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(54) Foldable apron for car of a lift system

(57) The present invention relates to a foldable apron for a lift car. Such an apron is composed by a fixed part integral with the car sill and a mobile part connected to said fixed part by an assembled unit which allows for keeping locked either in extended position or in folded position. In the extended position the mobile part grants to the whole apron the mechanical strength required to comply with the safety regulations. In the folded position, instead, the mobile part can be closed toward the fixed part thus reducing the apron overall dimensions and avoiding interference with the ground of the shaft pit when it is too much close to the lowermost floor of the shaft to install a conventional apron.

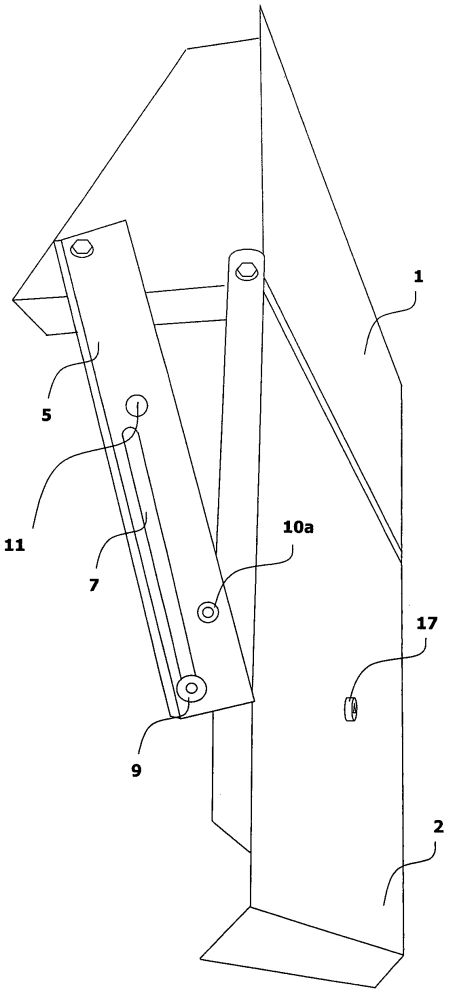

Figure 2

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Description

[0001] The present invention relates to a car folding apron of lift system to be fixed on the car at the entry sill thereof. The car folding apron of the present invention is designed and configured such that people, in case of lift evacuation, cannot fall into the lift shaft.

[0002] The possibility to install a new lift system in buildings, where the presence of a lift was not originally designed, leads to technical and structural difficulties due to a not suitable size of the lift shaft chosen for the lift system installation. Moreover, in order to comply with the current safety regulations provided for the lift systems, it is necessary to take into account in the lift shaft adaptation the minimum allowable dimensions not only for the actuating and control members but also for the associated safety devices. It would be appropriate to point out that the structural interventions necessary for the lift shaft adaptation, assuring a correct and suitable lift system installation, represent almost always a too high cost and, in some cases, they may also undermine the building stability requirements. Then there are several occurrences in which the relevant building is under the guardianship of the Department of Art, so that any structural intervention on the building would involve further restriction in addition to the technical constructional limitations.

[0003] Most of the problems due to the lack of minimum space necessary for the lift system installation in buildings not provided with suitable shaft are often close to the car shaft ends, that is at the pit and at the head of the shaft. The regulations about the car shaft pit provide, in order to assure the safety of maintenance engineer, for a sufficient shelter space. If it is not possible to obtain such a space the regulations impose the use of additional safety devices. Particularly, when the pit dimensions do not meet the regulations, even if additional devices are installed, there is always the problem of installation of a car apron, which avoids people falling into the lift shaft during evacuation.

[0004] Nowadays on the market there are already safety devices that allow, once installed in the lift shaft, to comply with the current regulations and, so, to keep a shaft pit with reduced dimensions.

[0005] WO 02/060802 discloses a telescopic apron divided into two parts, a fixed part anchored at the car sill and half-dimensioned in respect of the standard, and a mobile part foldable onto the fixed part in case of interference with the shaft pit ground.

[0006] EP 1 118 576 discloses more embodiments of such safety devices, only one having minimum bearing on the present invention and it differs in the lack of a relative anyway reverse rotation of a part in respect of the other part. In respect of the present invention the lack of a single lock member for more set positions has to be pointed out.

[0007] DE 100 65 101 describes, instead, an apron foldable on itself by the action of wheels fixed on the apron imposing its closure at once when touching the pit ground.

[0008] EP 1 189 210 describes a solution similar to the preceding solution while using guides instead of the wheels in order to utilize the contact with the shaft pit ground.

[0009] WO 02/10053 discloses an apron half-folding on itself once if in contact with a member fixed on the shaft pit ground.

[0010] Finally, EP 1 215 159 describes an apron, installed under the car floor, extensible and foldable depending on cases.

[0011] Therefore, an object of the present invention is to provide a foldable apron for a lift system car such that it allows the installation in buildings having a lift shaft with dimensions not allowable under the current safety regulations that impose the use of additional safety devices like the device herein described.

[0012] Further object of the present invention is to provide a foldable apron for a lift system car not interfering with the shaft pit ground plane even with the car at the lowermost floor.

[0013] These objects are achieved by said foldable car apron, whose features are defined in the claims and illustrated in the annexed drawings showing an illustrative embodiment, not limiting, of the present invention and in which:

fig. 1 is a front view of a preferred embodiment according to the present invention;
fig. 2 and 4 are side views of the preferred embodiment in fig. 1 in the extended position;
fig. 3 is a side view of a detail of the preferred embodiment in fig. 1 in a folded position; and
fig. 5 is a flow diagram showing the steps for passing the mobile part 2 from a position to the other relative to the fixed part 1.

[0014] Referring now to figs. 1 to 3, the car foldable apron according to the present invention is composed by a pair of parts 1 and 2, made of sheet iron or other mechanically tough material. Said parts 1, 2 are disposed such that a part, that is the fixed part 1, is anchored under the car entry sill 3 while the other part, that is the mobile part 2, connected to the fixed part 1 by mechanical members results able to reach, relative to that part, two different positions: folded (fig. 3) or extended (fig. 2). The relative rotation of a part in respect of the other is assured by a hinge 4 and two side brackets 5, 6 anchored to the fixed part 1. Along almost the entire length dimension of each bracket 5, 6 a slot 7, 8 is formed in which a pin 9 slides. Such a pin 9 is installed onto the mobile part 2. at the sides parallel to the brackets 5, 6 such that it can engage the corresponding slots 7, 8 so adjusting the relative rotation of the two parts 1, 2.

[0015] The locking function in one of the two positions allowable for the mobile part 2, that is folded or extended, is achieved by a pair of spring closure devices 10a, 10b engaging holes 11, 12 or 13, 14 corresponding thereto

and formed on the brackets 5, 6 close to the slots 7, 8 of the brackets 5, 6. The drive of such a closure devices 10a, 10b is actuated by a pairs of connecting rods 15, 16 each one having its small end hinged onto said spring closure devices 10a, 10b respectively, and its big end hinged to a single unlocking member 17. The rotation of said unlocking member 17 around a predetermined direction by a suitable tool causes a simultaneous rotation of the big ends of the connecting rods 15, 16 consequently actuating the closure devices 10a, 10b disengaging from the respective holes 11, 12 and realizing the unlocking function in the aforementioned way.

[0016] Further the lift car foldable apron may include a position control 18 that in the preferred embodiment uses a contact electric sensor for detecting mobile part position.

[0017] The maintenance engineer, or the user, in case of need by a suitable tool engaging the member 17 can unlock the folded mobile part 2 moving it downward to the extended position in which the mobile part 2 results coplanar in respect of the fixed part 1 and in which automatically is locked at the preset holes 13, 14 by the action of said closure devices 10a, 10b. Vice versa by the same tool with the unlocking member 17 the mobile part 2 is unlocked from the extended position moving it upward to the folded position in which the lock is restored in the holes 11, 12.

[0018] It is obvious to one skilled in the art that many embodiments may result from the present description which it has not to be considered in a manner limited by the just shown preferred embodiment. Moreover it is envisioned that the present invention could be realized using different technologies and materials depending on the features required by the particular application provided for the lift car foldable apron.

Claims

1. A foldable apron for lift system car including two parts, a fixed part (1) and a mobile part (2), connected by an assembled unit dimensioned in order to be installed also in lift shafts provided with a pit not enough high to contain it if the two parts are not coplanar, **characterized by** the fact that said mobile part (2) can rotate in respect of such a fixed part (1).

2. The foldable apron for lift system car according to claim 1, **characterized by** the fact that said mobile part (2), locked in folded position in respect of the fixed part (1), does not interfere with the ground of said lift shaft pit.

3. The foldable apron for lift system car according to claim 2, **characterized by** the fact that the mobile part (2) can be unlocked from the outside by a tool for a unlocking member (17), mechanically connected and able to engage closure members (10a, 10b) with said mobile part (2), and manually available in extended position, in which grants to said foldable apron the necessary mechanical strength.

4. The foldable apron for lift system car according to claim 2, **characterized by** the fact that the mobile part (2) can be unlocked from the outside by a tool for a unlocking member (17), mechanically connected and able to engage closure members (10a, 10b) with said mobile part (2), and manually available in folded position, in which it removes every interference with the ground of said lift shaft pit.

5. The foldable apron for lift system car according to claims 3 and 4 in which the position control, folded or extended, of the mobile part (2) in respect of the fixed part (1) is electrical (18).

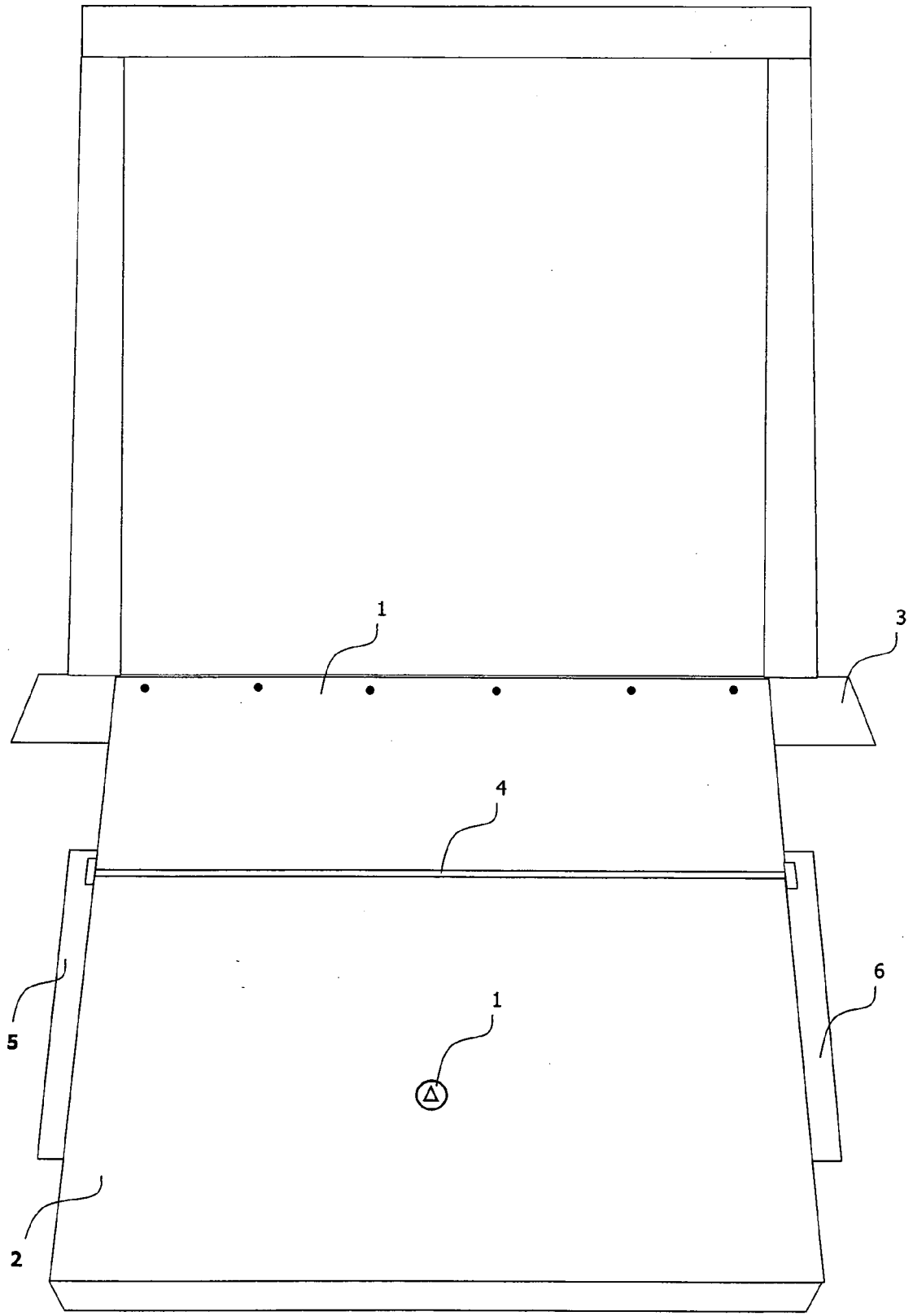

Figure 1

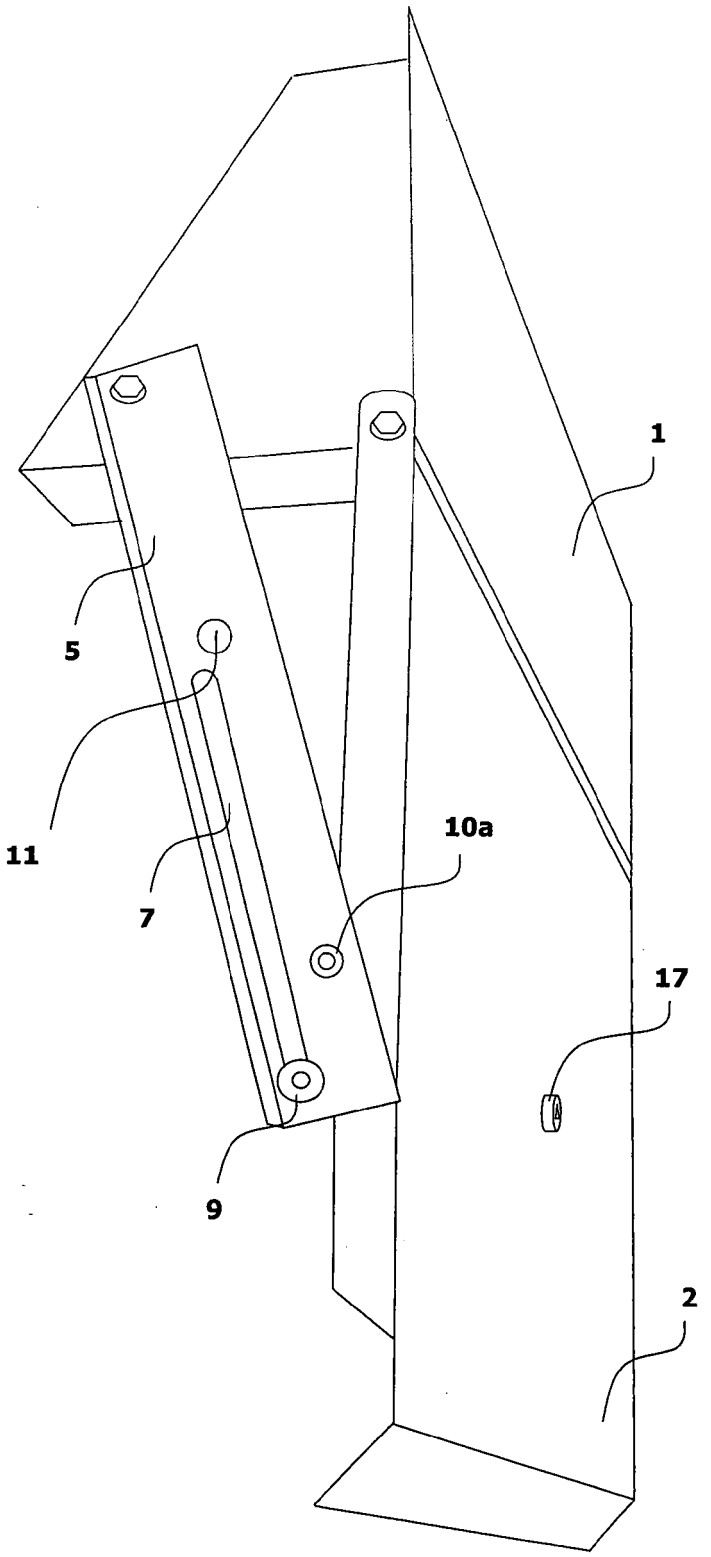

Figure 2

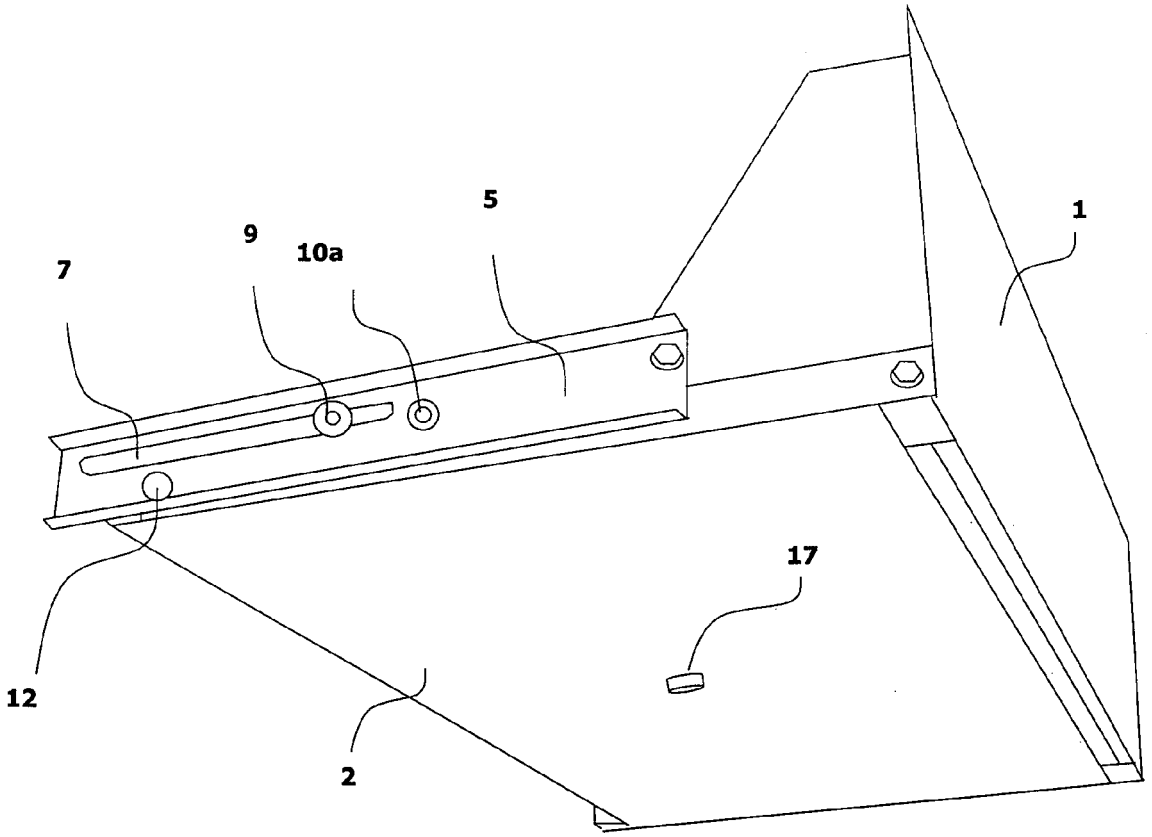

Figure 3

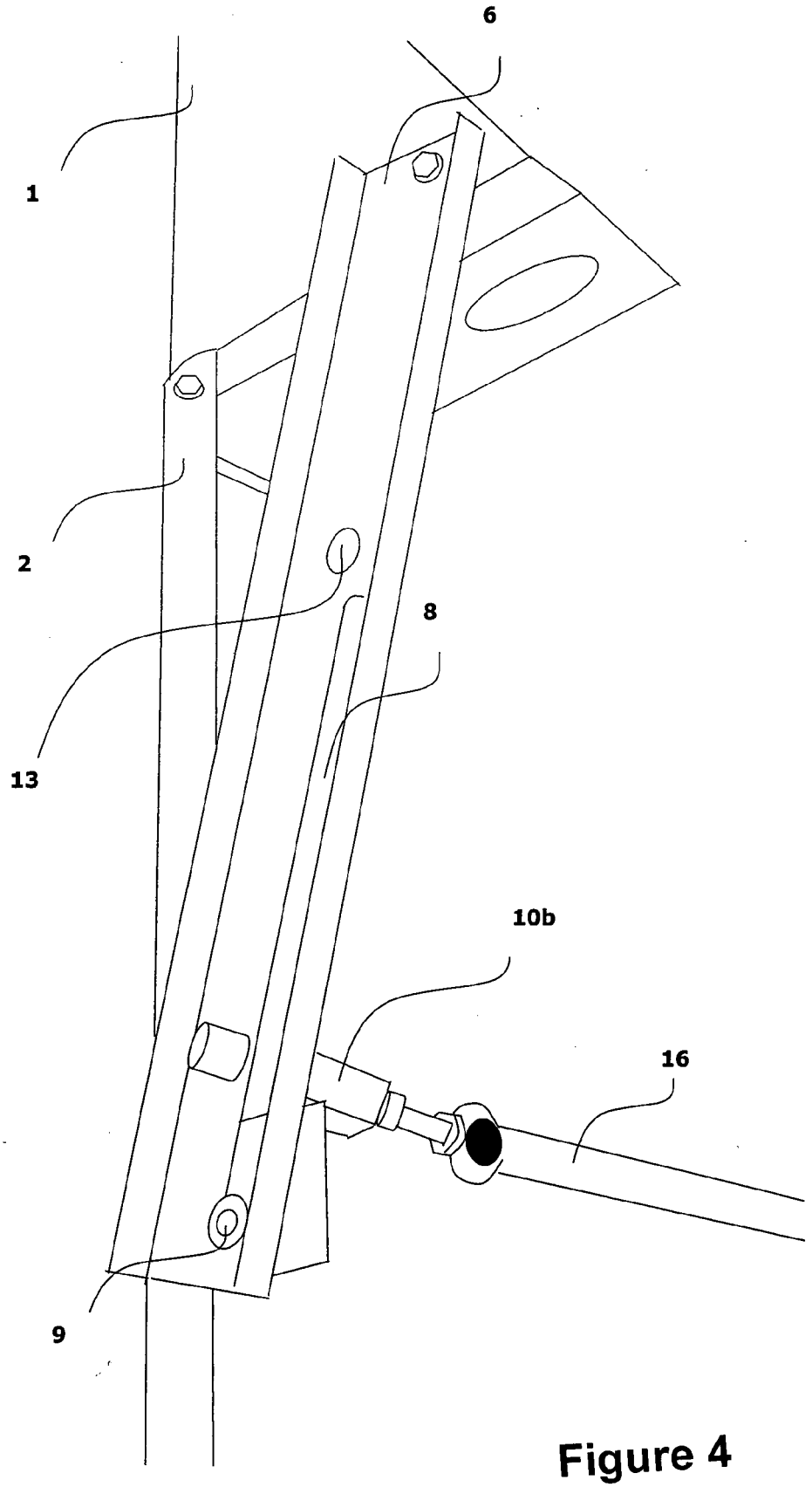

Figure 4

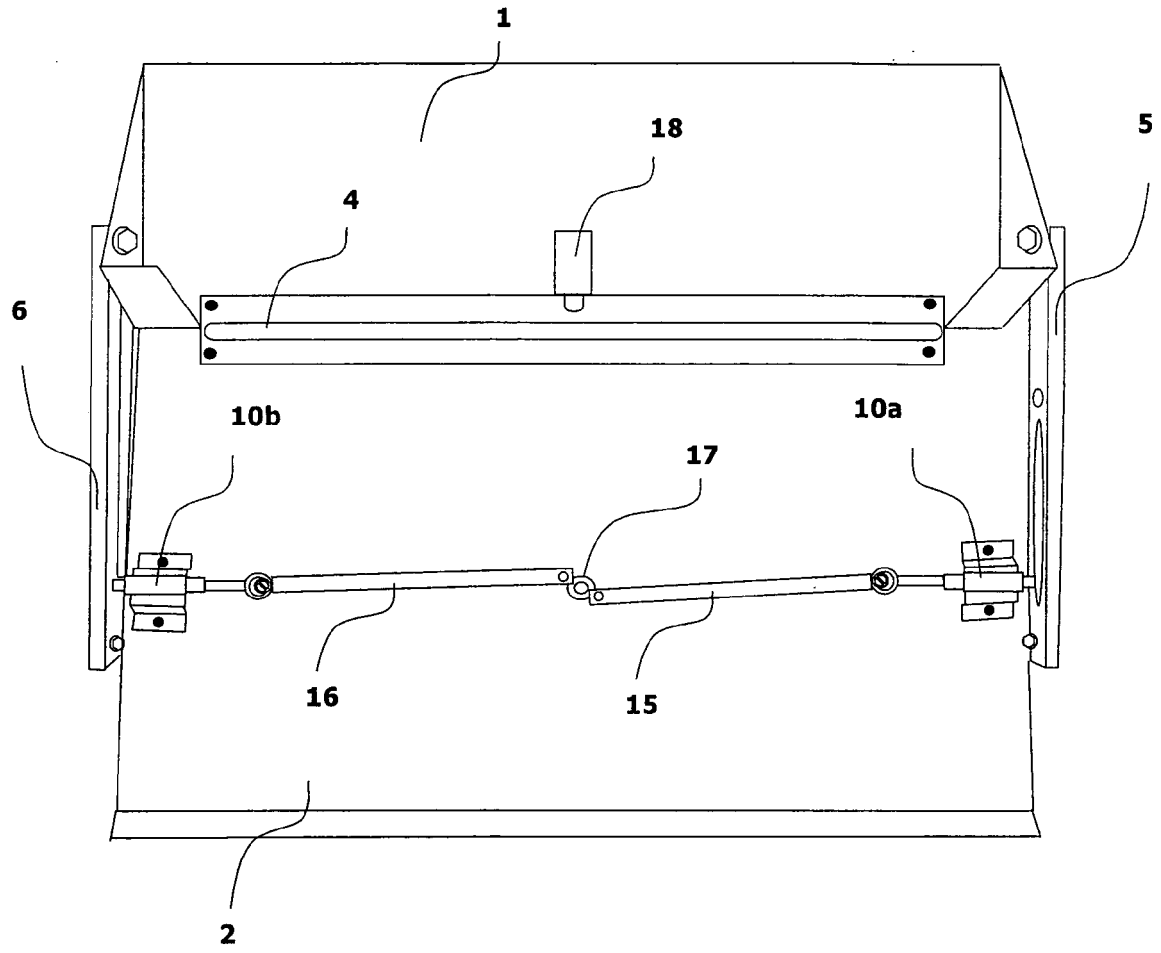

Figure 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 07 5881

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	DE 103 57 035 A1 (MAHLER FRANK [DE]) 30 June 2005 (2005-06-30) * abstract; figures 1-4 *	1,2,4,5 3	INV. B66B13/28
D,Y A	DE 100 65 101 A1 (LOGOS INNOVATIONEN GMBH [DE]) 18 July 2002 (2002-07-18) * paragraph [0029] *	3 1,2,4,5	
X	EP 1 524 234 A (LM LIFTMATERIAL GMBH [DE]) 20 April 2005 (2005-04-20) * abstract; figure 5 *	1-5	
X	DE 101 15 990 C1 (MUTH REINHARD [DE]) 10 October 2002 (2002-10-10) * abstract *	1-5	
A	JP 05 319746 A (HITACHI BUILDING SYST ENG) 3 December 1993 (1993-12-03) * abstract *	1-5	

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	19 February 2008	Nelis, Yves

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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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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19-02-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10357035 A1	30-06-2005	NONE	
DE 10065101 A1	18-07-2002	NONE	
EP 1524234 A	20-04-2005	AT 340756 T	15-10-2006
		DE 60308684 T2	16-08-2007
		DK 1524234 T3	22-01-2007
		WO 2005040030 A1	06-05-2005
		ES 2272873 T3	01-05-2007
DE 10115990 C1	10-10-2002	NONE	
JP 5319746 A	03-12-1993	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 02060802 A **[0005]**
- EP 1118576 A **[0006]**
- DE 10065101 **[0007]**
- EP 1189210 A **[0008]**
- WO 0210053 A **[0009]**
- EP 1215159 A **[0010]**