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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : B60P 1/46, 1/44	A1	(11) International Publication Number: WO 91/01900
		(43) International Publication Date: 21 February 1991 (21.02.91)

(21) International Application Number: PCT/FI89/00145

(22) International Filing Date: 9 August 1989 (09.08.89)

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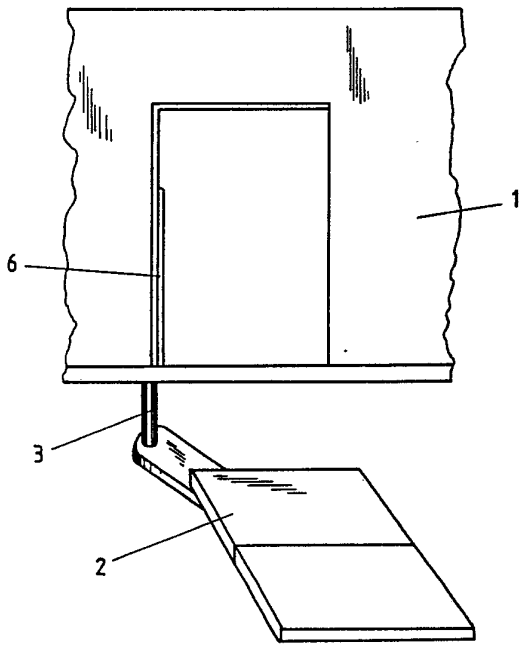
(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent)*, DK, FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE, SE (European patent), US.

Published
With international search report.

(54) Title: ELEVATOR

(57) Abstract

The object of the invention is an elevator to be used in vehicles, to which elevator belong a casing (6) attached to the vehicle body (1) close to the door opening, a shaft (3) attached in the casing turnable in regard of the vehicle and movably in the height direction, a power unit (4) for moving of the shaft, an on the other end of the shaft attached elevator frame (2), which is arranged to be movable in regard of the vehicle by means of the shaft, and an in the casing placed control unit (5, 5a, 8) of the shaft for steering of the movements of the shaft. The present elevators are complicated, occupy a lot of space inside the vehicle and change the outlook of the vehicle. In an elevator in accordance with the invention the shaft (3) is extended underneath the vehicle in its every position, the elevator frame (2) is attached to the part of the shaft below in regard of the vehicle and arranged to be beneath the vehicle during the storage, to be turned on the side of the vehicle and to be transferred in the height direction of the vehicle during the use.



* See back of page

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ELEVATOR

Object of the invention is an elevator to be used in vehicles to hoist goods or people up to the level of the floor of the vehicle, to which elevator belong a casing attached to the body of the vehicle close to the door opening, an inside the casing in regard of the vehicle turnable and in the height direction movably attached shaft, an on the other end of the shaft attached elevator frame, which is arranged to be movable in regard of the vehicle by means of the shaft, and an inside the casing placed control element for steering of the movement of the shaft.

When using the elevator frame the elevator frame is transferred to the level of the ground and the goods are loaded onto it, the person to be transported places himself or is transferred to the elevator frame and the elevator frame is hoisted up to the level of the vehicle floor. After this the goods or people are easily transferred into the vehicle. Elevators are used in different kinds of vehicles, such as e.g. small buses and delivery/goods vans. The present elevators are big in size and after the use they are always turned inside the vehicle, where they occupy a lot of space. In addition they are expensive and complicated to their structures. Further the present elevators can generally be used only in vehicles opening in the backward direction, because the elevators are not very suitable for being operated in side doors. One of the disadvantages caused by the elevators is the change in the outlook of the vehicle, because the elevators remain visible.

The purpose of the invention is to bring forth an elevator, which is suitable for use in both back and side doors, is simple to its structure, relatively small in size, does

not in an essential way change the outlook of the vehicle or its interior and is favourable to produce.

The purpose of the invention is achieved by means of an elevator, which is characterized in that, what has been presented in the patent claims.

In an elevator in accordance with the invention the shaft is extended below the vehicle in its every position, the elevator frame is attached to the part of the shaft underneath the vehicle and arranged to be below the vehicle during the storage, to be turned on the side of the vehicle and to be transferred in the height direction of the vehicle during the use. When the elevator is out of use, the elevator frame is underneath the vehicle, protected and invisible. The inside the vehicle located power, transfer and control equipment can hereat be placed inside a closed casing, which can be upholstered in a way corresponding to the upholstery of the vehicle. The device is small to its size and the elevator with its operational units does not change the outlook of the vehicle or does not present a hindrance or disturb the use of the car for any other purpose. When taking the elevator into use the elevator is transferred forth by moving the shaft firstly downwards and by turning it then so, that the elevator frame comes forward from the beneath of the vehicle. The goods or people transferred on the elevator frame are hoisted up on the level of the floor of the vehicle by transferring the shaft and the elevator frame upwards. After the loading the elevator frame is transferred back to underneath the vehicle by turning the shaft. In the different applications of the invention the shaft and the elevator frame attached thereto can be transferred in the height direction and turned in the most appropriate order and in the way best suitable for the purpose.

In the following the invention is explained more in detail by referring to the attached drawing, in which

figure 1 present one application of the elevator in accordance with the invention attached to the vehicle and seen obliquely from the side,
figure 2 presents the elevator in accordance with the figure 1 attached to the vehicle and partly in cross-section, and
figures 3-7 present one application of the position of the control elements of the elevator in accordance with the invention seen from the side, and the positions of the elevator frame seen from the side and from above the control element being in different positions.

In the applications presented in the figures to the elevator in accordance with the invention belong the casing 6 attached to the vehicle 1, the partly inside the casing in regard of it and the vehicle movably attached shaft 3, the on the one end of the shaft attached elevator frame 2 and the power unit 4 for moving of the shaft. The elevator frame is a platformlike device, which in this application is formed of two to each other attached parts, which can be turned on top of each other supported for instance by hinges or similar. The shaft is an elongated bar, the upper end 7 of which is inside the casing. Inside the casing above the shaft is a hydraulic cylinder acting as the power unit, which is arranged to move the shaft in the height direction. The control element of the shaft is formed by the grooves 5, 5a made in the casing and the pin 8 attached to the shaft, which is arranged to be moved in the grooves. The movement of the shaft in the grooves is steered by a special steering part (not presented in the figures). To the elevator belongs still a clamping device for locking of the shaft in an optional position. As a clamping device a known, for the purpose suitable clamping device is used.

In the figures 3-7 the elevator frame has been presented in different positions and the corresponding positions of the control unit. In figure 3 the elevator frame 2 is turn-

ed underneath the vehicle 1. When driving with the vehicle the elevator frame is in this position. The pin 8 is in the groove 5a. When using the elevator the shaft is moved by means of the hydraulic cylinder downwards, whereat the pin of the shaft is transferred steered by the groove 5a downwards and the shaft and the elevator frame attached thereto are turning when moving downwards at the same time steered by the groove firstly in the position presented in the figure 4 and then in the position presented in the figure 5. Finally the elevator frame is turning into the position presented in the figure 6, whereat the elevator frame is mainly entirely outside the edge of the vehicle and has been transferred on the end of its way directly downwards on the surface of the ground. When loading the vehicle the elevator frame is transferred directly upwards steered by the groove 5 into the position presented in the figure 7. After finishing the loading the elevator frame is transferred downwards and lifted upwards steered by groove 5a, whereat the elevator frame, when hoisted up, is turned underneath the vehicle.

To the elevator belong and thereto can be attached different kinds of known signal and warning devices for controlling or following of the operation of the elevator either from the cabin of the vehicle or from the side of the elevator.

The invention is not limited to the presented application, but it can vary within the frames of the patent claims.

PATENT CLAIMS

1. An elevator to be used in vehicles for hoisting of goods and people up to the level of the floor of the vehicle, to which elevator belong a casing (6) attached to the body (1) of the vehicle close to the door opening, a shaft (3) attached to the casing turnable in regards of the vehicle and in the height direction movably, a power unit (4) for moving of the shaft, an in the other end of the shaft attached elevator frame (2), which is arranged to be movable in regard of the vehicle by means of the shaft, and an inside the casing placed control element (5, 5a, 8) for steering of the movements of the shaft, c h a r a c t e r i z e d in, that the shaft is extended underneath the vehicle in its every position, the elevator frame is attached to the part of the shaft below in regard of the vehicle and arranged to be underneath the vehicle during the storage, to be turned on the side of the vehicle and to be transferred in the height direction of the vehicle during the use.

2. Elevator in accordance with the patent claim 1, c h a r a c t e r i z e d in, that to the control element belong a inside the casing movable upper end (7) of the shaft attached pin (8) and in the casing formed grooves (5, 5a), in which the pin is arranged to be moved when transferring the shaft and to steer during the transfer the movement of the shaft and the elevator shaft.

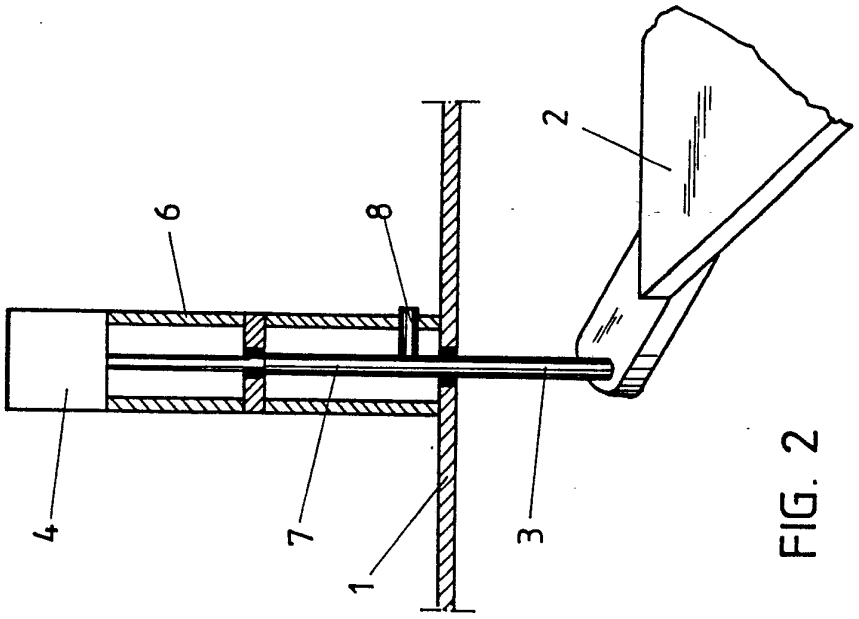


FIG. 2

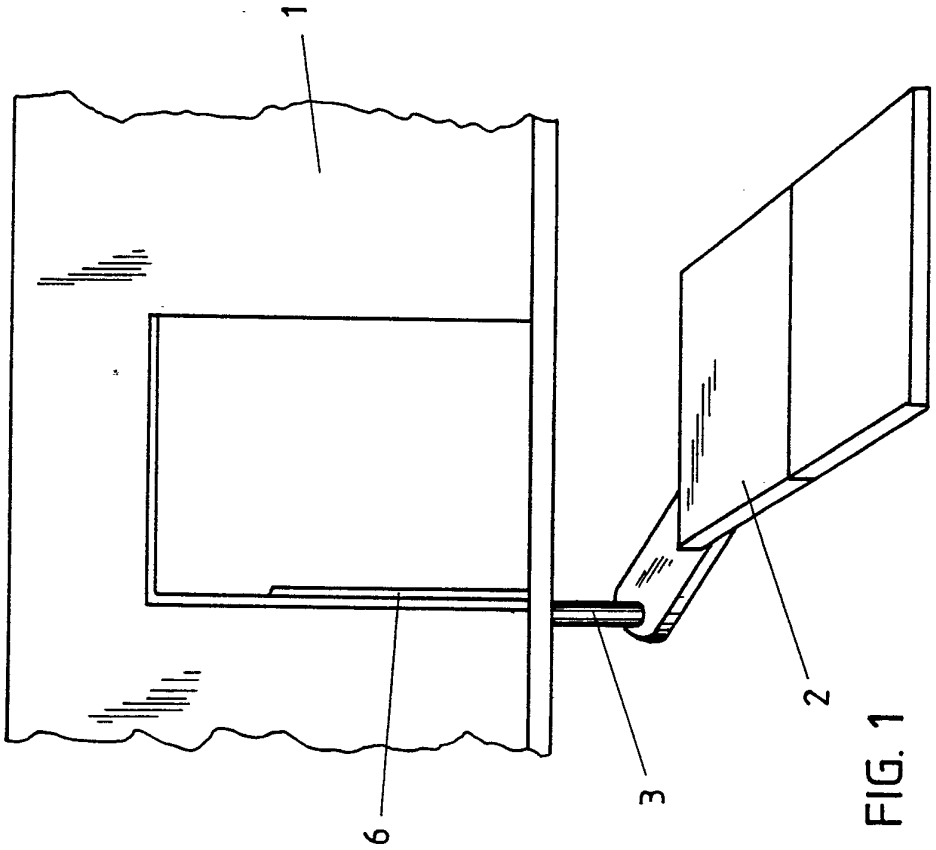


FIG. 1

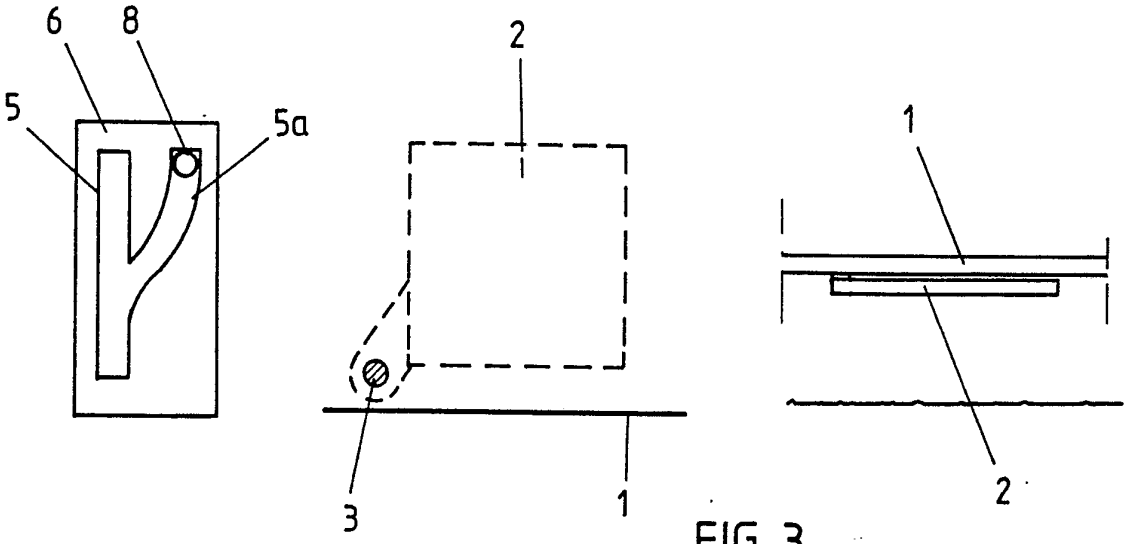


FIG. 3

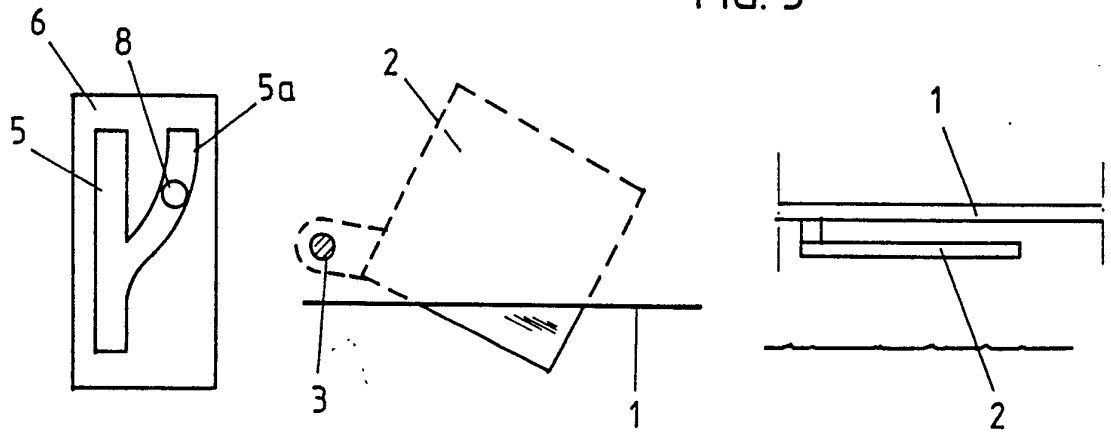


FIG. 4

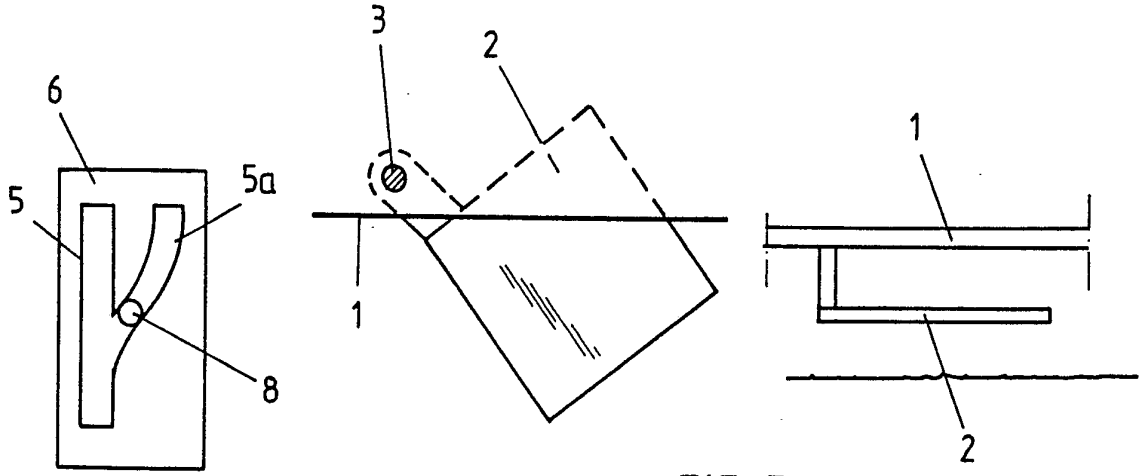


FIG. 5

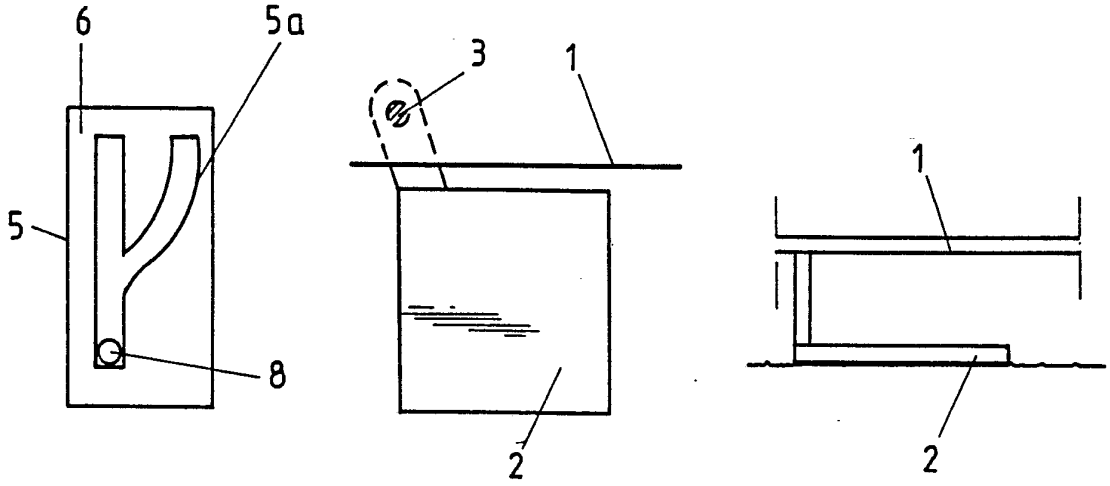


FIG. 6

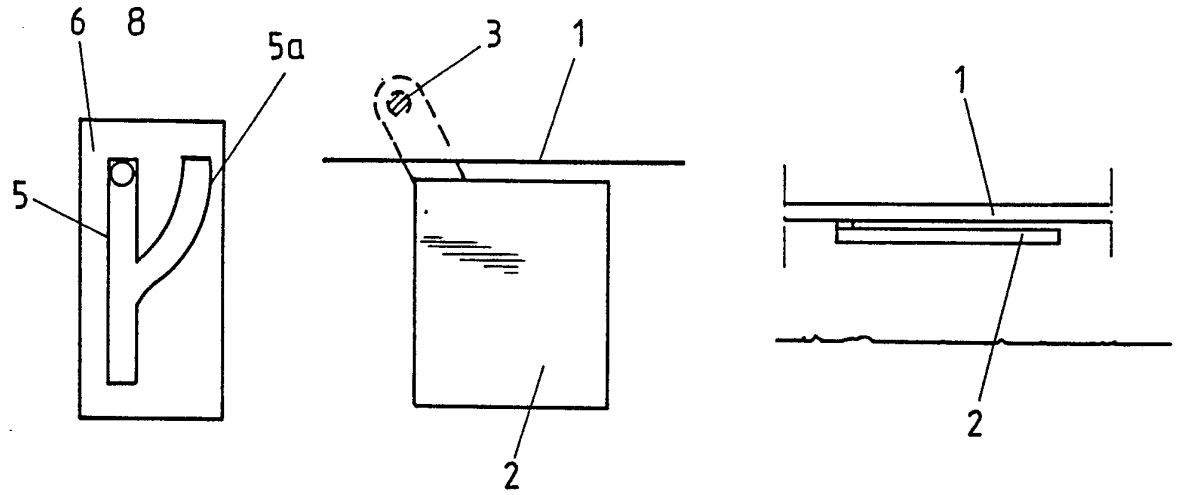


FIG. 7

INTERNATIONAL SEARCH REPORT

International Application No PCT/FI 89/00145

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 60 P 1/46, 1/44

II. FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC5	B 60 P

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched 8

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13
X	DE, A, 3132871 (BÄR, GERD) 17 March 1983, see page 19 - page 21 --	1
X	DE, A, 2816549 (NIEMANN, HENNER) 25 October 1979, see page 2 the last paragraph --	2

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* Special categories of cited documents: 10

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
28th February 1990	1990 -03- 06
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	Åke Carlsson Åke Carlsson

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. PCT/FI 89/00145

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A- 3132871Bä	17/03/83	NONE	
DE-A- 2816549	25/10/79	NONE	