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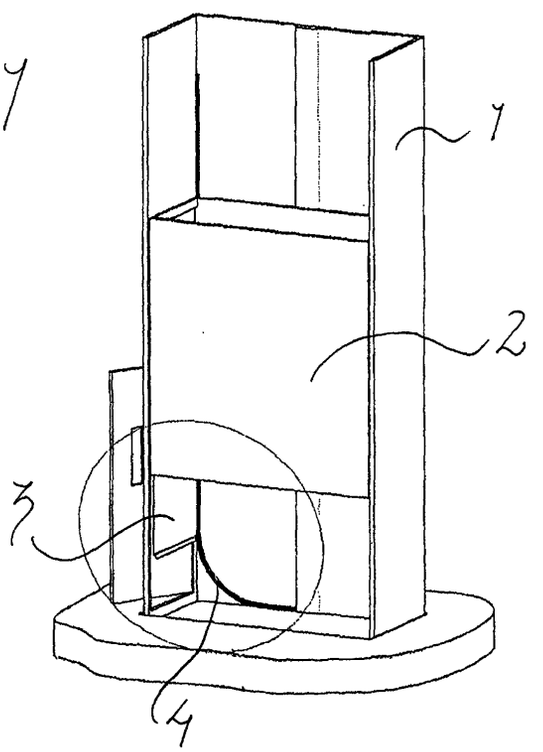
(54) Toe guard for elevator

(57) Lift cage provided with a guard extending downwards for preventing persons to fall down into the lift shaft below the lift cage at emergency evacuation, the guard being articulated to the bottom of the lift cage immediately below the floor at the lift cage door. Furthermore the guard is controlled by a roller at the lower edge of the guard. This roller runs in a U-shaped guide that is applied to a lateral wall of the shaft. The guide runs vertically over the entirely height of the lift shaft but in the lower end were the guide bends inward and transcends into a horizontal section. In this way the guard will be maintained vertical but when it comes close to its most lowered position where the guard is swung in below the bottom of the lift cage. The lift cage guard can in this way simply and efficiently be used also at later installations of lifts were there its no pit below the lift cage in its bottom position.

Fig. 1



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Description

[0001] If a lift cage, for instance as a result of a power cut off, stops in an intermediate position between two stories authorized personnel can open an appropriate story door in the lift shaft as well as the door of the lift cage in order to evacuate persons that have been travelling with the lift. If this takes place downwards, that is the opened shaft door is below the lift cage the evacuated persons must be prevented from falling in under the lift cage itself and down into the lift shaft, which is achieved by a ridged cage guard extending downwards from the floor of the lift cage and sufficiently far down in order to eliminate the risk that anybody falls in under the lift cage. When reequipping with lifts buildings that originally have had lifts this however leads to problems since the arranging of lift pit that extends down below the bottom floor in reality is impossible to arrange and there is thus no space for the downwards extending cage guard.

[0002] The invention has as its object to provide a solution to this problem and enable lift installations without lift pit with a retaining of a safe cage guard function.

[0003] In accordance with the invention this object is solved by the guard being articulated to the floor of the lift cage in order to allow a folding of the cage guard against bottom side of the floor of the lift cage. Furthermore a guide for the cage guard is arranged along the lift shaft preventing guard from being swung into the shaft anywhere but close to the bottom position, that is when the lift cage is getting close to the bottom of the shaft. Here it is of no importance if the guard is swung in below the bottom of the lift cage since there is no drop inside the shaft. The swinging in of the guard may for instance be achieved by the same guide that controls the guard during the movement higher up in the shaft curving inward forcibly controlling the lower end of the guard inward towards the middle of the lift cage so that when the lift cage reach the bottom the guard lays flat below bottom of the cage. Since the guard only has to be a few millimeters thick in order to fulfill its function the required increased height of the bottom position of the lift is only a few millimeters. Although it is prescribed that the guard in its lower end has to have a bending at the edge this may be located between supporting beams in the lift bottom. The control may preferably include a ball bearing that with a bolt is connected to the guard and a guide rail fastened to the shaft wall and enclosing the ball bearing. The rail may then curve inward more or less along a quarter of a circle to achieve the swing in movement also by means of the guide and the roller.

[0004] If so should be desired in order to increase the safety further one can consider that the guard on the side opposite to the above guide over the entire height of the side runs in an additional guide that only extends down over the upper floors since the guard is not needed in the bottom floor. This guide has however then no swinging in function of its own, but it functions as an efficient blocking of the movement of guard but when the lift comes closer to its bottom position.

[0005] The guard device according to the invention is very reliable and dependable since it is completely mechanical and the guard is efficiently constrained. Furthermore the device is very easy to check since it is sufficient to look and grip it to decide if it is functioning or not. The device is strong and takes at the same time extremely little space in the bottom position. If the control from one reason or the other should fail the guard will when elevator gets closer to the bottom be deformed more or less and cause the lift to stop, which then only can occur with the lift close to its bottom position at which the security system of the elevator existing for other reasons will be activated in this extremely unlikely incidence.

[0006] Further advantages and characteristics of the invention are apparent form the following description of an embodiment shown in the enclosed drawing and from the claims. In Fig 1 is shown a lift shaft with an accompanying lift cage in a lateral view with one shaft wall removed, fig 2 shows a detail of fig 1, fig 3 shows the lift shaft in fig 1 with the cage lowered somewhat further, fig 4 a detail from fig 3 in a larger scale, fig 5 the lift shaft in a lateral view with the lift cage in its most lowered position and fig 6 an enlargement of a detail in fig 5.

[0007] The lift shown in the drawings includes a shaft 1 in which a lift cage 2 is movably vertically. From the lift cage a guard 3 extends vertically downwards on the side where the doors are arranged. The guard 3 is in its upper end via a piano hinge articulated to the lower edge of the bottom of the lift cage. In the lower end the guard is provided with a laterally protruding bolt, on which a ball-bearing is arranged, which ball-bering runs inside a control rail 4 that runs vertically in the shaft but for the bottom end of the shaft, where the guide rail turns of in towards the middle of the shaft where control guide curves inward towards the center of the shaft in a soft bend that then finnish in a horizontal section close to the bottom of the lift shaft.

[0008] The guard functions so that it by the guide is held vertical but when the lift comes close to its bottom position where the lower guide (the ball bearing) follows the control guide as is shown in fig 3 and 4. When the cage at last reaches its bottom position the cage guard lies flat below the cage. When the lift cage once again moves upwards the movements is the opposite.

Claims

1. Arrangement at lift, **characterized in that** it includes a lift cage guard arranged at the door side of the lift and extending downwards, which lift cage guard is articulated to the lift cage and controlled by control means arranged on the lift cage shaft cooperating with control means on the lift cage guard in

order to hold the guard stably vertically during the movement of the lift cage in the lift shaft but when the guard is coming close to the bottom of the lift cage shaft.

2. Arrangement according to claim 1, **characterized in that** the control means on the shaft wall is a rail and that the control means on the guard is a roller.

3. Arrangement according to any of the preceding claims, **characterized in that** a folding in of the guard under the bottom of the lift cage occurs when the lift comes close to the bottom of the shaft.

4. Arrangement according to claim 2 and 3, **characterized in that** the rail on the lift shaft wall in its lower end bends in towards the center of the shaft and runs just above the floor so that the rail when lift floor comes closer to the bottom of the shaft swings the lift cage guard in below the floor of the lift cage.

5. Arrangement according to claim 1, **characterized in that** the control means is constituted by a U-shaped rail that encloses the lateral edge of the cage guard.

Fig. 1

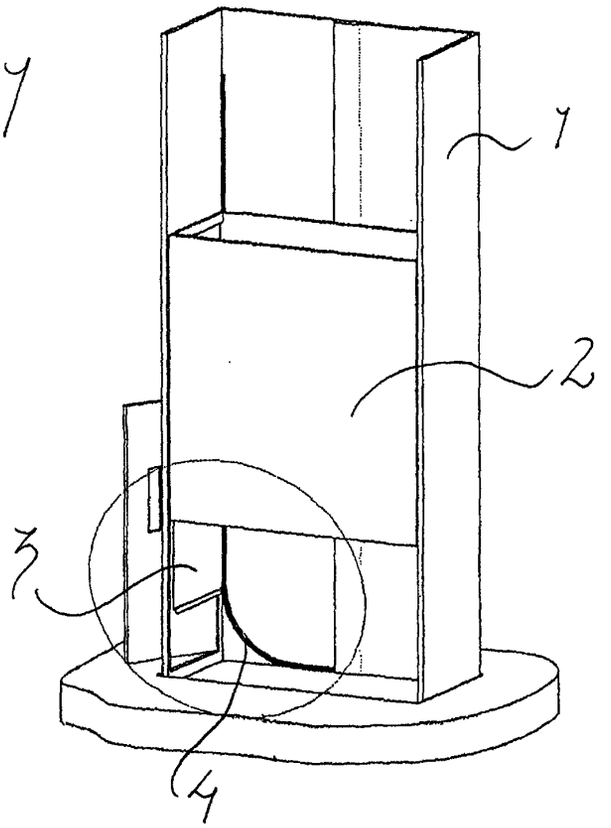
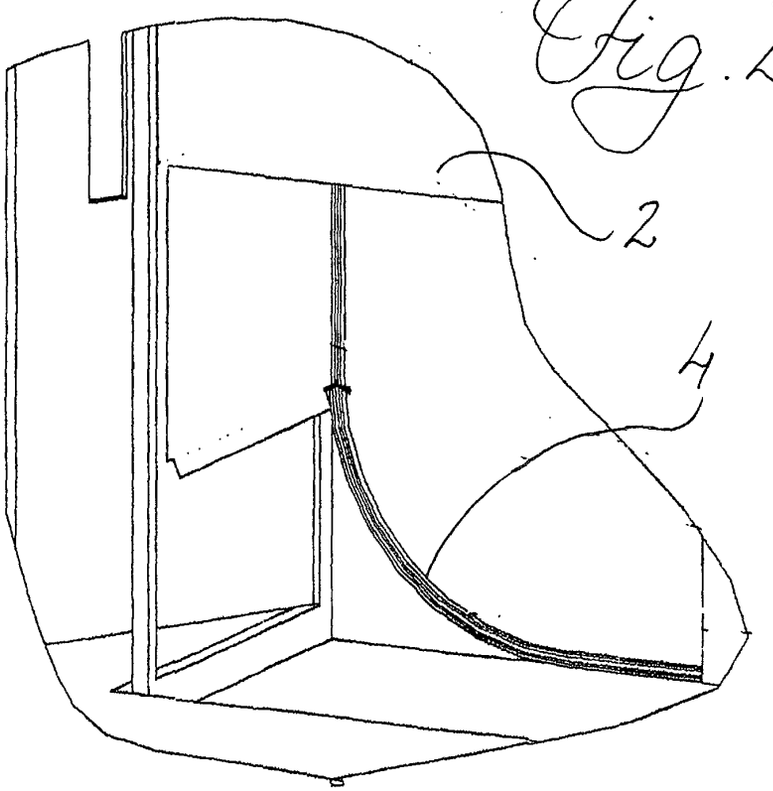


Fig. 2



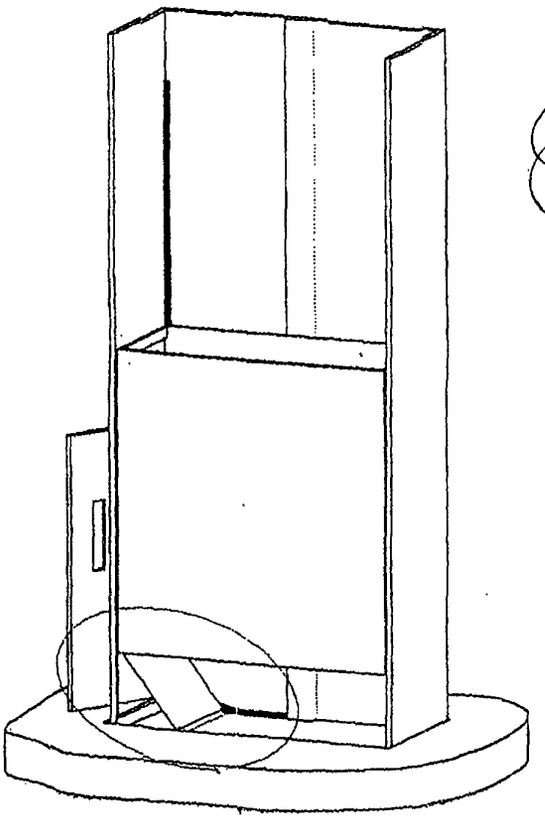


Fig. 3

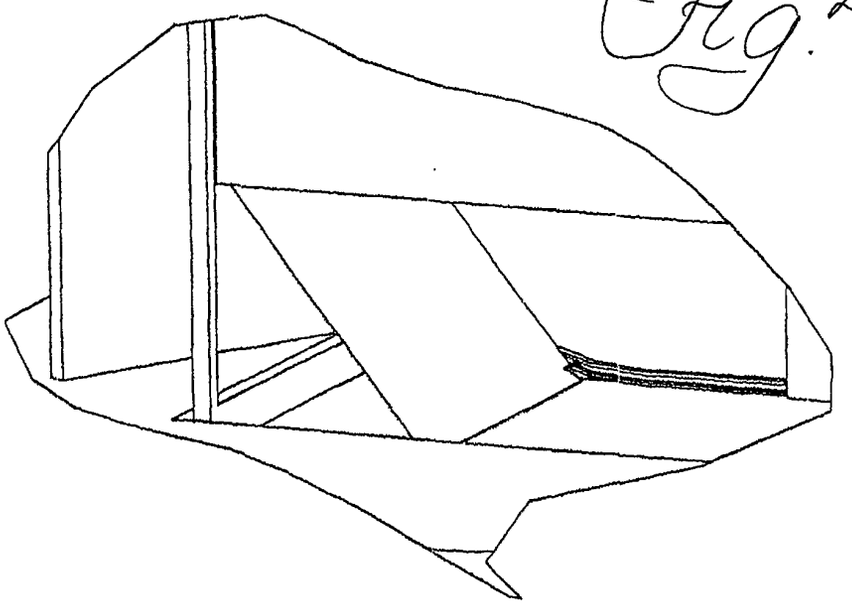


Fig. 4

Fig. 5

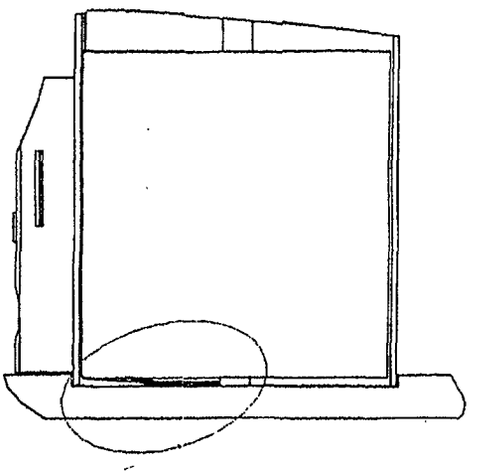
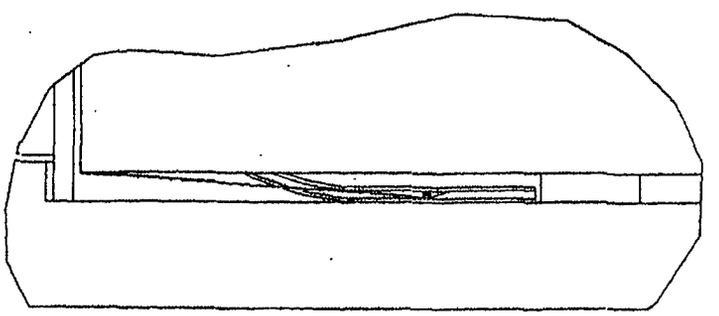


Fig. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 01 85 0150

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X,P	EP 1 118 576 A (THYSSEN AUFZUGSWERKE GMBH) 25 July 2001 (2001-07-25) * abstract; figures 6A-7C * * column 10, line 15 - line 58 *	1-5	B66B13/28
X	US 6 095 288 A (SANSEVERO FRANK M ET AL) 1 August 2000 (2000-08-01)	1,3,4	
A	* column 3, line 45 - column 4, line 5; figures 3,4 *	2,5	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 November 2001	Janssens, G

CATEGORY OF CITED DOCUMENTS

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27-11-2001

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EP 1118576 A	25-07-2001	EP 1118576 A2	25-07-2001
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82