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(54) **MECHANISM FOR OPERATING LIFT DOORS**

(57) A mechanism for operating telescopic lift doors which has two carriages (2, 3) which can be moved on corresponding rails (8, 9), one high-speed rail (8) and another low-speed rail (9). The high-speed carriage (2) is moved by an operating motor, and the low-speed carriage (3) is moved by means of a cable (12) which runs over two pulleys (11) mounted on the low-speed carriage

(3), said cable (12) being prevented from moving and being connected to the high-speed carriage (2). The mechanism has a profile (1) which forms two rails (8, 9) situated at different heights for the carriages (2, 3); first rolling elements (4) of the high-speed carriage (2) move on the upper rail (8), while second rolling elements (5) of the low-speed carriage (3) move along the lower rail (9).

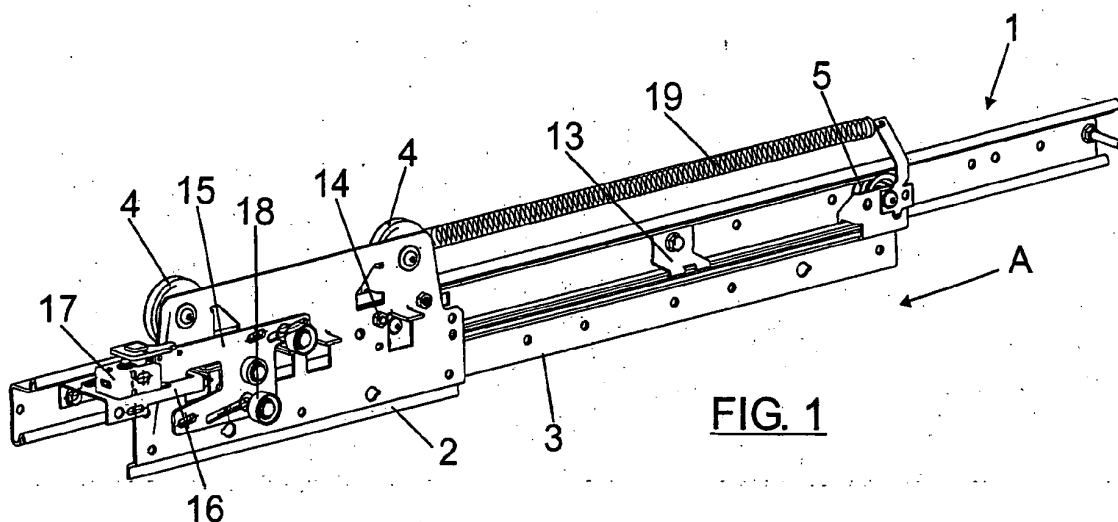


FIG. 1

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Description

Field of the Invention

[0001] The present invention relates to a mechanism for operating telescopic lift doors and more specifically for operating lift doors including two leaves which can be moved at different speeds, one leaf which will be called a low-speed leaf and the other leaf a high-speed leaf.

[0002] In the mechanisms for the purpose set forth, each leaf is suspended from a carriage, a high-speed carriage and another low-speed carriage, which have rolling elements for their movement along corresponding rails. For the movement of the doors the high-speed carriage is usually linked to an operating motor, whereas the low-speed carriage is linked to the high-speed carriage by means of a transmission cable which is mounted around two pulleys mounted on the low-speed carriage, the cable of which is connected to the high-speed carriage and is furthermore prevented from moving longitudinally, for which it is connected to a fixed point of the mechanism.

Background of the Invention

[0003] Mechanisms for operating telescopic lift doors are described for example in patent documents US 4073034, ES 2071772, US 5060763, EP 1176113, and EP 1621510.

[0004] In all these cases, the rolling elements of the carriages of the high- and low-speed doors roll or move along one and the same rail which requires that the rolling elements of both carriages are separated a distance equal to at least the movement of said elements along the rail.

[0005] In patent ES 2071772 the rolling elements of the low-speed door are separated along the rail a distance greater than the rolling elements of the high-speed door, these rolling elements of the high-speed door being located between the rolling elements of the low-speed door.

[0006] A similar arrangement is given in ES 2064645, in which a special constitution of the rolling elements is described, and in US 560763, with a content similar to ES 2071772.

[0007] Patent EP 1176113 describes a profile defining a single rail for the carriages of the high- and low-speed doors as well as a special constitution of said carriages.

[0008] Similarly, patent EP 1621510 describes a modular system for opening automatic lift doors, in which the wheels of the two doors run over one and the same rail, the rolling elements of the high-speed door being located between the rolling elements of the low-speed door.

[0009] In summary, in all the analyzed cases the wheels of the high- and low-speed carriages run over one and the same rail. As the corresponding doors must, in the open position, be located one in front of the other, the carriages must provide means for suspending the

doors located in different planes and the corresponding doors are also located in different planes whereas the means for supporting the doors on the rail, the rolling elements, are aligned in both doors. This circumstance causes a high overturning moment in at least one of the doors, which requires having compensation means constantly maintaining the doors in a vertical position.

Description of the Invention

[0010] The object of the present invention is to eliminate the problems set forth by means of a mechanism in which the rolling elements of each door move on different rails within one and the same profile, such that there is no risk of interference between the rolling elements of both doors.

[0011] Another object of the invention is to achieve a mechanism in which the means for suspending each door can be located in the same vertical plane as the corresponding rolling elements, whereby the overturning moment of the doors is eliminated or considerably reduced.

[0012] As has been indicated, in the mechanism of the invention each suspension carriage runs over a different rail. Since the door is formed by two leaves, each one with its corresponding carriage, one high-speed carriage and another low-speed carriage, there will be two rails, which are formed in one and the same profile. The two rails are located at different heights, the rolling elements of the high-speed carriage moving along the upper rail, whereas the rolling elements of the low-speed carriage move along the lower rail.

[0013] The profile forming the two mentioned rails further defines a roller path for a counter-roller, which is mounted or supported by the high-speed carriage. The same profile also defines an auxiliary roller track which is parallel to the rail of the low-speed carriage and is located above the rolling elements of said carriage, close to such rolling elements, for the purpose of preventing the pitching of the carriage and of the door along the rail.

[0014] The rolling elements of the low-speed carriage form coaxial pulleys, over which the transmission cable for operating said carriage runs.

[0015] The two rails will be preferably located in different vertical planes, the upper rail on which the high-speed carriage slides being located towards the outside of the cabin with respect to the position of the lower rail. The leaves can thus be located in planes coinciding with the position of the rolling elements of each door, the overturning moment thus being eliminated or reduced.

[0016] The profile from which the two rails for the high- and low-speed carriages are obtained has a C-shaped section and has the side branches with a different width, both being finished in respective longitudinal bends forming as many other inverted grooves which are raised on the convex side with respect to the corresponding branches. These bends or grooves determine, on the upper or outer surface, i.e., on the convex side, the two rails for the high- and low-speed carriages. The bend of

the upper branch further defines on the concave side the roller path for the counter-roller.

[0017] In other words, the rails for the rolling elements of the high- and low-speed carriage, the roller path for an anti-overturn roller and also an auxiliary roller track, on which the rolling elements of the low-speed carriage can be supported at the upper part in order to prevent the pitching of said carriage and of the corresponding door along the rail, are formed with a simple section profile.

[0018] Apart from that, the mechanism of the invention will include the traditional elements or components of these mechanisms, such as an electric safety contact, a lock catch, an unlocking roller or pulley-wheel, a closing spring for the case of manual opening, etc.

Brief Description of the Drawings

[0019] The constitution, features and advantages of the mechanism of the invention will be better understood with the following description made with the aid of the attached drawings, in which a non-limiting embodiment is shown and in which:

Figure 1 is a perspective view of the mechanism of the invention.

Figure 2 is a profile view of the mechanism according to direction A of Figure 1.

Figure 3 is a perspective view of the low-speed carriage with the movement means thereof.

Figure 4 is a frontal elevational view of the mechanism of the invention with the leaves mounted in an open position.

Figure 5 is a perspective view of the mounted mechanism of the invention, with the leaves in a closed position.

Detailed Description of an Embodiment

[0020] Figures 1 and 2 show the mechanism for operating telescopic lift doors, formed according to the invention, which comprises a profile 1 on which the high-speed carriage 2 and the low-speed carriage 3 move by means of the corresponding rolling elements, formed by two pulley-wheels 4 for the high-speed carriage and as many other pulley-wheels 5 for the low-speed carriage 3.

[0021] As can be better observed in Figure 2, the profile 1 has a C-shaped section, the side branches 6 and 7 of which have a different width, both being finished in as many other longitudinal bends 8 and 9 forming inverted grooves projecting at the upper part with respect to the corresponding branch. The bend or groove 9 of the narrower branch 7 forms on its convex surface the roller track of the wheels or pulley-wheels 5 of the low-speed carriage 3. The bend or groove 8 of the narrower branch 6 in turn configures on its convex surface the rail for the wheels or pulley-wheels 4 of the high-speed carriage 2.

[0022] As can be seen in Figure 2, since the branch 6

is wider, the rail 8 and the rolling elements 4 of the high-speed carriage 2 are moved towards the outside of the door with respect to the position of the pulley-wheels 5 and low-speed carriage 3.

[0023] With this configuration, the high-speed leaf, which is suspended from the carriage 2, can be in the same vertical plane as the pulley-wheel or rolling element 4 of the carriage 2. Similarly, the low-speed leaf, suspended from the carriage 3, can be located in the same vertical plane as the corresponding pulley-wheel or rolling element 5.

[0024] Both the low-speed leaf and the high-speed leaf can thus be located in the same vertical plane as the corresponding rolling elements, whereby eliminating or reducing the overturning moment of these doors. Despite this possibility, the high-speed carriage 2 can have mounted thereon a counter-roller or anti-overturn roller 10 which is introduced on the concave surface of the bend or groove 8, thus configuring a track where the counter-roller or anti-overturn roller 10 would strike in the event of pitching in order to prevent derailing.

[0025] The side branch 6 which is wider than the profile 1 is located close to the surface of the pulley-wheel or rolling element 5 of the low-speed carriage 3, such that it is used as an auxiliary roller track on which the pulley-wheels or rolling elements 5 will be occasionally supported for preventing the pitching of the carriage 3 and corresponding door along the rail 9.

[0026] As can also be seen in Figure 2, each of the rolling elements 5 of the low-speed carriage 3 form a pulley 11 which is moved towards the outside with respect to the rail 9. A transmission cable 12 is mounted from the pulleys 11 of the two pulley-wheels or rolling elements 5, which cable is anchored to the profile 1 by means of a plate 13, as shown in Figures 1 and 3, such that it is prevented from moving longitudinally. The cable 12 is furthermore connected to the high-speed carriage 2, for example by means of a pin 14 with a threaded end for its fixing to the carriage 2.

[0027] As is usual in these types of mechanisms, the carriage of the invention 2 carries a locking catch 15, lockable in the housing 16, integral to the profile 1, and which carries an electric safety contact 17. The catch 15 also carries an unlocking pulley-wheel 18. The low-speed carriage 3 is connected to the structure of the door by means of a spring 19 which is used as a closing element for the case of manually opening the doors.

[0028] Figure 4 shows the leaves in an open position, in which the high-speed leaf is superimposed with the low-speed leaf. The two leaves are moved with their corresponding carriages out of the gap 21 for accessing the cabin of the lift. Upon closing the leaves, as shown in Figure 5, the carriages 2 and 3 are moved towards the left, with the locking catch 15 inside the corresponding housing 16, the high- and low-speed leaves 20 and 22 closing the gap 21 for accessing the cabin of the lift.

[0029] In order to move the leaves, the high-speed carriage 2 is operated by means of a motor and the high-

speed carriage 2 transmits the movement to the low-speed carriage 3 through the cable 12 which, since it is connected to the high-speed carriage 2 by means of the pin 14 and is prevented from moving longitudinally by the anchoring plate 13, causes the movement of the carriage 3 at a speed equal to half the movement speed of the carriage 2.

Claims

1. A mechanism for operating telescopic lift doors comprising two carriages (2, 3) which can be moved on corresponding rails (8, 9), one high-speed rail (8) and another low-speed rail (9), the high-speed carriage (2) of which is moved from an operating motor, and the low-speed carriage (3) of which is moved through a cable (12) running over two pulleys (11) mounted on the low-speed carriage (3), said cable (12) being prevented from moving and connected to the high-speed carriage (2), **characterized in that** it comprises a profile (1) forming two rails (8, 9) located at different heights for the mentioned carriages (2, 3), on the upper rail (8) of which first rolling elements (4) of the high-speed carriage (2) move, whereas second rolling elements (5) of the low-speed carriage (3) move along the lower rail (9); and **in that** the mentioned profile (1) defines a first auxiliary track opposite the upper rail (8) and separated a free space from an anti-overturn roller (10), said anti-overturn roller (10) being supported by the high-speed carriage (2), said first auxiliary track being configured to be used as accidental upper support means for supporting the anti-overturn roller (10) for preventing a pitching of the high-speed carriage (2) along the upper rail (8); and a second auxiliary track (6) which is parallel to the rail (9) and is located immediately above the second rolling elements (5), to be used as accidental upper support means for supporting the second rolling elements (5) for preventing a pitching of the low-speed carriage (3) along the lower rail (9).
2. The mechanism of claim 1, **characterized in that** the second rolling elements (5) of the low-speed carriage (3) form pulleys (11) over which the transmission cable (12) for operating the low-speed carriage (3) runs.
3. The mechanism of claim 1, **characterized in that** the two rails (8, 9) are located in different, planes, the upper rail (8), on which the high-speed carriage (2) slides, being located towards the outside of a cabin of a lift with respect to the position of the lower rail (9).
4. The mechanism of claim 1, **characterized in that** the profile (1) forming the two rails (8, 9) has a C-

shaped section and has side branches (6, 7) with a different width located in a horizontal position and finished in respective longitudinal bends forming raised and inverted grooves with respect to said branches, said grooves determining on an upper convex-curved surface the two rails (8, 9), the bend of the upper branch (6) further defining on its concave side a free space configured for being covered by the anti-overturn roller (10).

5. The mechanism of claim 2, **characterized in that** the pulleys (11) for the transmission cable (12) are formed by a gorge formed in each rolling element (5) of the low-speed carriage (3), the gorge of which is parallel to the rolling surface of the rolling element and is located axially outside said rolling surface.

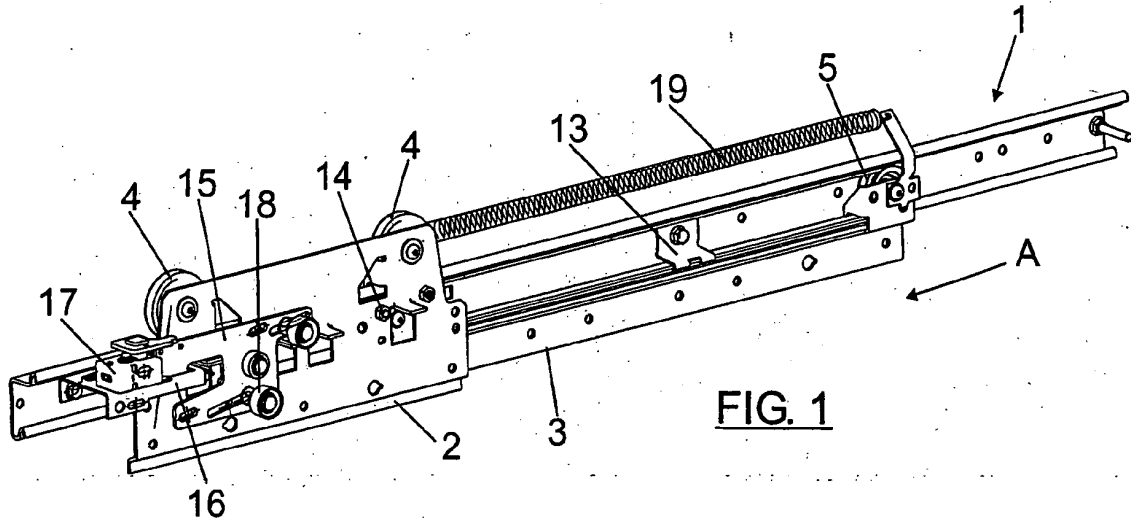


FIG. 1

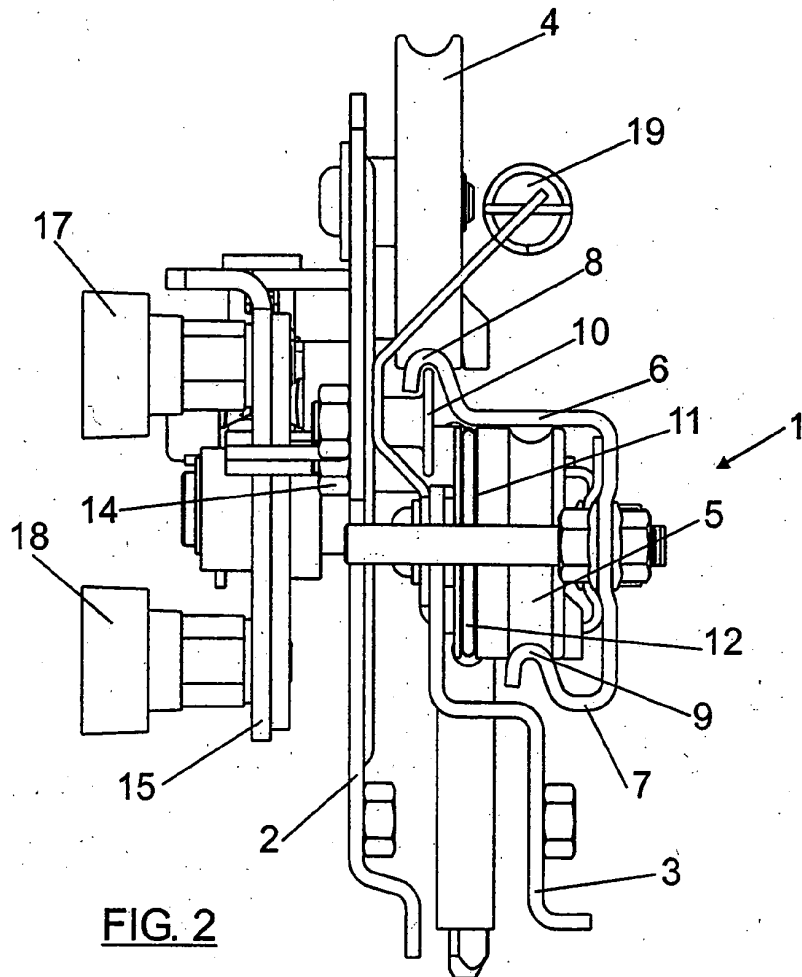


FIG. 2

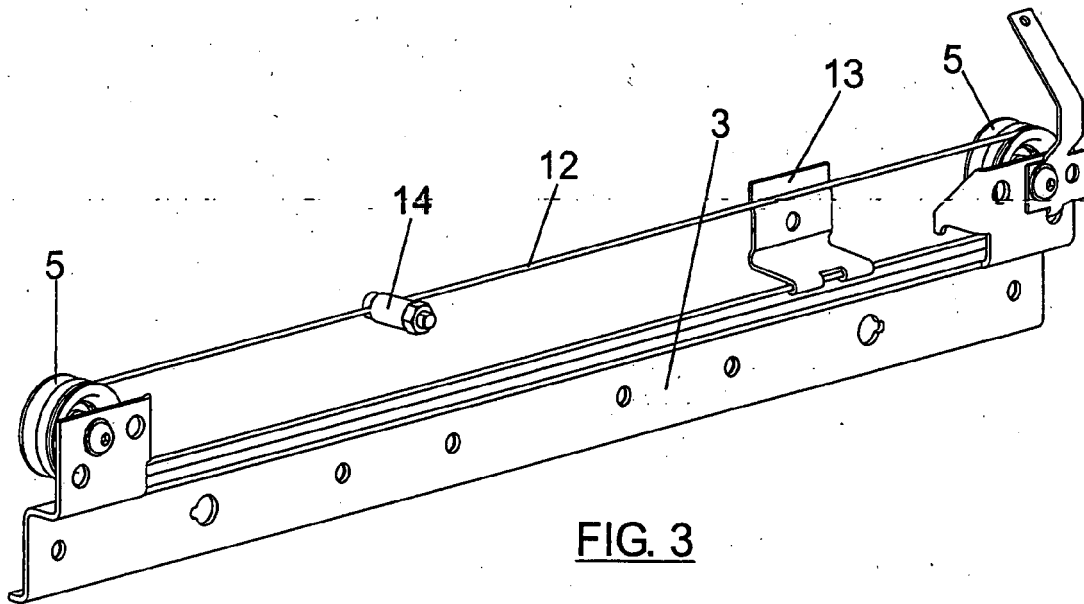
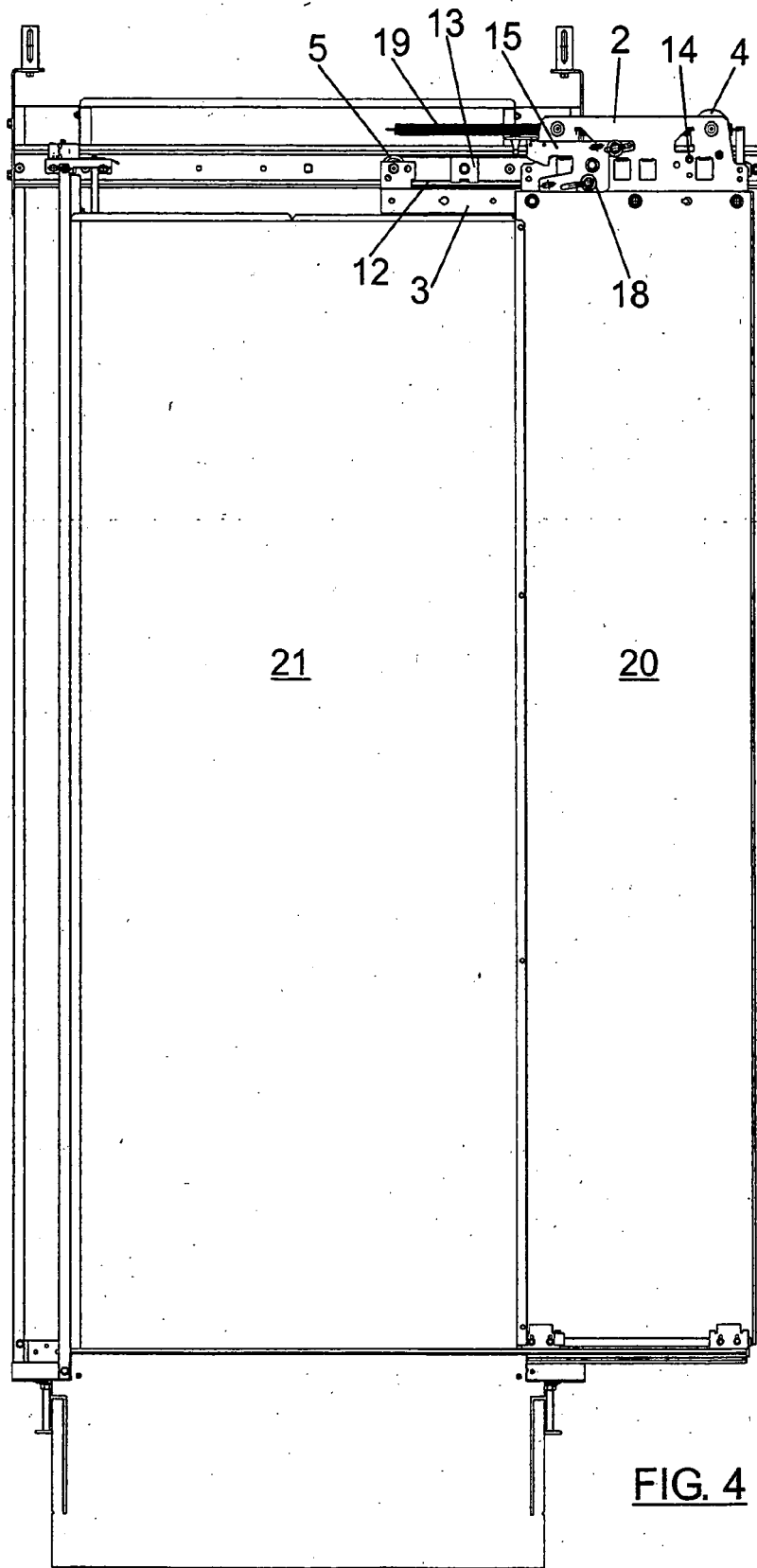


FIG. 3



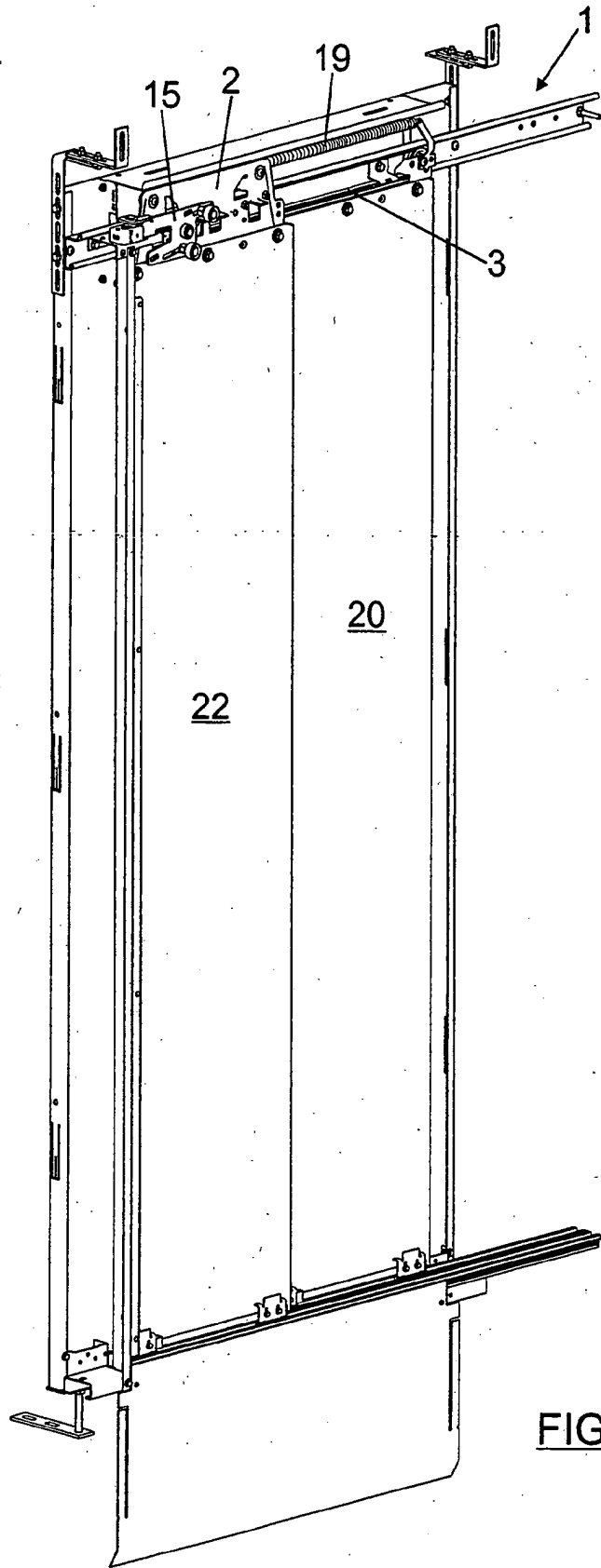


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 2006/000521

A. CLASSIFICATION OF SUBJECT MATTER				
<i>B66B 13/08</i> (2006.01)				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) B66B13/+, B66B11/+,E05D15/+				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CIBEPAT,EPODOC,WPI				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
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A		4		
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A	US 4073034 A (DOVER CORP) 14.02.1978, the whole document.	1		
A	EP 1621510 A2 (AUTUER S A) 01.02.2006, the whole document.	1		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
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Date of the actual completion of the international search 28.February.2007 (28.02.2007)		Date of mailing of the international search report (24/04/2007)		
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304		Authorized officer F. J. Riesco Ruiz Telephone No. +34 91 349 68 69		

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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