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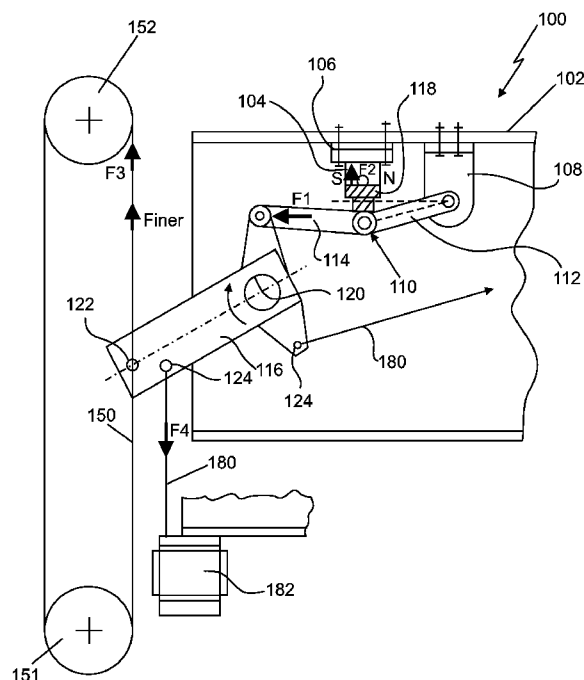
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Declarations under Rule 4.17:

[Continued on next page]

(54) Title: MAGNET RELEASING CARRIER

FIG. 1



(57) Abstract: A releasing carrier (100) for activating a safety mechanism (182) for an elevator car. The releasing carrier (100) includes a releasing carrier housing (102). A linkage (110) has one end mounted to the releasing carrier housing. A governor lever (116) is mounted to another end of the linkage (110). One of a magnet (104) and a block (118) is mounted to the releasing carrier housing (102) and the other of the magnet (104) and the block (118) is mounted to the linkage (110). The governor lever (116) has an attachment point (122) for a governor rope (150) and a further attachment point (124) for a safety linkage (180).



— *as to applicant's entitlement to apply for and be granted
a patent (Rule 4.17(ii))*

Published:

— *with international search report (Art. 21(3))*

MAGNET RELEASING CARRIER

BACKGROUND OF THE INVENTION

[0001] The subject matter disclosed herein relates to releasing carriers. More particularly, the subject matter disclosed herein relates to a releasing carrier having a magnetically retained linkage.

[0002] A releasing carrier is a device that travels with an elevator car and is responsible for actuating safety mechanisms in the event of certain conditions (e.g., car overspeed). A releasing carrier is typically designed with a pull out force and a push back force. The pull out force is the force needed for the releasing carrier to activate the safety mechanisms. The pull out force is designed to allow the car to operate under normal conditions without tripping the safety mechanisms, but still activate the safety mechanisms when needed. The push back force is the force needed to reset the releasing carrier. While a variety of releasing carriers exist, it is recognized that alternate designs may prove beneficial.

BRIEF DESCRIPTION OF THE INVENTION

[0003] According to one aspect of the invention, a releasing carrier for activating a safety mechanism for an elevator car includes a releasing carrier housing. A linkage has one end mounted to the releasing carrier housing. A governor lever is mounted to another end of the linkage. One of a magnet and a block is mounted to the releasing carrier housing and the other of the magnet and the block is mounted to the linkage. The governor lever has an attachment point for a governor rope and a further attachment point for a safety linkage.

[0004] These and other advantages and features will become more apparent from the following description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWING

[0005] The subject matter, which is regarded as the invention, is particularly pointed out and distinctly claimed in the claims at the conclusion of the specification. The foregoing and other features, and advantages of the invention are apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

[0006] FIG. 1 depicts a releasing carrier and associated components in an exemplary embodiment;

[0007] FIG. 2 depicts a linkage in an exemplary embodiment;

[0008] FIG. 3 depicts a shim mounted relative to a mounting bracket; and

[0009] FIG. 4 depicts a shim mounted between a magnet and a block.

[0010] The detailed description explains embodiments of the invention, together with advantages and features, by way of example with reference to the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0011] Shown in FIG. 1 is a releasing carrier 100 and associated components in an exemplary embodiment. The releasing carrier 100 travels with an elevator car and triggers safety mechanisms when needed (e.g., car overspeed). The releasing carrier 100 includes a releasing carrier housing 102 (e.g., elevator crosshead). A magnet 104 is mounted to the releasing carrier housing 102 through bolts or other fastening mechanisms. In the embodiment shown in Figure 1, the magnet 104 is a permanent magnet, but may be an electromagnet in alternate embodiments. Magnet 104 may be spaced from releasing carrier housing 102 through shims 106 as described in further detail herein.

[0012] Mounting bracket 108 is also secured to releasing carrier housing 102 through bolts or other fastening mechanisms. Mounting bracket 108 may be spaced from releasing carrier housing 102 through shims as described in further detail herein.

[0013] A linkage 110 has a first leg 112 and a second leg 114. The first leg 112 has one end pivotally attached to mounting bracket 108 and another end pivotally attached to second leg 114. Second leg 114 is pivotally connected to governor lever 116. A block 118 is mounted at the junction of the first leg 112 and the second leg 114 and is opposite magnet 104. Block 118 is made from a magnetic material (e.g., steel) so as to be attracted to magnet 104. It is understood that the position of the magnet 104 and the block 118 may be reversed. That is, block 118 may be mounted to the releasing carrier housing 102 and the magnet 104 mounted on linkage 110. Further, block 118 may be an integrally formed element of releasing carrier housing 102 in alternate embodiments.

[0014] Governor lever 116 is pivotally connected to the releasing carrier housing 102 at pin 120. An attachment point 122 of governor lever 116 is connected to governor rope 150 that runs through governor 152 and a tension sheave 151. Attachment points 124 on governor lever 116 connect to one or more safety linkages 180 that interact with safety mechanisms 182.

[0015] Operation of the releasing carrier 100 will now be described. When the elevator car operates under normal conditions, the interaction between magnet 104 and block 118 maintains linkage 110 in a first state. In this state, governor lever 116 does not rotate to actuate safety mechanisms 182. Minor forces on the governor rope 150 will not trigger safety mechanisms 182 as the governor lever 116 is held in place by linkage 110. When governor rope 150 is moved up by an inertial force (Finer) (e.g., due to an emergency stop of an elevator car), linkage 110 supplies a pull out force (F1) against the governor lever 116 to prevent rotation of the governor lever 116 and activation of safety mechanism 182.

[0016] When the elevator car enters a certain condition (e.g., overspeed), rope 150 exerts force (F3) on lever 116. The pull force (F3) on governor lever 116 overcomes the preset pull out force (F1) established by magnet 104, block 118 and linkage 110. Block 118 is pulled away from magnet 104 and governor lever 116 is free to rotate about pin 120. Rotation of governor lever 116 applies force to safety linkage 180 to activate safety mechanism 182.

[0017] Linkage 110 allows for adjustment of the pull out force to trigger the safety mechanism. Referring to Figures 1 and 2, the pull out force (F1) can be set by adjusting the angle A of legs 112, 114 relative to shims 106. Increasing angle A decreases the pull out force. For example, if the magnet 104 has 200N of attractive force (F2), and angle A is preset to 5.7 degrees, the preset pull out force (F1) will be 2004N. If shims 106 are added to adjust A to 6.8 degrees, the pull out force (F1) will be 1677N. Thus, the design allows for adjusting pull out force (F1). Angle A is dependent on the angle between the first leg 112 and the second leg 114 of linkage 110.

[0018] The pull out force (F1) may also be modified by altering the location of mounting bracket 108. If shims 106 are positioned beneath mounting bracket 108 as shown in Figure 3, this decreases angle A and increase pull out force (F1). Further, as shown in Figure 4, shims may be placed between magnet 104 and block 118 to control the gap between

magnet 104 and block 118 in the first state, which also affects the pull out force F_1 . In particular, if the distance between magnet 104 and block 118 is increased, force (F_2) is decreased and the pull out force (F_1) is decreased.

[0019] In safety reset process, governor lever 116 and linkage 110 return to the original positions and the magnet 104 attracts block 118. The push back force (F_4) on the safety linkages 182 is negligible as there are no components biased against the safety linkages.

[0020] Exemplary embodiments provide a compact releasing carrier, saving space in the elevator crosshead. The use of the magnetically held linkage allows the push back force to be negligible, facilitating resetting of the releasing carrier. Further, the pull out force can be routinely modified through the use of shims.

[0021] While the invention has been described in detail in connection with only a limited number of embodiments, it should be readily understood that the invention is not limited to such disclosed embodiments. Rather, the invention can be modified to incorporate any number of variations, alterations, substitutions or equivalent arrangements not heretofore described, but which are commensurate with the spirit and scope of the invention. Additionally, while various embodiments of the invention have been described, it is to be understood that aspects of the invention may include only some of the described embodiments. Accordingly, the invention is not to be seen as limited by the foregoing description, but is only limited by the scope of the appended claims.

CLAIMS:

1. A releasing carrier (100) for activating a safety mechanism (182) for an elevator car, the releasing carrier (100) comprising:

a releasing carrier housing (102);

a linkage (110) having one end mounted to the releasing carrier housing;

a governor lever (116) mounted to another end of the linkage (110);

one of a magnet (104) and a block (118) mounted to the releasing carrier housing (102);

the other of the magnet (104) and the block (118) mounted to the linkage (110), the magnet (104) and block (118) being opposite each other;

the governor lever (116) having an attachment point (122) for a governor rope (150);

the governor lever (116) having a further attachment point (124) for a safety linkage (180).

2. The releasing carrier of claim 1 wherein:

the linkage (110) includes a first leg (112) pivotally attached to a second leg (114).

3. The releasing carrier of claim 2 wherein:

the first leg (112) is pivotally attached to a mounting bracket (108) secured to the releasing carrier housing (102).

4. The releasing carrier of claim 2 wherein:

the second leg (114) is pivotally attached to the governor lever (116).

5. The releasing carrier of claim 2 wherein:

one of the magnet (104) and the block (118) is mounted at the junction of the first leg (112) and the second leg (114).

6. The releasing carrier of claim 2 wherein:

an angle between the first leg (112) and the second leg (114) controls pull out force of the releasing carrier.

7. The releasing carrier of claim 1 wherein:

the magnet (104) is mounted to the releasing carrier housing (102) and the block (118) is mounted to the linkage (110).

8. The releasing carrier of claim 1 further comprising:

a shim (106) positioned to establish a predetermined pull out force of the releasing carrier.

9. The releasing carrier of claim 8 wherein:

the shim (106) is positioned between the one of the magnet (104) and the block (118) and the releasing carrier housing (102).

10. The releasing carrier of claim 8 wherein:

the shim (106) is positioned between the block (118) and the magnet (104).

11. The releasing carrier of claim 8 wherein:

the shim (106) is positioned between a mounting bracket (108), to which the linkage (110) is pivotally connected, and the releasing carrier housing (102).

FIG. 1

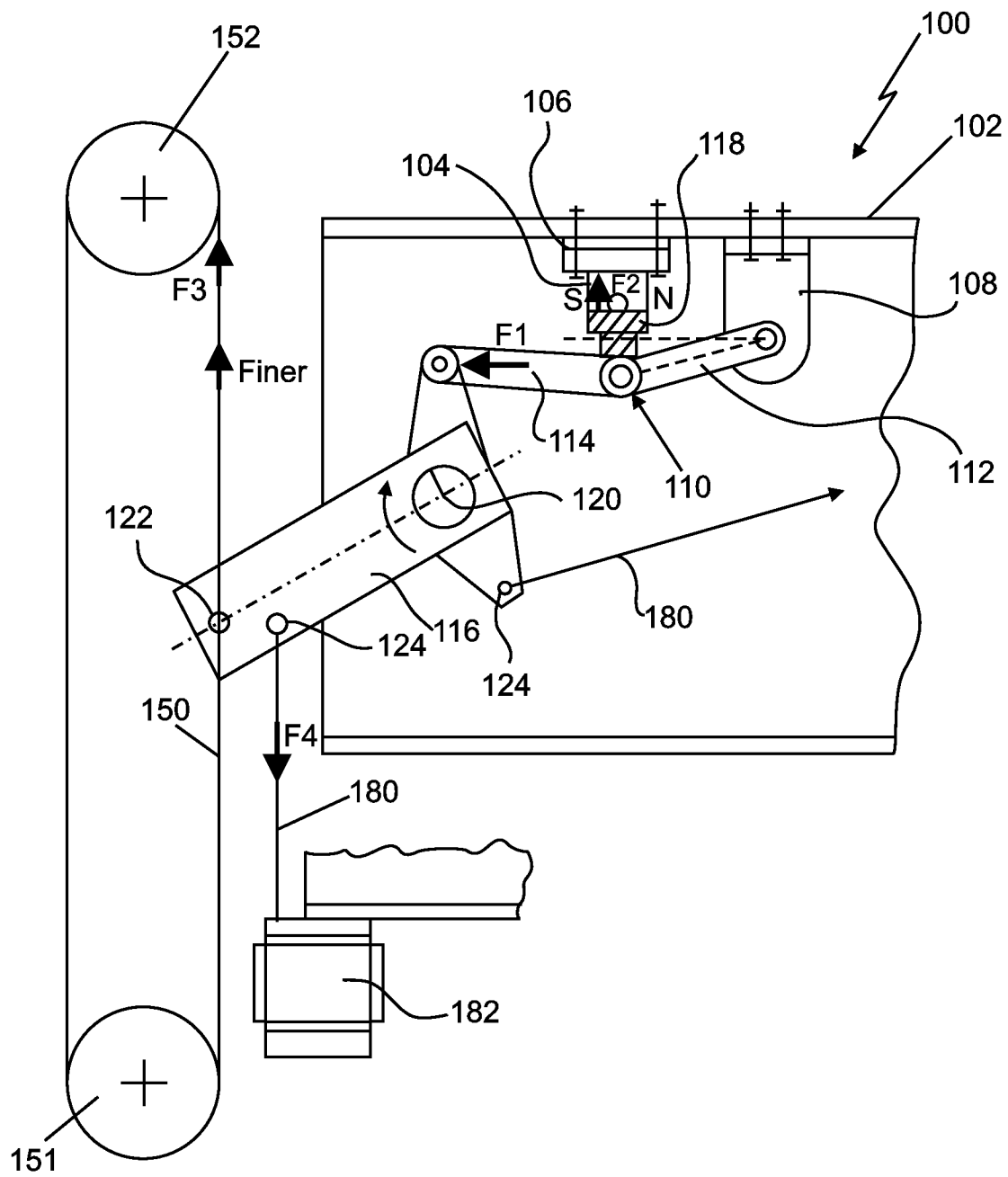


FIG. 2

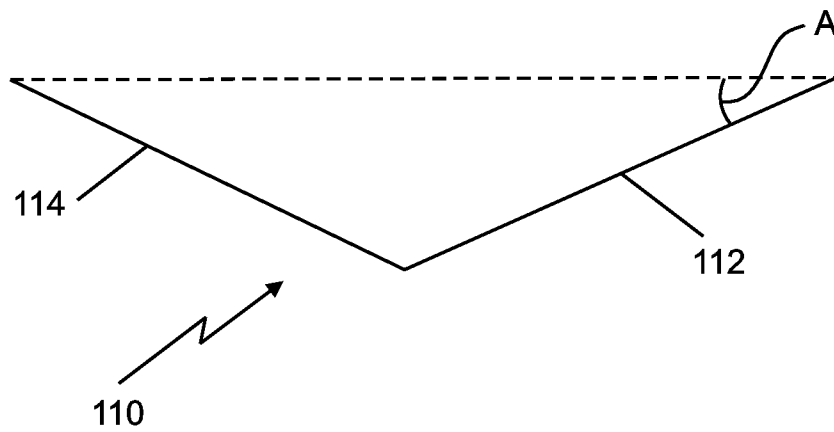


FIG. 3

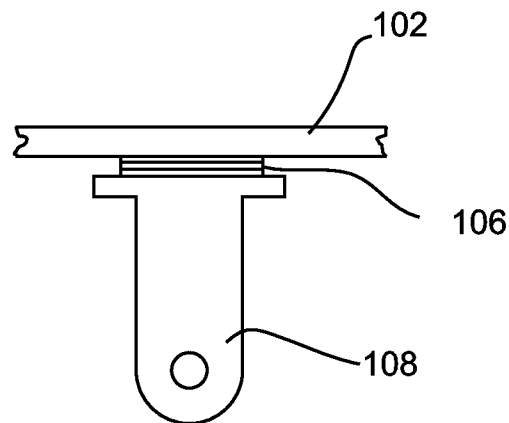
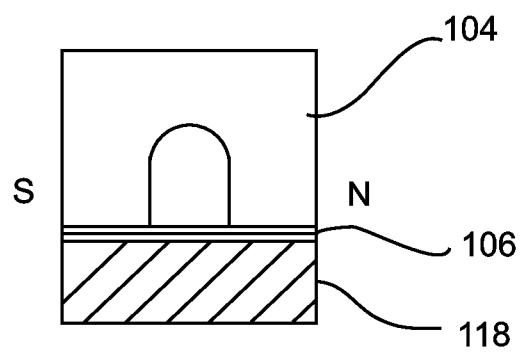


FIG. 4



A. CLASSIFICATION OF SUBJECT MATTER***B66B 5/06(2006.01)i, B66B 5/04(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)

B66B 5/06; B66B 5/18; B60L 7/00; B66B 5/16; B66B 5/22

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: "elevator" and "safety" and "magnet"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-048473 A (OTIS ELEVATOR COMPANY) 20 February 1996 See the abstract; figs. 1-5; paragraphs [0011]-[0020].	1-11
A	JP 09-328268 A (MITSUBISHI ELECTRIC CORP) 22 December 1997 See the abstract; figs. 1-28; paragraphs [0029]-[0093].	1-11
A	US 2001-0042662 A1 (ANDRZEJ CHOLINSKI) 22 November 2001 See the abstract; figs. 1-2; paragraphs [0009]-[0013].	1-11



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 application or patent 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 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 such 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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/026340

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