(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 687 473 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
22.01.2014 Bulletin 2014/04

(21) Application number: **12758222.9**

(22) Date of filing: **12.03.2012**

(51) Int Cl.:
B66B 5/02 *(2006.01)* ***B66B 5/18*** *(2006.01)*

(86) International application number:
PCT/ES2012/070159

(87) International publication number:
WO 2012/123607 (20.09.2012 Gazette 2012/38)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **16.03.2011 ES 201130368 P**

(71) Applicant: **Aplicaciones Electromecanicas Gervall, S.A.**
08800 Barcelona (ES)

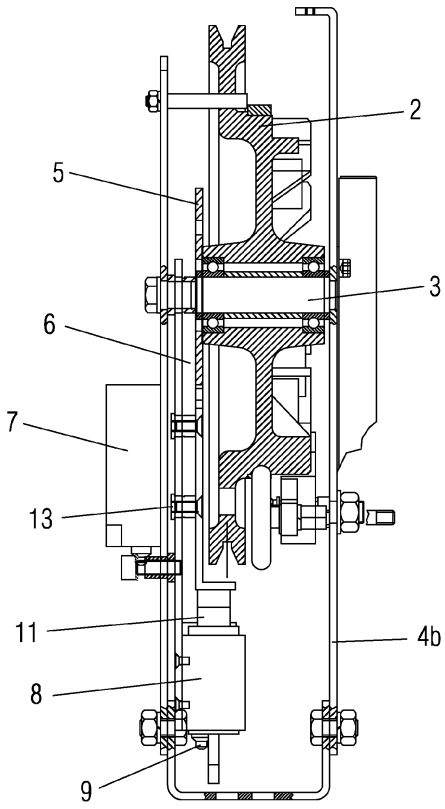
(72) Inventor: **ESCOFET ESTEVE, Martí**
E-08800 Barcelona (ES)

(74) Representative: **Isern-Jara, Nuria**
Avda. Diagonal 463 Bis 2°
08036 Barcelona (ES)

(54) **DEVICE FOR PROTECTING AGAINST THE UNCONTROLLED MOVEMENT OF A LIFT CAR AND SPEED LIMITER WHICH INCLUDES SUCH A DEVICE**

(57) Device for protecting against the uncontrolled movement of a lift car, which is suitable for being coupled to a speed limiter having a pulley (2) on a shaft (3), said device comprising: a ring gear (5) connected to the pulley; a pivoting support means (6) which can be coupled to the shaft (3), carries out a pivoting movement with respect to said shaft (3) and includes a blocking mechanism which acts on the ring gear (5) by means of an electromagnet, a solenoid or the like; and an electrical detector which is connected to the blocking mechanism and the movement trajectory of the pivoting support means (6) and, when the blocking means act on the ring gear (5), when the pivoting support means (6) has carried out an angular movement, the electrical detector sends an activation signal to a control unit connected to the lift in order to actuate means for stopping the lift car.

FIG.4



EP 2 687 473 A1

Description

DESCRIPTIVE MEMORY

OBJECT OF THE INVENTION

[0001] The purpose of the invention patent application herein is to register a device for protecting against the uncontrolled movement of a lift car that can detect the movement thereof and that incorporates significant innovations and advantages.

[0002] More specifically, the invention proposes the development of a device for detecting the uncontrolled movement of a lift car, intended for being coupled to a speed limiter for a lift, thereby increasing the safety of the hoist, lift or the like.

BACKGROUND OF THE INVENTION

[0003] The arrangement for speed limiters intended for operating transport means suspended by a cable, such as hoists, cable cars, etc. are well known.

[0004] An example of speed limiters are described in patent no. ES 2 306 623, the patent holder being the same as that of the present application.

[0005] Due to regulatory changes and updates in respect of the safety components in lifts, component manufacturers have developed new devices that increase the security measures of a lift, including the uncontrolled movement of the car. These devices are used in the speed limiters.

[0006] Currently, there are many complex devices on the market and they do not form part of an actual element of a lift, such as the limiters.

DESCRIPTION OF THE INVENTION

[0007] The invention herein has been developed with the aim of providing a device for detecting the movement of a lift car that resolves the aforementioned drawbacks, providing, in addition, other additional advantages that will become apparent from the description appended hereinafter.

[0008] It is therefore an object of this invention to provide a device for protecting against the uncontrolled movement of a lift car, in particular, which is suitable for being coupled to a speed limiter of the type that comprises a pulley on a shaft on which a cable or the like slides, and retaining means linked to the pulley. More specifically, it is characterised in that said device comprises a ring gear fixedly secured to the pulley; a pivoting support means which can be coupled to the shaft of the speed limiter such that it carries out a pivoting movement with respect to said shaft, that includes a blocking mechanism with a linear motion, that acts on the ring gear, by means of an electromagnet, a solenoid or the like; and an electrical detector which is connected to the blocking mechanism and the movement trajectory of the pivoting support means.

[0009] In this way and when the blocking means act on the ring gear, when the pivoting support means has carried out a predetermined angular movement caused by the movement of the pulley, the electrical detector sends an activation signal to a control unit connected to the lift in order to actuate means which are suitable for stopping the lift car.

[0010] In this way, a device for detecting and stopping a lift car which can be applied to any speed limiter regardless of the dimensions of the pulley of the speed limiter is obtained, therefore a wide variety of devices with different geometries and dimensions is avoided depending on the dimensions of the pulley mounted on a particular limiter.

[0011] Preferably, the pivoting support means include tensioning means for coupling to the speed limiter, such that when the blocking mechanism has no voltage from the electromagnet or solenoid, said mechanism operates on the ring gear and the system is ready to detect the uncontrolled movement effectively and reliably.

[0012] In a preferred embodiment of the invention, the blocking mechanism comprises a locking insert which can be coupled to the ring gear.

[0013] Advantageously, guide means are provided in the pivoting support means along which the locking insert linearly moves. These guide means consist of at least one recessed portion formed in the body of the pivoting support means along which a guide body fixed to the locking insert moves.

[0014] According to another characteristic, the pivoting support means has an elongated section having an arcuate recess on the upper edge thereof, in which the elongated section can abut an electrical detector switch, which detects the uncontrolled movement.

[0015] Advantageously, the end of the locking insert facing the ring gear has sawtooth-shaped teeth, such that it facilitates the interlocking of the blocking element with the ring gear.

[0016] It is another object of the present invention to provide a speed limiter which comprises a pulley on a shaft, on which a cable or the like slides, and retaining means linked to the pulley, which is provided with a device for protecting against the uncontrolled movement of a lift car as previously described.

[0017] According to another aspect of the speed limiter, it comprises a bedplate body with two fins facing each other, comprising stop means for limiting the angular path of the pivoting support means.

[0018] These stop means may comprise a groove following an arcuate path formed in one of the fins of the bedplate body.

[0019] Other characteristics and advantages of the device, object of the invention herein, will become apparent from the description of a preferred, although not exclusive embodiment, which is illustrated by way of non-limiting example in the drawings appended, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

Figure 1. - Front elevation view of a speed limiter for a lift which includes the device for protecting against the uncontrolled movement according to the present invention;

Figure 2.- Front elevation view of the speed limiter with the detector device of the invention;

Figure 3.- Exploded sectioned side elevation view of the speed limiter and the detector device shown in the preceding figures; and

Figure 4.- Sectioned side elevation view of the limiter with the detection device according to the invention.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0021] As shown in the attached figures, a speed limiter can be seen, generally indicated by the reference (1), comprising a pulley (2) on a shaft (3) on which a cable or the like slides, and retaining means linked to the pulley (2), characterised in that the speed limiter is further provided with a device for detecting the movement of a lift car which is described below. The retaining means can operate in the same way as that described in Spanish patent no. ES 2306623.

[0022] Furthermore, a bedplate body (4) is provided with two fins facing each other between which the shaft (3) is supported and arranged.

[0023] This detection device comprises a ring gear (5) that is fixedly secured to the pulley (2) of the limiter (in an alternative embodiment it may be an integral part of the pulley itself), a pivoting support means (6) that can be coupled to the shaft (3) of the speed limiter (1) such that it carries out a pivoting movement with respect to said shaft (3), as indicated by means of an arrow (f) in figure 2, that includes a blocking mechanism which acts on the ring gear (5) and an electrical detector (7) which is connected to the blocking mechanism and the movement trajectory of the pivoting support means (6). As shown, the pivoting support means (6) consists of an elongated body which is fixed on the upper part thereof by means of an orifice through which the shaft passes (3).

[0024] When the pivoting support means has carried out a predetermined angular movement caused by the movement of the pulley (2) and therefore the lift car, such as a distance defined by a maximum angle, it sends a motion detection signal through an electric switch (7) and subsequently causes a mechanical interlocking of the speed limiter, which causes the pull of the cable or the like of the speed limiter and therefore the wedging of the safety device on the lift (retaining means) that is provided.

[0025] The pivoting support means (6) may optionally include tensioning means that are coupled to the housing body (4) of the speed limiter (1).

[0026] In respect of the blocking mechanism, it mainly comprises a locking insert (10) which can be coupled to the ring gear (5) for blocking, a release (11) linked to the electromagnetic actuator (8) (electromagnet, coil or the like) which is attached to the locking insert (10).

[0027] The release (11) has a shaft which is externally provided with a helicoidal spring (not shown for clarity).

[0028] Guide means are provided in the pivoting support means by which the locking insert linearly moves. In particular, two grooved portions are provided (12), formed in alignment in the body of the pivoting support means(6) through which a guide body (13) attached to the locking insert (10) passes along each one. This guide body (13) in the present embodiment consists of a metallic cylindrical body attached by means of bolting elements.

[0029] The pivoting support means (6) has an additional elongated section (60), attached thereto by bolting elements, which has an arcuate recess (61) centred on the upper edge thereof, wherein the elongated section (60) can abut a switch (70) protruding from the bottom of the electric switch (7). This elongated section (60) has two mechanical stops (14) that are attached to the pivoting support means (6).

[0030] The aforementioned tensioning means can be coupled to the elongated section (60) of the pivoting support means(6).

[0031] The end (101) of the locking insert(10) facing the ring gear (5) has sawtooth-shaped teeth that facilitates coupling in the existing space between the ring gear teeth (5).

[0032] In respect of the bedplate body (4) it is composed of two fins (4a, 4b) which are facing each other between which the shaft (3) is supported, comprising stop means for limiting the angular path of the pivoting support means (6), which consist of a groove (40) following an arcuate path formed in one of the fins of the bedplate body. The two mechanical stops (14) define the maximum path of the pivoting support means in respect of a groove (40).

[0033] The fin (4a) that has the groove (40) mentioned above may include a dowel or the like in which the tensioning means are secured, in the case of being present.

[0034] The detection device according to the invention and described in the speed limiter (1) is operated as follows:

When a lift car stops, the flow of electric current to the coil is cut off such that it pushes the blocking element upwards, by the action of the spring, until it abuts with the ring gear (position shown in figure 1). In the event of the car moving when the device is in this position, the ring gear rotates by the rotation of the pulley (2), pulling the pivoting support means with the built-in blocking mechanism. In this situation, the switch (70) moves upwards such that it causes the electric switch (7) to send a signal which reports a sliding movement that is received by the control unit of the lift to actuate means which are suitable for stopping the lift car. In the event that this movement

of the car, with the doors either open or closed, does not stop, the pivoting support means (6) will collide at one end of the groove (40) causing the pulley (2) of the speed limiter to stop against the stop(14) by the action of the locking insert (10) and the ring gear (5) and, therefore, to pull on the cable of the speed limiter. This pull on the cable of the limiter actuates the safety device on the lift causing the car to stop and to stop permanently.

[0035] The details, shapes and dimensions and other accessory elements as well as the materials used in the manufacture of the protective device against the uncontrolled movement of a lift car of the invention may be conveniently replaced by others which are technically equivalent and do not depart from the essential nature of the invention or from the scope defined by the claims provided hereinafter.

Claims

1. Device for protecting against the uncontrolled movement of a lift car, in particular which is suitable for being coupled to a speed limiter comprising a pulley (2) on a shaft (3), on which a cable or the like slides, and retaining means linked to the pulley (2), **characterised in that** said device comprises:

   a ring gear (5) fixedly secured to the pulley;
   a pivoting support means (6) which can be coupled to the shaft of the speed limiter such that it carries out a pivoting movement with respect to said shaft (3), and includes a blocking mechanism which acts on the ring gear (5) by means of an electromagnet solenoid or the like; and
   an electrical detector which is connected to the blocking mechanism and the movement trajectory of the pivoting support means (6), such that when the blocking means act on the ring gear (5), when the pivoting support means (6) has carried out a predetermined angular movement caused by the movement of the pulley (2), the electrical detector sends an activation signal to a control unit connected to the lift in order to actuate means for stopping the lift car.

2. Device according to claim 1, **characterised in that** the pivoting support means (6) includes tensioning means for coupling to a speed limiter.

3. Device according to claim 1, **characterised in that** the blocking mechanism comprises a locking insert (10) which can be coupled to the ring gear (5), a release connected to an electromagnetic actuator which is attached to the locking insert (10).

4. Device according to claim 3, **characterised in that** the release is provided with elastic means.

5. Device according to claim 4, **characterised in that** said elastic means consist of a helicoidal spring.

6. Device according to claim 3, **characterised in that** guide means are provided on the pivoting support means by which the locking insert (10) linearly moves.

7. Device according to claim 6, **characterised in that** the guide means consist of at least one recessed portion formed in the body of the pivoting support means(6) along which a guide body fixed to the locking insert moves.

8. Device according to claim 3, **characterised in that** the electromagnetic actuator comprises a coil.

9. Device according to claim 1, **characterised in that** the pivoting support means (6) has an elongated section having an arcuate recess on the upper edge thereof, wherein the elongated section can abut an electrical detector switch.

10. Device according to claims 2 and 9, **characterised in that** the tensioning means are coupled to the elongated section.

11. Device according to claim 3, **characterised in that** the locking insert has an end facing the ring gear (5) with sawtooth-shaped teeth.

12. Speed limiter (1)having a bi-directional locking device comprising a pulley on a shaft on which a cable or the like slides, and retaining means linked to the pulley (2), **characterised in that** a device for detecting the movement of a lift car is provided, according to any of the claims 1 to 11.

13. Speed limiter (1) according to claim 12, **characterised in that** it comprises a bedplate body (4) having two fins (4a, 4b) facing each other between which the shaft (3) is supported, comprising stop means to limit the angular path of the pivoting support means (6).

14. Speed limiter (1) according to claim 12, **characterised in that** the stop means consist of a groove (40) following an arcuate path formed in one of the fins (4a) of the bedplate body (4).

15. Speed limiter according to claim 13, **characterised in that** one of the fins (4a) includes a dowel or the like in which the tensioning means are secured.

16. Speed limiter according to claim 12, **characterised in that** the ring gear (5) has coupling means for fix-

edly securing it to the pulley (2).

17. Speed limiter according to claim 12, **characterised in that** the ring gear (5) and the pulley (2) form an integral part thereof.

18. Speed limiter according to claims 14 and 15, **characterised in that** the stop means include a stop that protrudes from the pivoting support means (6) that passes through the groove of the arcuate path.

FIG.1

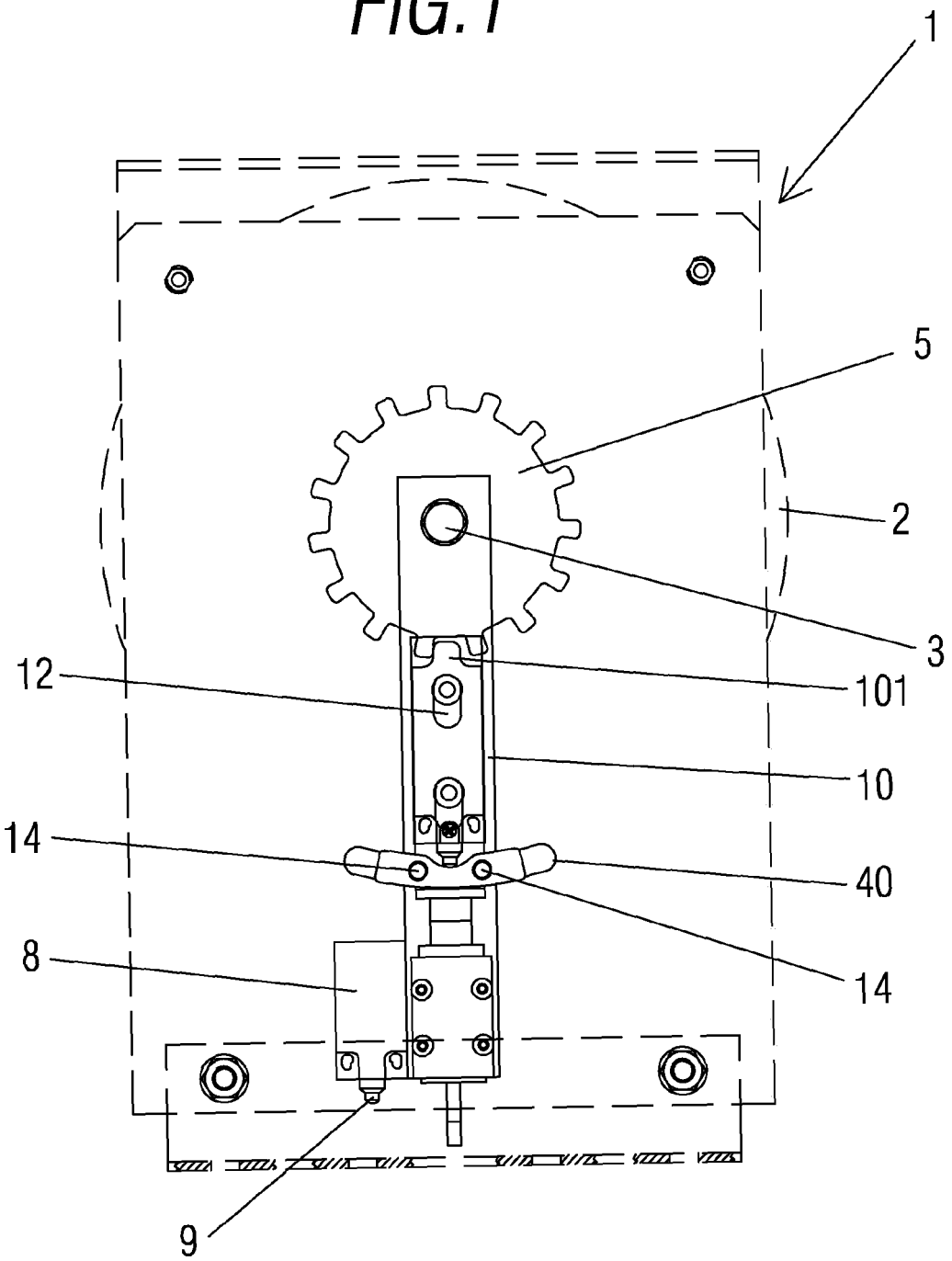


FIG.2

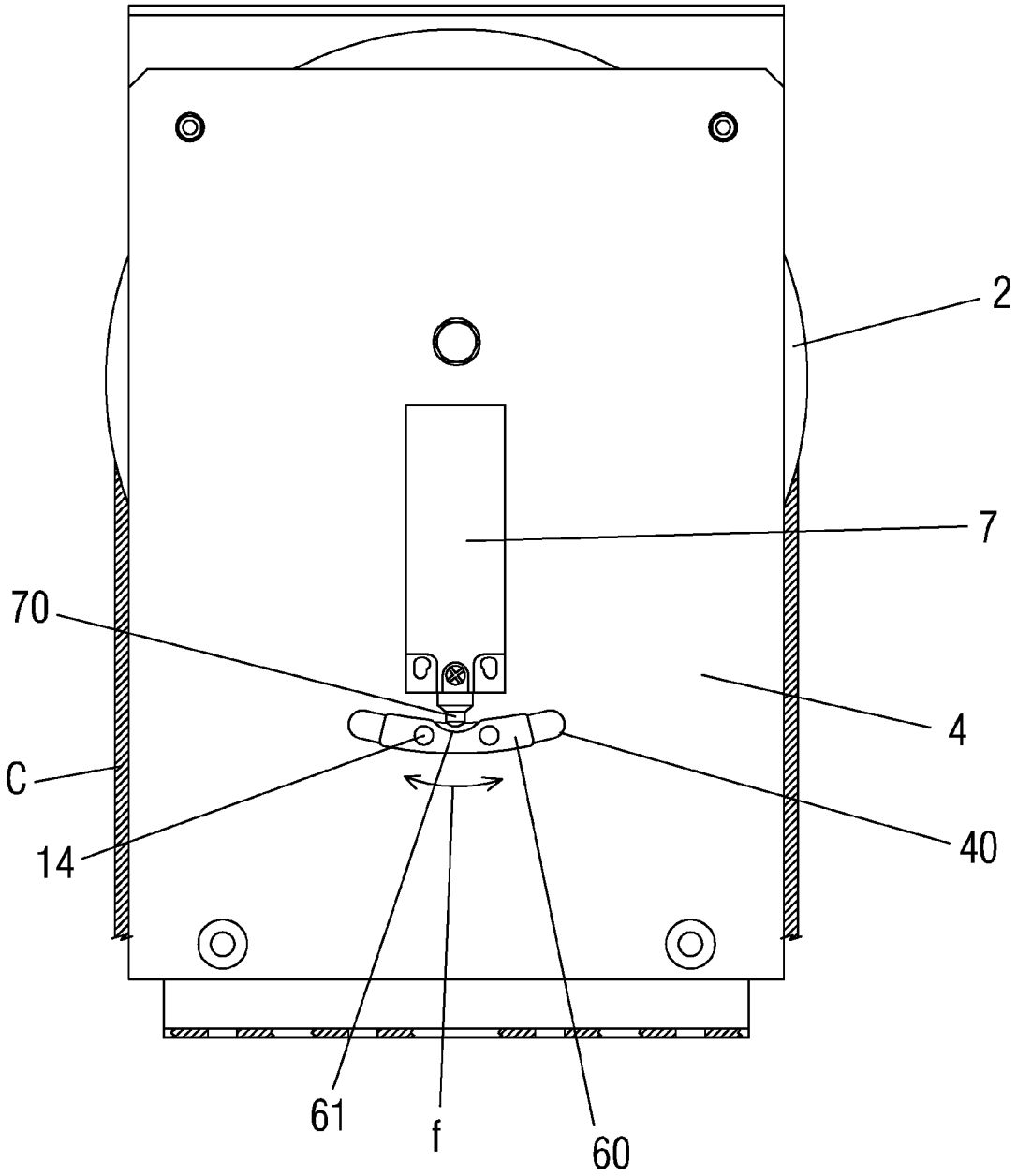


FIG.3

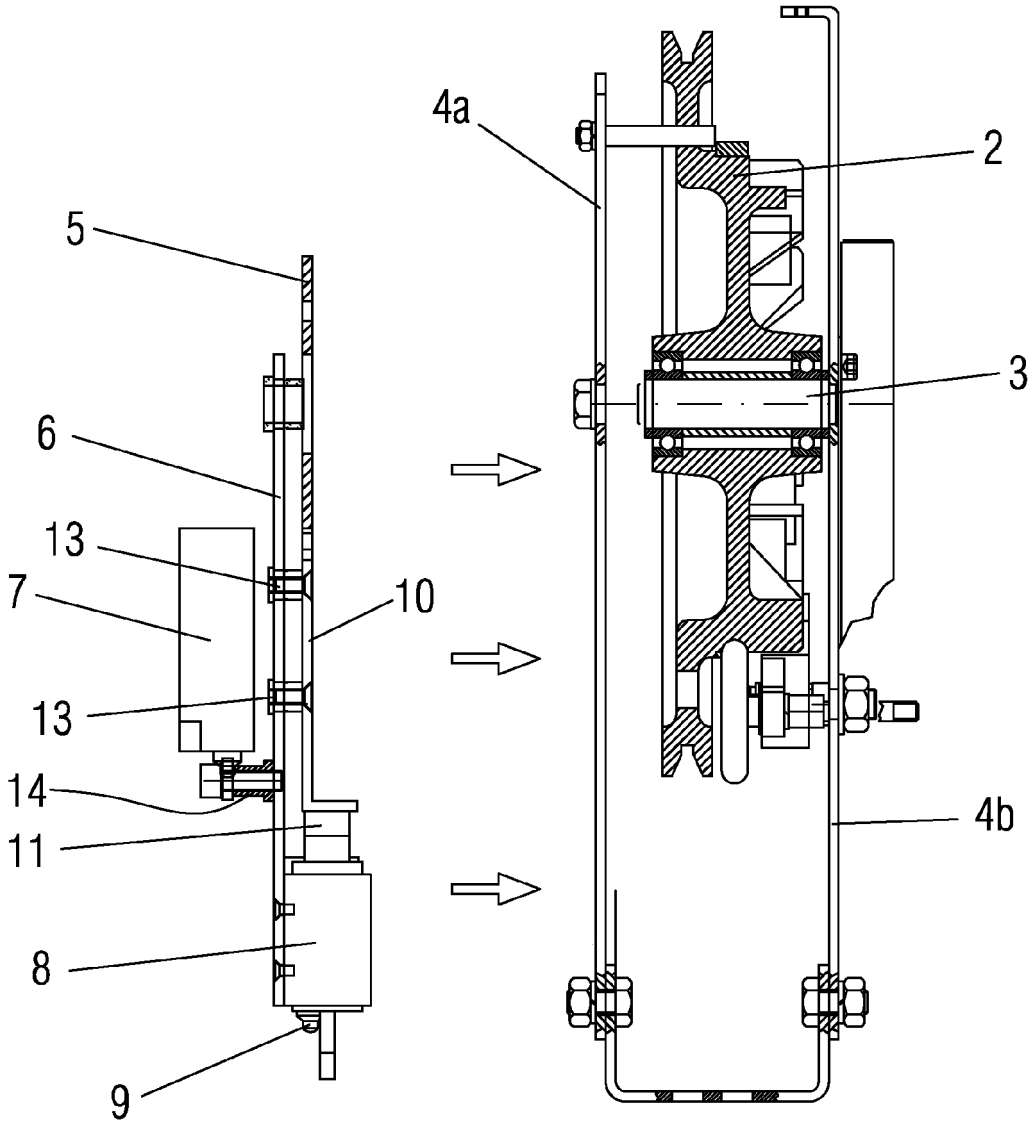
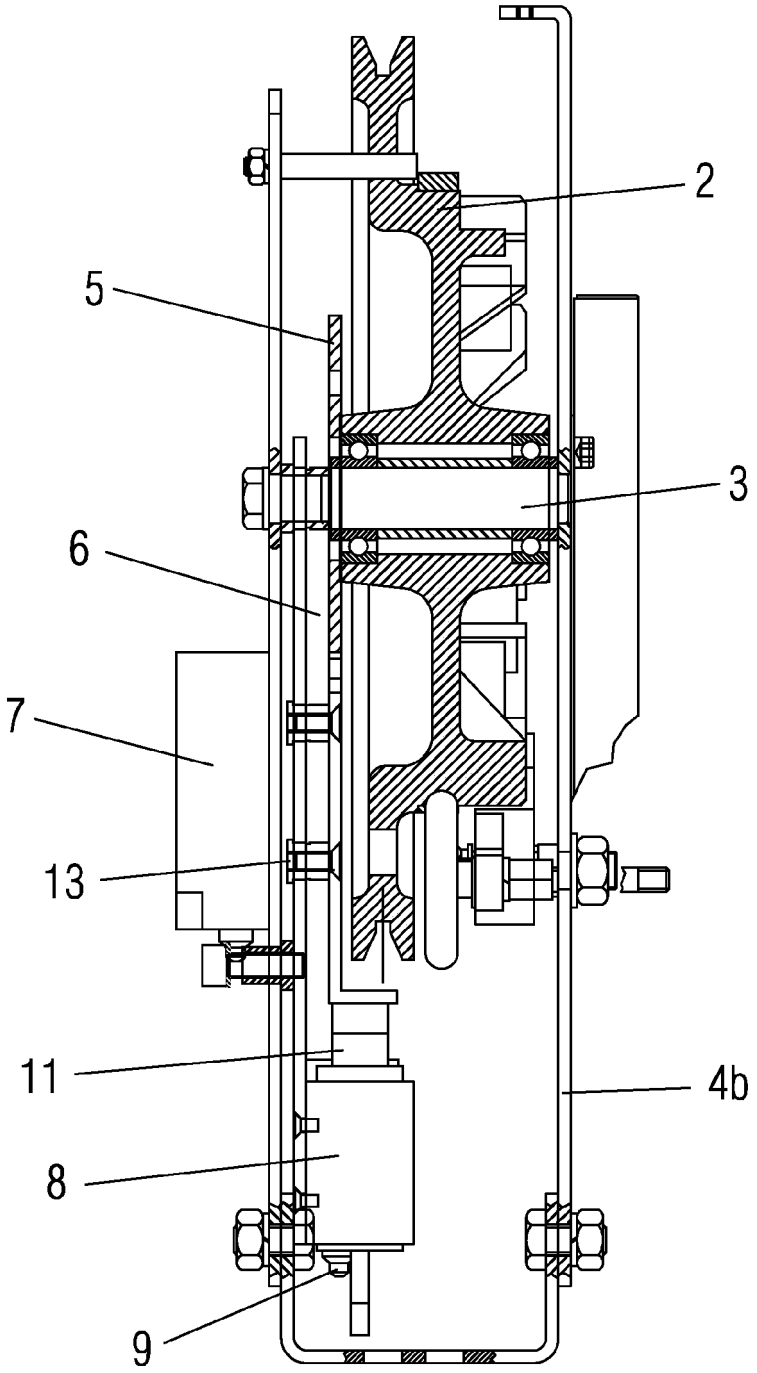


FIG.4



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2012/070159

A. CLASSIFICATION OF SUBJECT MATTER

B66B5/02 (2006.01)
B66B5/18 (2006.01)
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)
B66B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2212782 A (POON OTTO L) 02/08/1989, pages 1 - 10; figures.	1-18
A	WO 2005066058 A2 (KONE CORP ET AL.) 21/07/2005, pages 1 - 9; figures.	1-18
A	US 4898263 A (MANSKE BRADLEY W ET AL.) 06/02/1990, figures & Abstract from DataBase of WPI. Retrieved from EPOQUE; AN 1990-090824.	1-18
A	EP 1780160 A1 (MITSUBISHI ELECTRIC CORP) 02/05/2007, figures & Abstract from DataBase of WPI. Retrieved from EPOQUE; AN 2005-796878.	1-18

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure use, exhibition, or other means.
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24/05/2012	**(30/05/2012)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer M. Castañón Chicharro Telephone No. 91 3493261

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2012/070159

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
EP1780160 AB	02.05.2007	WO2005105649 A	10.11.2005
		CN1802306 A	12.07.2006
		CN100443392 C	17.12.2008
		EP20040730711	30.04.2004
		JP4566994B2 B	20.10.2010
		EP2258650 A	08.12.2010
		EP20100177854	30.04.2004
US4898263 A	06.02.1990	CA1311865 C	22.12.1992
GB2212782 AB	02.08.1989	JP1162690 A	27.06.1989
		US4928796 A	29.05.1990
WO2005066058 A	21.07.2005	FI20040021 A	10.07.2005
		FI118333 B	15.10.2007
		EP1701905 AB	20.09.2006
		EP20050701718	03.01.2005
		US2007000734 A	04.01.2007
		US7819229 B	26.10.2010
		CN1910104 A	07.02.2007
		CN1910104 B	06.10.2010
		AT409674 T	15.10.2008
		ES2311206 T	01.02.2009
		HK1096366 A	13.05.2011

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- ES 2306623 **[0004] [0021]**