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(71) Applicant: **Kleemann Hellas S.A.**
61100 Kilkis (GR)

(72) Inventor: **Leonidas-Aggelos, Theoharis**
54629 Thessaloniki (GR)

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(54) FOLDABLE MAINTENANCE BEAM FOR AN ELEVATOR

(57) The present invention concerns a foldable maintenance beam for elevator, located within the mechanical equipment. Due to its location, it occupies minimal space inside the elevator shaft, while at the same time it is always ready to be placed in a maintenance position, when required. The foldable beam consists of a beam (1) with arms (4a), (4b), which rotate around axes (3a), (3b), (5a), (5b) and (5c) so that they unfold and, on the beam (1), there is a support base (7) for the cabin. In normal operation the beam (1) and arms (4a), (4b) are stored on a fixed base (9), supported by the elevator guide rail (6).

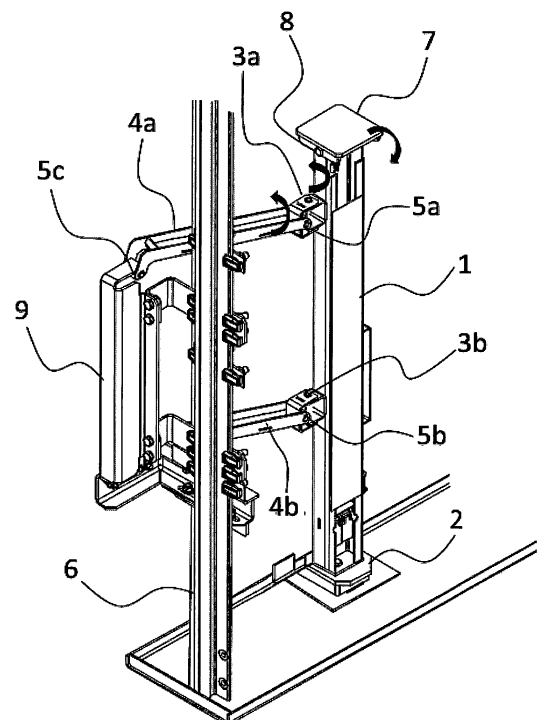


Fig. 1

Description

[0001] The present invention concerns a foldable maintenance beam for elevator, located within the mechanical equipment. Due to its location, it occupies minimal space inside the elevator shaft, between the guide rails, while at the same time it is always ready to be placed in a maintenance position, when required. Such a foldable maintenance beam is mainly applicable to elevators that should serve facilities with reduced clearances.

[0002] The MRL (Machine Room-Less) elevators are constantly evolving due to the increasing need to utilize all available spaces in a building. Their main feature is that no machine room is required for the installation of the drive mechanism. Generally, the traction, or electrically powered, elevator uses an electric motor that provides the required power to lift the cabin with the rated load. The movement is transferred from the electric motor to a pulley. The cabin is suspended by wire ropes that transmit the movement from the pulley to the cabin. Essentially, in its most common form the traction elevator includes a friction pulley and a counterweight.

[0003] Also, in the context of utilizing, to the maximum possible, the available spaces of a building, in recent years the market of elevators, that serve applications with reduced clearances, has been growing strongly. Reduced clearances refer to a special category, in which the space within the elevator shaft is limited in terms of the minimum headroom and the minimum pit depth.

[0004] In the most common form during maintenance, maintenance beams are placed, either under the cabin for carrying out work on the pit depth, or under the counterweight for carrying out work on the headroom. It is customary for these maintenance beams to occupy space inside the shaft, but possibly also outside it.

[0005] The present invention concerns a maintenance beam, in case of reduced pit depth, that occupies space within the mechanical system, between the guide rails, which is available, without requiring the occupation of additional space within the shaft. Also, this maintenance beam consists of folding mechanisms that allow its safe storage during the normal operation of the elevator, as well as its easy transition to a maintenance position, meeting all strength and safety requirements.

[0006] Maintenance beams should, generally, provide to the maintainer with space of at least 1m in the pit depth and 1m in the headroom, these distances are specified by the regulation, so that he is safe during maintenance. The size of the folding part depends on the distance between the drivers of the cabin. Also, when designing the system, the available space should be taken into account, so that it does not hinder the smooth operation of the other components of the elevator. The regulation on safety switches, which inform the elevator operation panel of the exact position of the maintenance beams, i.e. closed, open or intermediate in the case of the foldable beam, should also be complied with in order to activate or deactivate the operation of the elevator accordingly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

- 5 Figure 1 presents in detail the invention in an open position, for example during maintenance.
Figure 2 shows the invention in an open position, as is in the installation.
10 Figures 3 (a) - (b) show the invention in a closed position during normal operation of the elevator.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

- 15 **[0008]** The invention will subsequently become apparent to those skilled in the art, with reference to the accompanying drawings, in which it is illustrated in a nonlimiting manner.

- 20 **[0009]** The present invention is found in the lower part of an elevator shaft. The maintenance beam (1), Fig. 1, is mounted on a base (2) on which it is placed when in an open position, i.e. during maintenance, when the elevator is switched off. The beam (1) can be rotated using two joints, in the form of a cross, both in relation to the axis parallel to the ground, around joints (3a) and (3b), and in relation to the vertical axis, around joints (5a) and (5b). In particular, rotation is made about the joint (3a), which is above the middle (in height) of the beam (1), and the joint (3b), which is below the middle of the beam (1). As a result of the above movements, the beam (1) is moved away from the arm (4) during elevator maintenance, Fig. 2, while the beam (1) touches the arm (4) when storing the beam (1) to save space, Fig. 3.

- 30 **[0010]** The second rotation shall be made about axes (5a) and (5b) so that the arms (4a) and (4b) are approximately parallel to the elevator guide rail (6) during storage and almost perpendicular to the guide rail (6) and the beam (1) at the maintenance position. Absolute parallelism with the horizontal plane is not necessary for the right operation of the system. The support base of the cabin (or counterweight) (7) rotates about the axis (8), so that it folds during storage and is parallel to the beam (1) or perpendicular to the beam (1) during the maintenance process. During maintenance, the cabin (or counterweight) touches and rests on the surface of the support base (7).

- 45 **[0011]** During normal operation of the elevator, the maintenance beam (1) folds and rotates with respect to the vertical axis, around the joint (5c) and is stored on the fixed base (9), Fig. 3b. The fixed base (9) shall be firmly fixed to the guide rail (6), using brackets (10), preferably L-shaped, without the mode of retaining the fixed base (9) on the guide rail (6) being restrictive, Fig. 3a. During normal operation of the elevator, the maintenance beam (1) shall remain secured to the fixed base (9) and shall in no way affect the movement and operation of the elevator. It occupies the minimum possible space in the shaft and remains ready whenever needed.

[0012] The invention has the main advantage that while it is located inside the shaft, it takes minimal space and does not hinder the basic functions of the elevator. Also, during maintenance, the worker-maintainer is not required to bring special tools to the installation to connect it to the maintenance position nor is it required special muscle strength to transfer it from another point inside or outside the shaft. All he has to do is release it, extend the arms (4a), (4b), place it on its base (2), rotate the support base of the chamber (7) and then continue with the maintenance work.

Claims

1. Foldable maintenance beam for elevator, consisting of a maintenance beam (1) mounted on a base (2) on which it rests during elevator maintenance by two arms (4a), (4b), which rotate around two joints (3a), (3b) in relation to the axis parallel to the ground, and around two joints (5a) and (5b) in relation to the vertical axis, an elevator cabin base (7), in the upper part of the maintenance beam (1), which rotates about the axis (8) so as to fold during storage and from a fixed base (9) firmly fixed to a guide rail (6), using brackets (10), to which the maintenance beam (1) remains secured during elevator operation.

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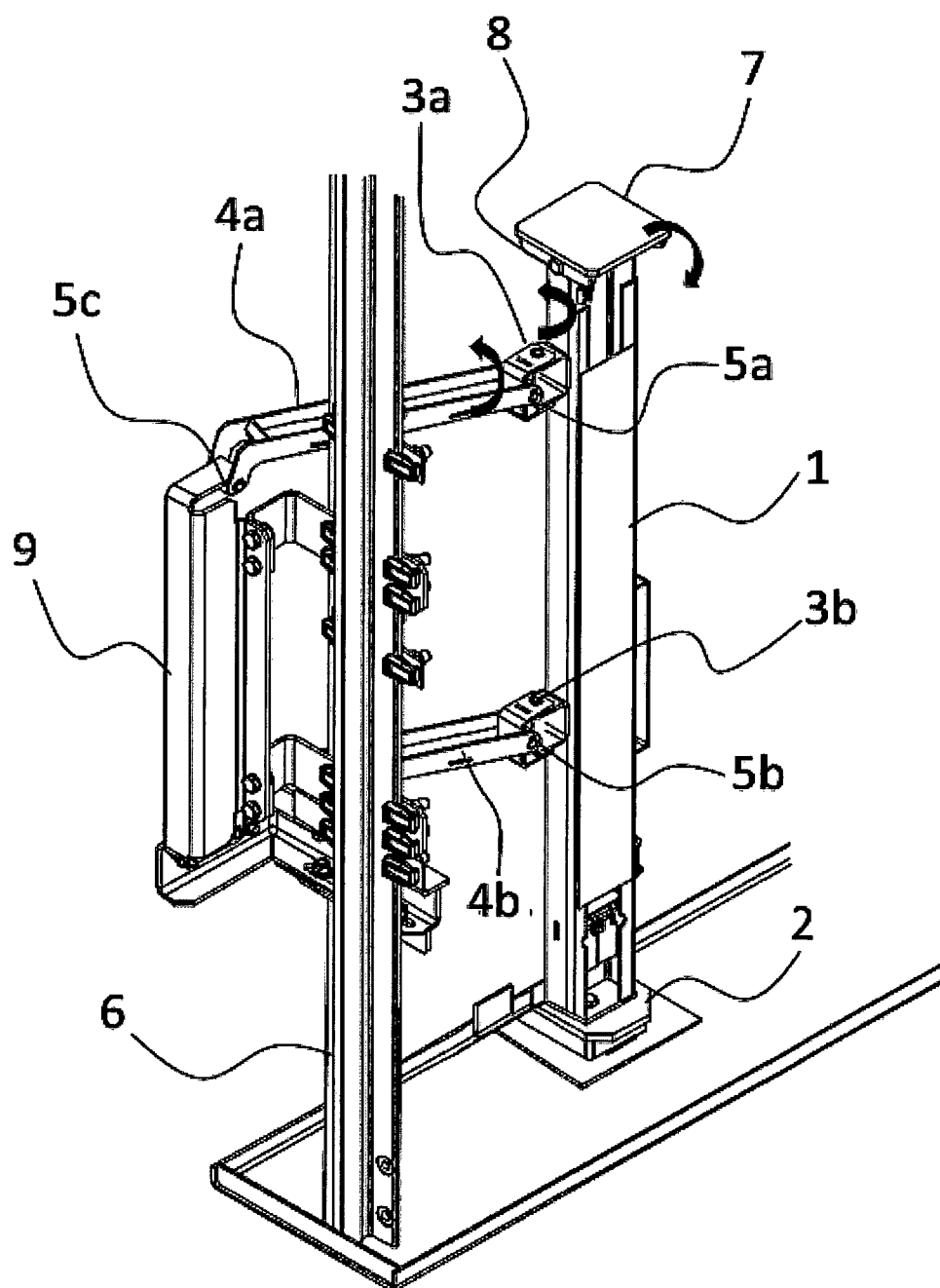


Fig. 1

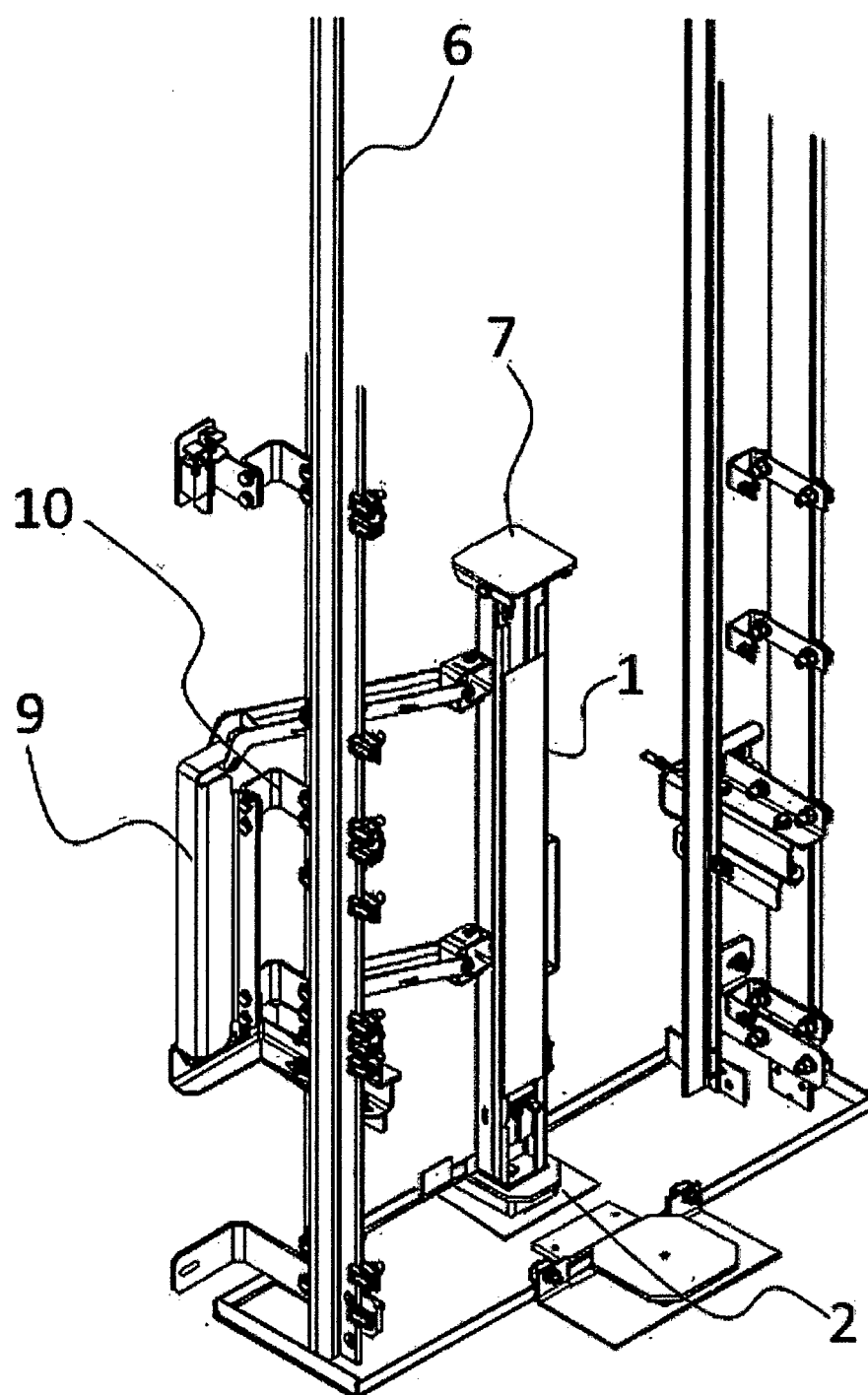


Fig. 2

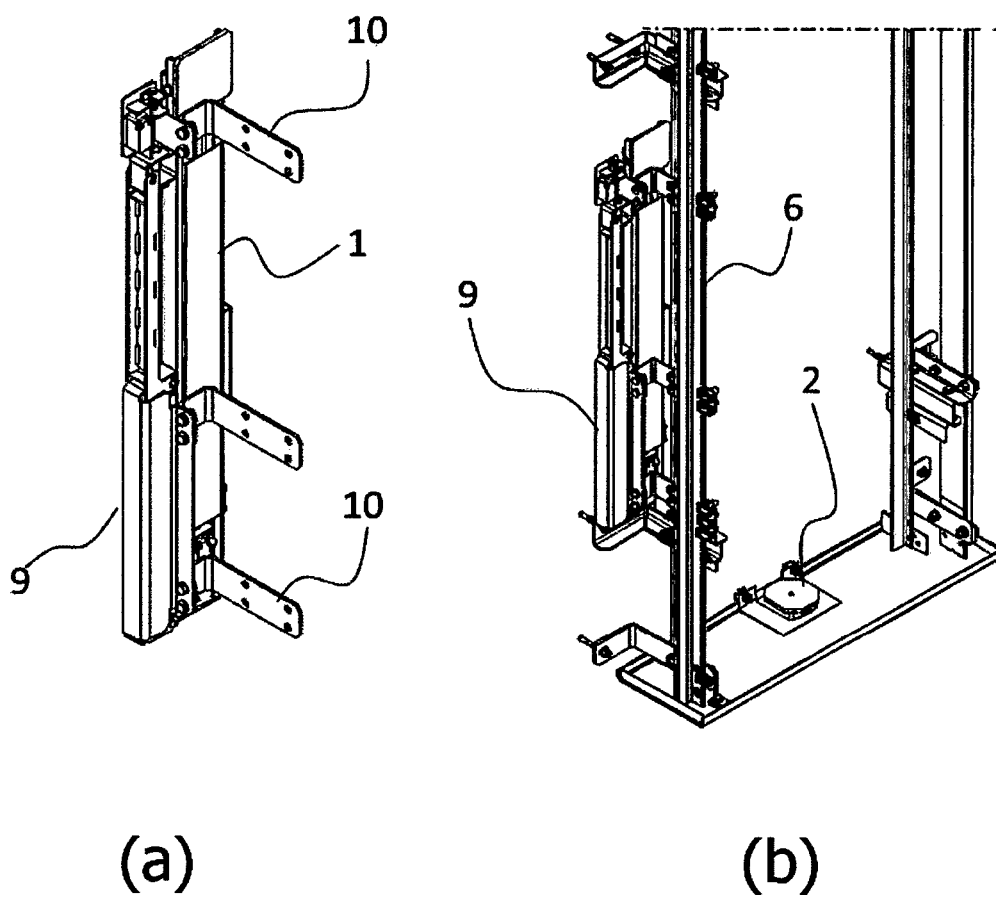


Fig. 3



EUROPEAN SEARCH REPORT

Application Number

EP 24 38 6142

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 488 435 B1 (IGV GROUP S P A [IT]) 5 June 2013 (2013-06-05) * abstract * * paragraphs [0033] - [0037] * * figures 2-5 *	1	INV. B66B5/00
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			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		2 April 2025	Oosterom, Marcel
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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