attached to the rope-like means may be attracted towards the guide arrangement. For example, the guide arrangement may comprise iron, nickel, cobalt or some of their alloys. Preferably, the entire guide arrangement consists of such ferromagnetic material.

[0030] According to an embodiment, the guide arrangement may comprise a guide rail continuously extending within the hoistway in the longitudinal direction of the hoistway. Such guide rail may be provided for example along a wall of the hoistway and may be fixedly attached to such wall. The guide rail may extend for example from a bottom portion to a top portion of the hoistway or may extend along segments of the hoistway. The guide rail may be provided as a single continuous part. Alternatively, the guide rail may be composed of several segments arranged in series along the longitudinal direction of the hoistway. In a simple implementation, the guide rail may be a flat member such as a metal sheet longitudinally arranged within the hoistway.

[0031] According to a specific embodiment, the guide rail may have U-shaped cross-section. Such U-shaped guide rail profile may enclose a volume comprised between sidewalls of the U-shaped profile and may be open towards one side of the U-shaped profile.

[0032] Accordingly, the rope-like means may be comprised within such volume enclosed in the U-shaped guide rail such that the sidewalls of the U-shaped guide rail may mechanically limit a swaying of the rope-like means in a direction perpendicular to such sidewalls. In such embodiment, at least a bottom portion of the U-shaped guide rail, i.e. a portion of the guide rail connecting the sidewalls, may comprise a ferromagnetic material. Accordingly, a magnet arrangement provided at the rope-like means may be attracted towards the bottom of the U-shaped guide rail thereby additionally limiting any swaying of the rope-like means in a direction perpendicular to such bottom, i.e. in a direction parallel to the sidewalls of the U-shaped guide rail. Accordingly, using such U-shaped guide rail, any swaying of the rope-like means may be limited in all lateral directions.

[0033] According to an embodiment, the rope-like means itself predominantly comprises a nonferromagnetic material. In other words, the rope-like means preferably does not comprise significant portions of iron, nickel, cobalt or alloys thereof. Accordingly, the rope-like means may not be significantly attracted by magnetically induced forces.

[0034] In this context, "predominantly comprises a non-ferromagnetic material" may be interpreted as the rope-like means comprising less than 50%, preferably comprising less than 20% or 10%, of its volume and/or weight of ferromagnetic material or not comprising at all such ferromagnetic material.

[0035] For example, the rope-like means may comprise a cable for electrically transmitting signals and/or for supplying electrical energy between the movable component and the fixed position to which the rope-like means is attached. Such rope-like means adapted for conducting electricity for signal transmission and/or for electrical energy supply typically mainly consist of non-ferromagnetic material with high electrical conductivity such as for example copper. Optionally, such signal or energy transmitting cables may have mechanical reinforcement structures, such reinforcement structures potentially comprising ferromagnetic material.

[0036] According to an embodiment, the cable may be shielded against electromagnetic influences from the magnet arrangement.

[0037] In principle, any magnetic field may induce electric currents within an electrical conductor. Particularly in case of transmission of electrical signals, transmitted electrical energy is only small such that electromagnetic influences generated by an external magnetic field may disturb signal transmission.

[0038] Of course, while the function of the magnet arrangement provided in the rope sway reducing arrangement of generating magnetically induced forces onto the rope-like means is desired, any disturbing electromagnetic influences onto signal transmission through the rope-like means is not desired. Therefore, it is suggested to specifically shield a cable comprised in the rope-like means against such electromagnetic influences generated by the magnet arrangement.

[0039] For example, a shielding of the cable may comprise a tubular enclosure of the cable, such enclosure consisting of an electrically and/or magnetically conductive material such that magnetic fields are prevented from entering into a volume enclosed by the enclosure. For example, the shielding effect may be achieved by a metal fibre netting which encloses a signal transmitting core of a cable in a tubular manner.

[0040] Furthermore, it may be mentioned that in order to reduce any electromagnetic influences generated by the magnet arrangement, it may be beneficial to fixedly

attach the magnet arrangement to the rope-like means instead of providing the magnet arrangement separate to the movable rope-like means. Being fixedly attached to the rope-like means, the magnetic field generated by the magnet arrangement and experienced by the rope-like means does not move and/or significantly temporarily vary within the rope-like means such that disturbing electric currents induced by electromagnetic influences may be minimized for example in a signal transmitting cable comprised in the rope-like means.

[0041] According to a second aspect of the present invention, an elevator system is proposed. Such elevator system comprises a movable component to be displaced within a hoistway, a rope-like means and a rope sway reducing arrangement according to an embodiment of the above-described first aspect of the invention.

[0042] In such elevator system, any swaying of the rope-like means being attached to the movable component at its one end and being attached to a fixed position within the hoistway at its other end may be effectively suppressed using the force-inducing effect provided by the rope sway reducing arrangement.

[0043] It shall be noticed that possible features and advantages of embodiments of the present invention are described herein partly with respect to a rope sway reducing arrangement and partly with respect to an elevator system comprising such RSR arrangement. One skilled in the art will recognize that the described features may be suitably transferred from one embodiment to another and features may be modified, adapted, combined and/or replaced, etc. in order to come to further embodiments of the invention.

[0044] In the following, advantageous embodiments of the invention will be described with respect to the enclosed drawings. However, neither the drawings nor the description shall be interpreted as limiting the invention.

Fig. 1 shows an elevator system comprising a rope sway reducing arrangement according to an embodiment of the present invention.

Fig. 2 shows details of a rope sway reducing arrangement according to an embodiment of the present invention.

[0045] The figures are only schematic representations and are not to scale. Same reference signs refer to same or similar features throughout the figures.

[0046] Fig. 1 shows an elevator system 1 comprising two movable components such as an elevator car 3 and a counterweight 5 both being displaceable within a hoistway 7. The car 3 and the counterweight 5 are suspended and may be displaced using a suspension traction means 9 being driven by a traction sheave 11 of a driving engine 12.

[0047] Furthermore, the elevator system 1 comprises a rope-like means 13. The rope-like means may be any elongate means being bendable like a rope. For example, the rope-like means may be a rope, a belt, a cable, a wire or combinations of one or more such components.

[0048] One end 33 of the rope-like means 13 is attached to a fixed position 33 within the hoistway 7 and may be connected for example to a control unit 39 of the elevator system 1 controlling motions of the drive engine 12 and/or controlling functions of other components of the elevator system 1 such as functions of the elevator car 3. Furthermore, the rope-like means 13 may be connected to an electric power supply (not shown). An opposite end 35 of the rope-like means 13 is connected to the car 3 and may therefore move together with the car 3 throughout the hoistway 7.

[0049] As the rope-like means 13 is generally flexible in lateral directions, i.e. is bendable, and as furthermore the rope-like means 13 is only attached with its ends 33, 35 to components of the elevator system 1, an intermediate portion of the rope-like means 13 may generally be freely displaced within the hoistway 7. This is particularly true for a loosely hanging portion 37 of the rope-like means 13. Such loosely hanging portion 37 generally forms a U-shaped formation with one branch being formed by a portion of the rope-like means 13 attached to the car 3 and another branch being formed by a portion of the rope-like means being attached to the fixed position 31. Generally, this loosely hanging portion 37 is not mechanically tensioned except by its own weight and may therefore easily be moved within the hoistway 7. Particularly, this loosely hanging portion 37 may laterally sway within the hoistway 7.

[0050] In order to limit such ability for lateral swaying of the rope-like means, the elevator system 1 further comprises a rope sway reducing arrangement 15. This RSR arrangement 15 comprises an elongate guide arrangement 17 and a magnet arrangement 21. Therein, the RSR arrangement 15 is specifically adapted for generating forces onto the rope-like means 13 for attracting the rope-like means 13 towards the guide arrangement 17. Thereby, for example the loosely hanging portion 37 of the rope-like means 13 may be laterally displaced and mechanically tensioned towards the guide arrangement 17 thereby reducing its ability for lateral swaying.

[0051] Particularly, the RSR arrangement 15 is configured such that forces are induced magnetically which force for example the loosely hanging portion 37 of the rope-like means 13 towards the guide arrangement 17 and into a mechanical adherence with the guide arrangement 17. Accordingly, at least parts of the loosely hanging portion 37 of the rope-like means 13 may magnetically adhere to the guide arrangement 17 thereby mechanically tensioning other non-adhering portions of the rope-like means 13 and thereby limiting a lateral swaying capability of the rope-like means 13.

[0052] Of course, as the forces attracting the rope-like means 13 towards the guide arrangement 17 are magnetically induced, any adherence of portions of the rope-like means 13 to the guide arrangement 17 may be released without any damages for example upon further

moving the elevator car 3 in an upward direction.

[0053] In the example shown in Fig. 1 and displayed in Fig. 2 in more detail, the RSR arrangement 15 is provided with a guide rail 19 forming the guide arrangement 17 and with a plurality of magnets 23 forming the magnet arrangement 21.

[0054] The guide rail 19 may be attached to a wall of the hoistway 7 and may therefore be provided at a fixed location within the hoistway 7 and extend along a longitudinal, generally vertical direction of the hoistway 7. The guide rail 19 may consist of or comprise a ferromagnetic material such as steel or other materials or alloys comprising iron, nickel or cobalt.

[0055] In the example shown, the guide rail 19 is made from a steel sheet which is bent into a U-shape with a bottom portion 29 and two opposing side portions 25, 27. Accordingly, the guide rail 19 forms a duct in which the side portions 25, 27 may guide the rope-like means 13 in a sideways lateral direction X, i.e. in a direction substantially perpendicular to the side portions 25, 27.

[0056] However, while the duct-like guide rail 19 may generally prevent that the rope-like means 13 sways in the sideway lateral direction X, it may not prevent any swaying in a direction Y perpendicular thereto, i.e. in a frontward and rearward direction. Accordingly, without any additional measures being taken, the rope-like means 13 could for example sway out of the duct-like guide rail 19 at the open side of the U-shaped profile.

[0057] This may occur for example when a high-rise building comprising the hoistway 7 sways due to for example heavy storms and therefore the duct-like guide rail 19 is temporarily "overhanging". When, in such condition, the rope-like means 13 escapes from inside the U-shaped guide rail 19, it may even sway in the sideway lateral direction X.

[0058] Due to excessive lateral swaying, cable losts and/or elevator shutdowns due to cable failure may occur in worst cases.

[0059] Accordingly, in order to avoid such undesired lateral swaying, particularly in the front and rearward direction Y, a multitude of magnets 23 form the magnet arrangement 21 and are attached to the rope-like means 13. The magnets 23 may be relatively small as they shall only attract a portion of the rope-like means 13 into mechanical adherence with the ferromagnetic guide rail 19. The magnets 23 are distributed along the length of the rope-like means 13. For example, every 5 to 10m, one magnet 23 may be attached to the rope-like means 13. Preferably, the magnets 23 are permanent magnets. In the example shown, the magnets 23 enclose the rope-like means 13 and form a non-positive connection to the rope-like means 13. However, the magnets 23 may be attached to the rope-like means 13 in any other manner.

[0060] In an alternative embodiment (not specifically shown), the magnet arrangement 21 is provided with one or more elongate magnets being bendable in a bending direction of the rope-like means 13. Such elongate magnets may be attached along the entire length of the rope-like means 13 or along substantial portions thereof and may bend together with the rope-like means upon the rope-like means 13 being displaced within the hoistway 7 together with the car 3.

[0061] Due to the magnetic arrangement 21 being attached to the rope-like means 13, the rope-like means 13 may be magnetically adhered to the bottom portion 29 of the guide rail 19 thereby preventing any escaping of loosely hanging portions 37 of the rope-like means 13 from the guide arrangement 17.

[0062] Furthermore, as the rope-like means 13 is typically adapted for transmitting electrical signals and/or for supplying electrical energy to the elevator car 3, a cable comprised in or forming the rope-like means 13 is shielded against electromagnetic influences from the magnet arrangement 21 by a shielding arrangement 41. Such shielding arrangement may be a simple electrically and/or magnetically conducting enclosure surrounding the cable and thereby protecting the cable against any electromagnetic fields entering the cable and generating disturbing electric currents therein.

[0063] Finally, it should be noted that the term "comprising" does not exclude other elements or steps and the "a" or "an" does not exclude a plurality. Also elements described in association with different embodiments may be combined. It should also be noted that reference signs in the claims should not be construed as limiting the scope of the claims.

List of reference signs

[0064]

1	elevator system
3	car
5	counterweight
7	hoistway
9	suspension traction member
11	traction sheave
12	drive engine
13	rope-like means
15	rope sway reducing arrangement
17	guide arrangement
19	guide rail
21	magnet arrangement
23	magnets
25	side portion of guide rail
27	side portion of guide rail
29	bottom portion of guide rail
31	fixed position
33	one end of rope-like means
35	other end of rope-like means
37	loosely hanging portion of rope-like means
39	elevator control
41	shielding arrangement

Claims

1. Rope sway reducing arrangement (15) for hindering a lateral sway of an elongate rope-like means (13) in an elevator hoistway (7), one end (35) of the rope-like means (13) being attached to a movable component (3, 5) to be displaced within the hoistway (7) and another end of the rope-like means (13) being attached to a fixed position (31) within the hoistway (7), the arrangement (15) comprising:

   an elongate guide arrangement (17) fixedly attached within the hoistway (7) and
   extending in a longitudinal direction of the hoistway (7);
   a magnet arrangement (21);
   wherein the magnet arrangement (21) is adapted and arranged such as to generate forces onto the rope-like means (13) for attracting the rope-like means (13) towards the guide arrangement (17).

2. Rope sway reducing arrangement of claim 1, wherein the magnet arrangement (21) is adapted and arranged such as to generate forces onto the rope-like means (13), the forces having a magnitude sufficient for attracting a portion (37) of the rope-like means (13) hanging loosely downwards from the movable component (3, 5) towards the guide arrangement (17) into releasable physical adherence with the guide arrangement (17).

3. Rope sway reducing arrangement of one of the preceding claims, wherein the magnet arrangement (21) is attached to the rope-like means (13).

4. Rope sway reducing arrangement of one of the preceding claims, wherein the magnet arrangement (21) comprises a multitude of magnets (23).

5. Rope sway reducing arrangement of claim 4, wherein the magnets (23) are attached to the rope-like means (13) in a distributed manner along a length of the rope-like means (13).

6. Rope sway reducing arrangement of claim 5, wherein the magnets (23) are attached to the rope-like means (13) at several attachment positions along the length of the rope-like means (13), the attachment positions having a distance from each other of less than 10m.

7. Rope sway reducing arrangement of one of the preceding claims, wherein the magnet arrangement (21) comprises an elongate magnet being bendable in a bending direction of the rope-like means (13).

8. Rope sway reducing arrangement of one of the preceding claims, wherein the magnet arrangement (21) comprises permanent magnets (23).

9. Rope sway reducing arrangement of one of the preceding claims, wherein the guide arrangement (17) comprises a ferromagnetic material.

10. Rope sway reducing arrangement of one of the preceding claims, wherein the guide arrangement (17) comprises a guide rail (19) continuously extending within the hoistway (7) in the longitudinal direction of the hoistway (7).

11. Rope sway reducing arrangement of claim 10, wherein the guide rail (19) has a U-shaped cross-section.

12. Rope sway reducing arrangement of one of the preceding claims, wherein the rope-like (13) means predominantly comprises a non-ferromagnetic material.

13. Rope sway reducing arrangement of one of the preceding claims, wherein the rope-like means (13) comprises a cable for at least one of electrically transmitting signals and supplying electrical energy.

14. Rope sway reducing arrangement of claim 13, wherein the cable is shielded against electromagnetic influences from the magnet arrangement (21).

15. Elevator system (1) comprising:

   a movable component (3, 5) to be displaced within a hoistway (7);
   a rope-like means (13), one end (35) of the rope-like means (13) being attached to the movable component (3, 5) and another end (33) of the rope-like means (13) being attached to a fixed position (31) within the hoistway (7); and
   a rope sway reducing arrangement (15) according to one of claims 1 to 14.

Fig. 1

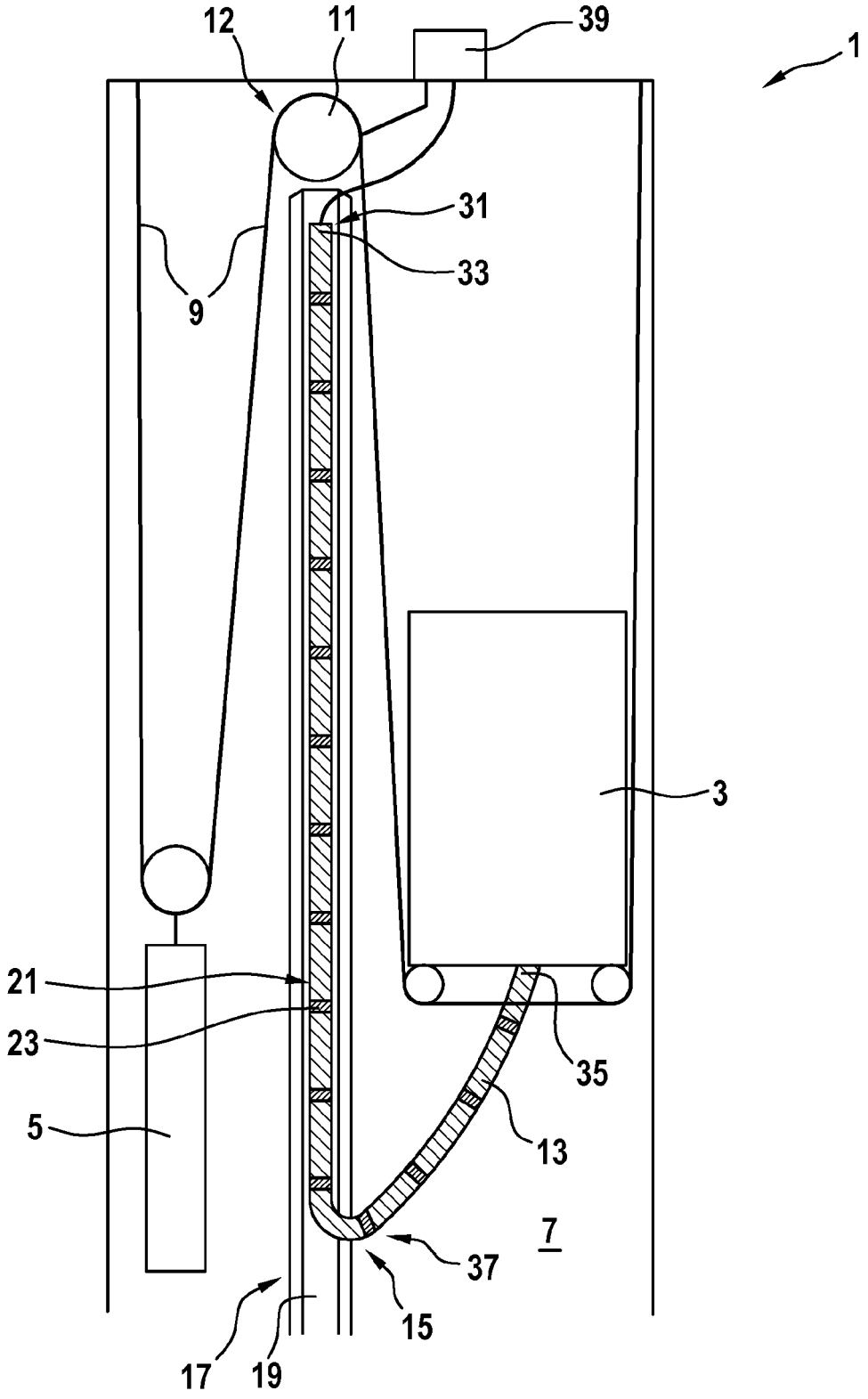
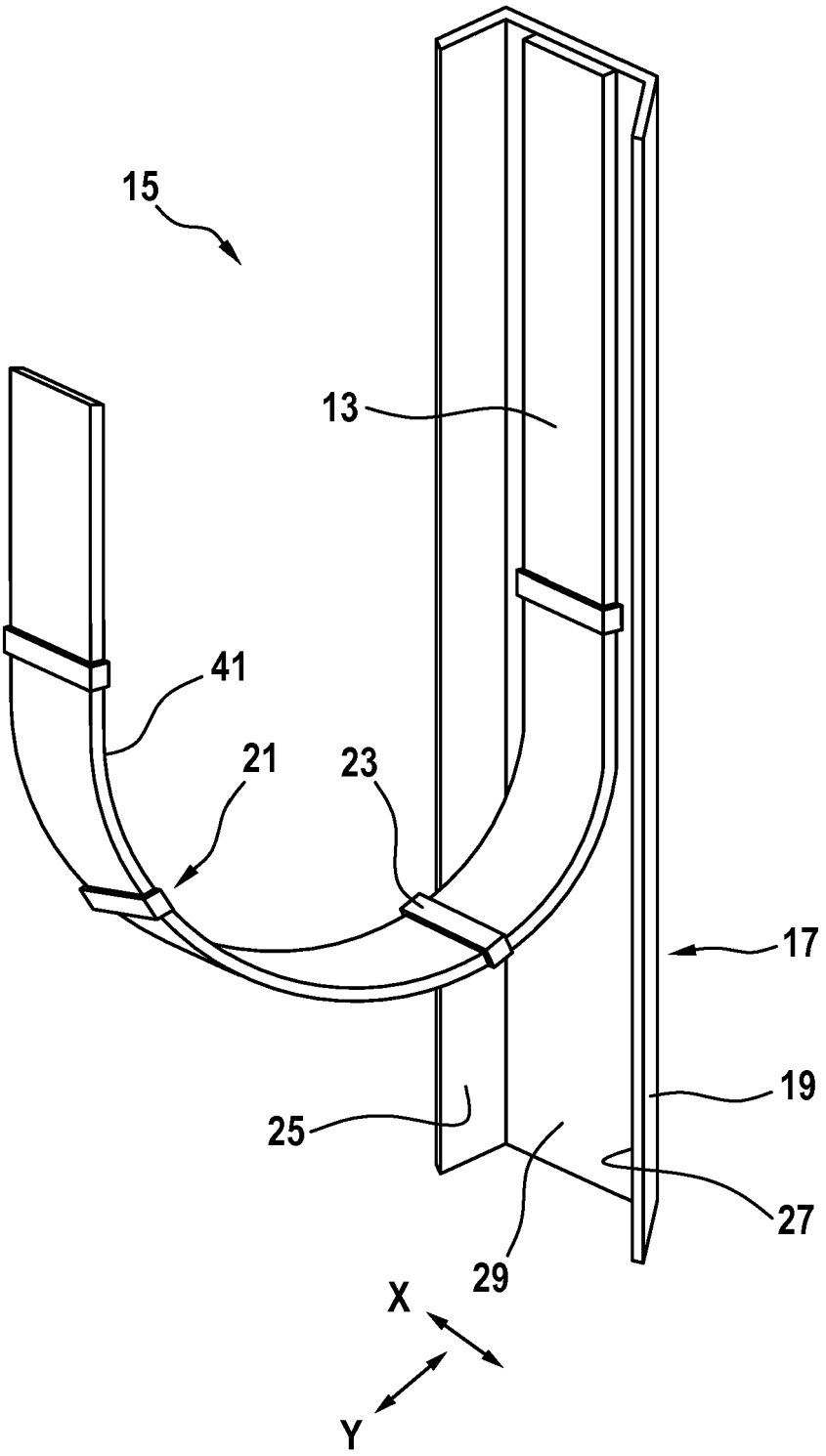


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 7705

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP H01 288588 A (MITSUBISHI ELECTRIC CORP) 20 November 1989 (1989-11-20) * figure 1 *	1-15	INV. B66B7/06
X	JP 2009 280349 A (MITSUBISHI ELECTRIC CORP) 3 December 2009 (2009-12-03) * figure 5 *	1-15	
X	US 3 885 773 A (DUNKELBERGER THOMAS L) 27 May 1975 (1975-05-27)	1-14	
Y	* column 2, line 60 - column 3, line 16; figures ,2,3,5,7 *	15	
Y	US 2003/196857 A1 (TINER JAMES L [US]) 23 October 2003 (2003-10-23) * paragraphs [0001], [0002], [0015] *	15	

TECHNICAL FIELDS SEARCHED (IPC)

B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 March 2016	Fiorani, Giuseppe

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