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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) **Lift foot guard**

(57) Lift foot guard which comprises a lower plate (1) which is displaced with respect to an apron (2) affixed to the lift cabin (3) due to two studs (2.1,1.2) solid to the apron (2) or the plate (1) through which two slots (1.1,2.2) present in the plate (1) or in the apron (2) respectively slide. The slots (1.1) present a form such that they permit rotation of the plate (1) with respect to at least one axis perpendicular to the plate (1) and coinciding with one of the studs (2) when the lower plate (1) enters into contact with an obstacle (6).

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Description

OBJECT OF THE INVENTION

[0001] The purpose of this invention is a lift foot guard which slides in respect of an apron affixed to the lift cabin when it enters into contact with an obstacle.

[0002] Due to its special configuration, the foot guard returns to its resting position once the lift cabin has moved once more, preventing blockage at any time, in addition to preventing injury to operators or passengers who could be trapped by said foot guard.

BACKGROUND TO THE INVENTION

[0003] Lift foot guards are known in the state of the art which prevent operators and passengers from falling into the lift shaft in the event of lift breakdown or when the lift remains trapped between two floors.

[0004] One such lift guard of this type is that of international patent application WO2005/092774 for a lift foot guard provided with studs which slide through parallel and vertical slots of an apron parallel to said foot guard and affixed to the lift cabin.

[0005] The previous systems require linear bearings present in said slots for ensuring the correct guidance thereof.

[0006] This permits the foot guard to stop the cabin as a safety measure when it enters into contact with the bottom of the lift shaft. Nevertheless, when the cabin moves upwards again, and the foot guard should occupy a resting position, there are occasions on which it sticks, due to the fact that striking the bottom of the lift shaft has caused misalignment of the studs with respect to the parallel slots, which blocks the foot guard and causes this lift's safety system to malfunction.

[0007] Furthermore, in the previous systems, it is necessary to include an electrical contact which informs the lift's safety system of the malfunction.

[0008] In addition, there are occasions when the operator present in the lift shaft could be struck or trapped by the foot guard in the event of malfunction, or in the event that the lift cabin suddenly starts to move.

[0009] This invention resolves all the previous disadvantages by providing a lift foot guard which returns to its resting position once the lift cabin continues its movement again, preventing blocking at any time, in addition to preventing any harm coming to operators or passengers who might remain trapped by said foot guard, without the need for any auxiliary safety or guiding elements.

DESCRIPTION OF THE INVENTION

[0010] The purpose of this invention is a lift foot guard which slides in respect of an apron affixed to the lift cabin when it enters into contact with an obstacle.

[0011] The foot guard comprises a lower plate which is displaced in respect of the apron affixed to the lift cabin as a result of two studs solid to the apron through which two slots present in the plate slide.

[0012] The slots present in the plate are formed in such a way that they permit the rotation of the plate with respect to at least one axis perpendicular to the plate, and coinciding with one of the apron studs, and as a result when the foot guard makes contact with any obstacle situated in a decentralised position with respect to the centre of the lower plate, this lower plate rotates in respect of the stud furthest from the obstacle, as there is no overturning torque due to the geometry of the slots, and thus the foot guard is prevented from imprisoning the obstacle.

[0013] When the obstacle is centred with the lower plate, this lower plate displaces vertically with the slots, following the rectilinear trajectory marked by the studs.

[0014] Once the obstacle has been removed, the lower plate falls, through gravity, to a resting position, due to the fact that there is no overturning torque which might block the lower plate.

[0015] The slots present in the lower plate may be arranged on the apron affixed to the lift cabin, with the studs in this case being arranged in the lower plate, as the relative movements between both elements do not vary.

DESCRIPTION OF THE DRAWINGS

[0016] The present descriptive report is complemented by a set of plans illustrating a preferred embodiment of the invention, but which is in no way restrictive.

Figure 1 shows an upright view of an embodiment of a foot guard for a lift in the present invention in its resting position.

Figure 2 shows a lateral upright view of the foot guard for a lift indicated in Figure 1.

Figure 3 shows an upright view of an embodiment of a foot guard for a lift in the present invention when the foot guard contacts with a decentred obstacle.

Figure 4 shows an upright view of an embodiment of a foot guard for a lift in the present invention when the foot guard contacts with a centred obstacle.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] In the light of the foregoing, the purpose of this invention is a lift foot guard which slides in respect of an apron affixed to the lift cabin when it enters into contact with an obstacle.

[0018] In a first example of an embodiment, the foot guard comprises a lower plate (1) which is displaced in respect of the apron (2) affixed to the lift cabin (3) as a result of two studs (2.1) solid to the apron (2) through which two slots slide(1.1)present in the plate (1).

[0019] Each of the studs (2.1) are joined to the apron (2) by means of a sliding plate (4) situated between the

lower plate (1) and the apron (2) and affixed to this by fixation means (5), with these sliding plates (4) being provided with a reinforcement (4.1) which stiffens the foot guard.

[0020] The slots (1.1) present in the plate (1) are provided with a growing width, in this case in the descending direction of the plate (1), thus when the lower plate (1) makes contact with any obstacle (6) situated in a decentred position with respect to the centre of the lower plate (1), this (1) rotates with respect to the stud (2.1) of the apron (2) furthest from the obstacle (6).

[0021] The slots (1.1) may have a triangular form as is shown in the figures, or with the side closest to the opposite stud (2.1) having a curved form.

[0022] One of the sides of the slots (1.1) is vertical so that when the obstacle is centred with the lower plate (1), this (1) is vertically displaced, with the slots (1.1) following a vertical rectilinear trajectory.

[0023] In a second example of an embodiment the slots (2.2) are arranged on the apron (2) affixed to the lift cabin (3) and are provided with a growing width in the upward direction of the plate(1) with the studs (1.2) in this case being arranged on the lower plate(1).

[0024] The essential nature of this invention is not altered by any variations in materials, form, size and arrangement of its component elements, which are described in a non-restrictive manner, with this being sufficient to proceed to its reproduction by an expert.

Claims

1. Lift foot guard which comprises a lower plate (1) which is displaced with respect to an apron (2) affixed to the lift cabin (3) due to two studs (2.1, 1.2) solid to the apron (2) or the plate (1) through which two slots (1.1, 2.2) present in the plate (1) or in the apron (2) respectively slide, **characterised** because the slots (1.1) present a form such that they permit rotation of the plate (1)with respect to at least one axis perpendicular to the plate (1) and coinciding with one of the studs (2) when the lower plate (1) enters into contact with an obstacle (6).

2. Lift foot guard according to claim 1 **characterised in that** the slots (1.1) present in the plate (1) are provided with a growing width.

3. Lift foot guard according to claim 2 **characterised in that** the slots (1.1) present in the plate(1) are provided with a growing width in the downward direction of the plate (1), the studs (2.1) are solid to the apron (2) and the slots (1.1) are present in the plate (1).

3. Lift foot guard according to claim 2 **characterised in that** the slots (2.2) present in the plate(1) are provided with a growing width in the downward direction of the plate (1), the studs (1.2) are solid to the apron (2) and the slots (2.2) are present in the plate (2).

5. Lift foot guard according to any of the previous claims **characterised in that** when the lower plate (1) enters into contact with an obstacle (6) situated in a centred position with respect to the centre of said lower plate (1), this lower plate (1) displaces vertically following the slots (1.1, 2.2), which present on one of their vertical sides, the rectilinear trajectory marked by the studs (2.1, 1.2) or vice versa.

6. Lift foot guard according to claims 1 or 5 **characterised in that** when the obstacle (6) has been removed, the lower plate (1) falls through gravity to the resting position.

7. Lift foot guard according to claim 3 **characterised in that** each of the studs (2.1) is affixed to the apron (2) by means of a sliding plate (4) situated between the lower plate (1) and the apron (2), and affixed to this by fixation means (5).

8. Lift foot guard according to claim 7 **characterised in that** the sliding plates (4) are provided with a reinforcement (4.1) which stiffens the foot guard.

9. Lift foot guard according to claim 2 **characterised in that** the slots (1.1, 2.2) have a triangular form.

10. Lift foot guard according to claim 2 **characterised in that** the slots (1.1, 2.2) present their side closest to the opposite stud (2.1)in curved form.

Amended claims in accordance with Rule 137(2) EPC.

1. Lift foot guard which comprises a lower plate (1) which is displaced with respect to an apron (2) affixed to the lift cabin (3) due to two studs (2.1) solid to the apron (2) or the plate(1) through which two slots (1.1) present in the plate (1) or in the apron (2) respectively slide, **characterised** because the slots (1.1) present a form such that they permit rotation of the plate (1) with respect to at least one axis perpendicular to the plate (1) and coinciding with one of the studs (2) when the lower plate (1) enters into contact with an obstacle (6).

2. Lift foot guard according to claim 1 **characterised in that** the slots (1.1) present in the plate (1) are provided with a growing width in the downward direction of the plate (1), the studs (2.1) are solid to the apron (2) and the slots (1.1) are present in the plate (1).

3. Lift foot guard according to claim 1 **characterised in that** the slots present in the apron (2) are provided

with a growing width in the upward direction of the plate (1), the studs are solid to the plate (1) () and the slots are present in the apron (2).

4. Lift foot guard according to any of the previous claims **characterised in that** when the lower plate (1) enters into contact with an obstacle (6) situated in a centred position with respect to the centre of said lower plate (1), this lower plate (1) displaces vertically following the slots (1.1), which present on one of their vertical sides, the rectilinear trajectory marked by the studs (2.1) or vice versa.

5. Lift foot guard according to claims 1 or 4 **characterised in that** when the obstacle (6) has been removed, the lower plate (1) falls through gravity to the resting position.

6. Lift foot guard according to claim 2 **characterised in that** each of the studs (2.1) is affixed to the apron (2) by means of a sliding plate (4) situated between the lower plate (1) and the apron (2), and affixed to this by fixation means (5).

7. Lift foot guard according to claim 6 **characterised in that** the sliding plates (4) are provided with a reinforcement (4.1) which stiffens the foot guard.

8. Lift foot guard according to claim 1 **characterised in that** the slots (1.1) have a triangular form.

9. Lift foot guard according to claim 1 **characterised in that** the slots (1.1) present their side closest to the opposite stud (2.1)in curved form.

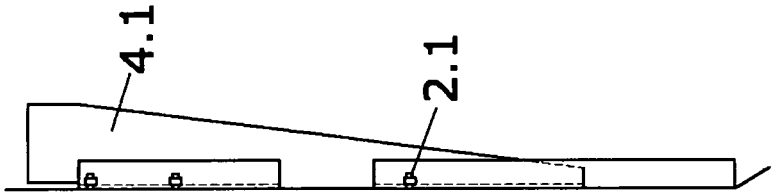

FIG.2

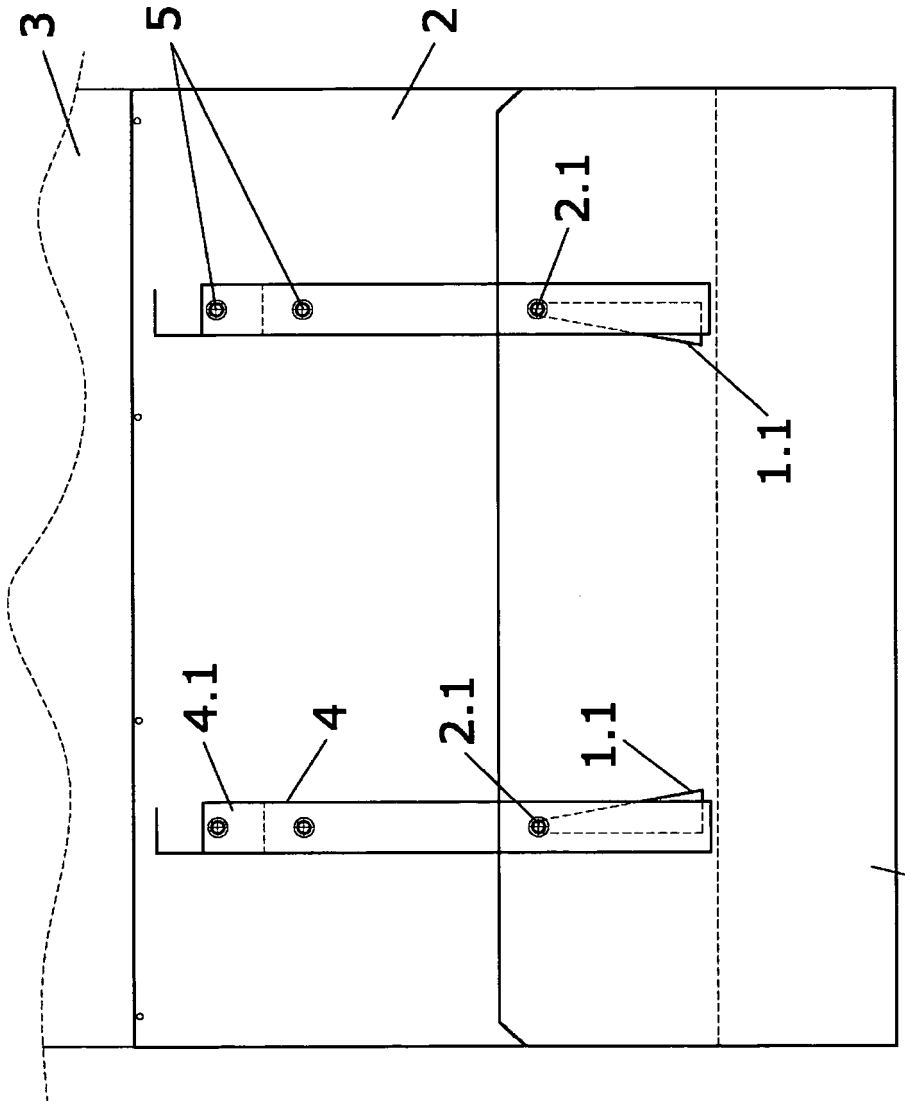

FIG.1

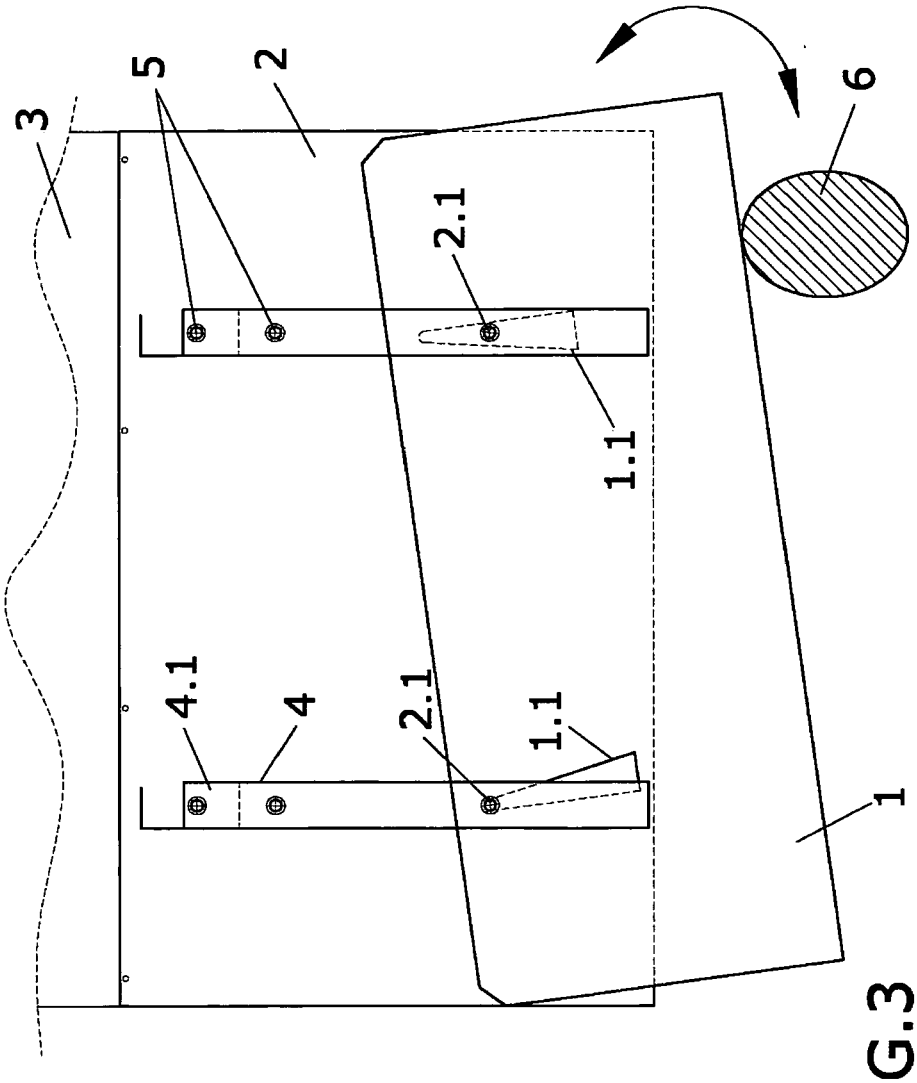

FIG.3

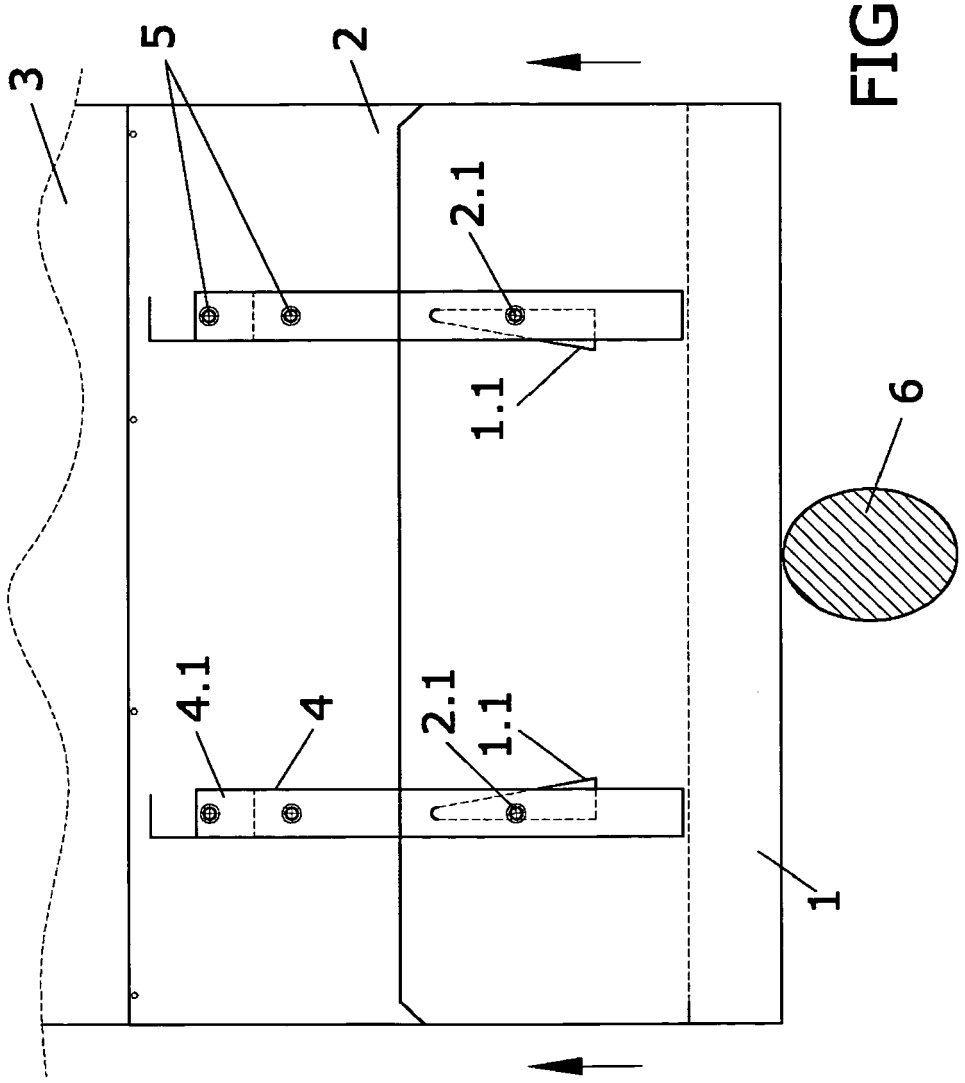

FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 09 38 2192

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	WO 2005/092774 A (OTIS ELEVATOR CO [US]; MONZON-SIMON ANDRES [ES]; CABANAS FALCON JULIAN) 6 October 2005 (2005-10-06) * abstract * * page 3, line 29 - page 5, line 13 * * figures 1,2 * -----	1-10	INV. B66B13/28
A	JP 2006 264809 A (TOSHIBA ELEVATOR CO LTD) 5 October 2006 (2006-10-05) * abstract * * paragraphs [0019] - [0030] * * figures 1-4 * -----	1-10	
			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	10 February 2010	Oosterom, Marcel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 38 2192

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-02-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005092774 A	06-10-2005	EP 1730068 A1	13-12-2006
		US 2008230327 A1	25-09-2008
JP 2006264809 A	05-10-2006	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2005092774 A **[0004]**