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(54) DERAILMENT- AND UNCOUPLING-PREVENTION SAFETY SYSTEM COMPRISING CORRESPONDING GUIDES FOR SLIDING DOORS AND SIMILAR

(57) The invention relates to an anti-lift and anti-derailing safety system with its respective guides for sliding doors and the like comprising an anti-lift assembly (1), an anti-derailing assembly (2) and at least one rolling carriage, the anti-lift assembly (1) of which comprises a first sliding guide rail (3) and a first sliding device comprising in turn a first casing (4) and a first sliding element (5), and the anti-derailing assembly (2) of which comprises a second sliding guide rail (15) and a second sliding device comprising in turn a second casing (16) and a second sliding element (17) and fixing means between said second casing (16) and said second sliding element (17). The first sliding element (5) has an end flap (14) surpassing the lower part of the first casing (4) and configured so that the first sliding element (5) cannot be removed from the first casing (4) during the sliding of the door (6), and the anti-derailing assembly (2) is independent of the rolling carriage, acting before said rolling carriage during the sliding of the door (6).

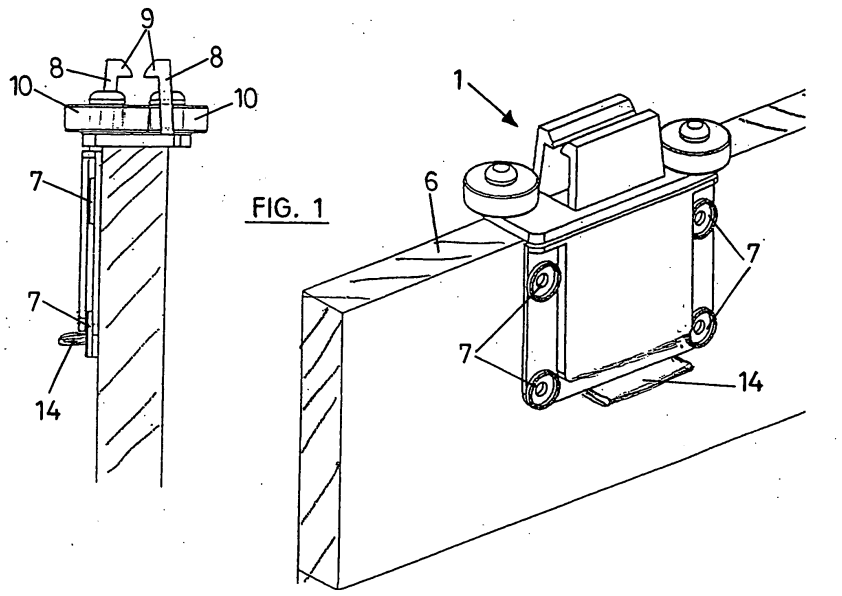


FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention is included within the safety elements applied to slide systems applied for example to doors or the like, and more specifically to an anti-lift and anti-derailing safety system with its respective guides for sliding doors and the like.

BACKGROUND OF THE INVENTION

[0002] Sliding devices for sliding doors are currently known. In the case of sliding systems placed in the upper part of the door, they are normally metal fittings placed in the door for its guiding and to allow its movement with respect to a guide which is fixed to the frame of the door. Document ES1018799U describes a sliding device placed in the upper part of a sliding sheet comprising a metal plate defining two orthogonal surfaces for supporting respective panels, having at its upper part two opposing vertical bolts in which two opposing wheels having a frusto-conical configuration are located, which wheels form the sliding means when they rest on the edges of the corresponding guide rail and allow locating the passage of the door on the inside of the guide rail at a certain distance or height thanks to the flaps of the rail itself and provide a fixed position to prevent the friction of the side profiles of the door or of the door itself. With the particular configuration of this device and in the event that the door should suddenly fall during its movement along the guide rail, the mentioned wheels lose contact with said guide rail and the door comes off the latter, the derailing of the door occurring.

[0003] Document ES1012194U describes an anti-derailing guide part for sliding doors which is coupled on one of the side flaps of the sliding roller of the door, said guide part being provided at its upper part with an opening in the form of a window to be fixed to the sliding carriage and with an upper groove in which a screw is assembled and which allows varying the fixing height. The guide part has a flange which is coupled in a complementary flange arranged on the sliding rail so that the derailing of the door is thus prevented. This system must be fixed to the sliding carriage, i.e. in the event that said carriage is damaged, it would be necessary to change the entire part and not just the carriage.

[0004] Document ES1023635U describes an anti-derailing device for sliding leaves arranged in the lower part of the door and resting on wheels the height of which can be adjusted and which run along rails embedded in the floor, the device consists of an inverted U-shaped part enveloping the wheel and provided with side stops to prevent the part from sliding sideways, it further has at its lower part fingers fitting into the base profile in order to maintain the wheel joined thereto and prevent the vertical movement thereof and therefore the derailing. As occurred previously in this case, the device is fixed to the sliding carriage itself, i.e. in the event that said carriage is damaged, it would be necessary to change the entire part and not just the carriage, in addition to assembling the device on the door, an additional part serving to secure the device is necessary, which additional part is in turn fixed to the door..

[0005] Document ES2115243 describes an sliding system sliding on two parallel guides and formed by a frame and a part in the form of a box open at its lower base in which a sliding drawer is assembled with respect to the box, said drawer incorporating rolling means and means for adjusting the distance between the box and the drawer. The box has at its front part legs serving as a stop for the movement of the drawer with respect to the box, to that end the drawer has a pair of projections acting as a stop with the mentioned legs. As in the previous cases, this system is directly associated with the sliding means.

[0006] Finally document ES 242289U describes a sliding system for a sliding door comprising a box part arranged on the upper part of the door inside which a sheave-holding part is assembled, the system further has means for adjusting the height between both parts. A pair of sheaves is arranged one after the other with parallel axes of rotation in the sheave-holder. The system further has elastic means materialized in the form of respective springs arranged between the sheave-holder and the lower base of the box part. The described system is directly joined to the sliding means. Since this system is assembled on the upper edge of the door, the derailing of the door is not satisfactorily prevented because since the springs work under compression, if there is an obstacle on the guide during the movement of the door, when the wheel passes over said obstacle, it would lose contact with the mentioned rail and the derailing would occur, making the door fall due to the action of gravity, the falling distance being greater than the flaps of the rail of the upper part where the door is housed, the upper sliding device being in the air and the door falling and possibly hurting the user.

[0007] For all of that set forth, the need has been detected to provide an anti-lift and anti-derailing safety system effectively achieving that the door does not derail or lift during its movement on the corresponding guides, the anti-derailing assembly being completely independent of the sliding means.

DESCRIPTION OF THE INVENTION

[0008] The present invention therefore relates to an anti-lift and anti-derailing safety system with its respective guides for sliding doors and the like comprising either an anti-lift assembly or an anti-derailing assembly, or both simultaneously, and at least one rolling carriage, the anti-lift assembly of which comprises a first sliding guide rail and a first sliding device comprising in turn a first casing and a first sliding element with the possibility of relative sliding with respect to the first casing in a sub-

stantially vertical direction and having sliding means on the first guide rail, and the anti-derailing assembly of which comprises a second sliding guide rail and a second sliding device comprising in turn a second casing and a second sliding element with the possibility of relative sliding with respect to the second casing in a substantially vertical direction, and having second sliding means on the second sliding guide rail and fixing means between said second casing and said second sliding element.

[0009] The system is characterized in that the first sliding element has an end flap surpassing the lower part of the first casing and configured so that once said first sliding element has been introduced in the first casing, it cannot be removed therefrom during the sliding of the door, preventing the lifting of the first sliding device and therefore of the door with respect to the first guide rail, and in that the anti-derailing assembly is independent of the rolling carriage, acting before said rolling carriage during the sliding of the door.

[0010] In this way, it is achieved that the door is not lifted in the event of encountering an obstacle during its movement because thanks to the mentioned end flap arranged on the first sliding element, the existence of a certain freedom in the vertical movement between said first sliding element and the first casing is allowed, the vertical movement caused by the obstacle being able to be absorbed both if the latter is on the first guide rail or on the second guide rail.

[0011] The particular configuration of the first sliding means together with the configuration of the first guide rail makes the door remain safely hanged at all times without any lifting being able to occur during its movement.

[0012] On the other hand, since the anti-derailing assembly assembled on the door is independent of the corresponding rolling carriage and given the particular configuration of the second sliding means and of the second guide rail, it is achieved that the door does not derail if there is an obstacle during its movement, because the anti-derailing assembly acts independently of the rolling carriage and its behavior in view of a possible derailing is optimal.

[0013] The anti-lift assembly is normally fixed to the upper edge of the door and the anti-derailing assembly is fixed to the lower edge of the door, being able to independently assemble one or the other or both simultaneously on the same door.

[0014] The fixing means of the second sliding device consist of a threaded housing in the second casing and a channel in the second sliding element arranged according to the direction of the relative movement between both, configured so as to allow fixing the relative height of the door with respect to the second sliding guide rail.

[0015] In this way, the adjustment of the positioning of the door with respect to the first and second guide rails is achieved, which allows preventing many derailments. The door can move vertically in a sufficient magnitude so as to go over the obstacle but it is always restricted so that the derailment does not occur, this being achieved thanks to the end flap acting as a stop arranged on the first actuation means, which flap allows a certain vertical freedom between the door and the first and second guide rail with the possibility of adjusting said magnitude thanks to the fixing means.

[0016] The first guide rail has at least one arrow-shaped projection configured so as to be coupled, with the possibility of sliding, in the sliding means of the first sliding element, which means consist of two parallel flanges with inner projections arranged in the mentioned first sliding element ,retaining the mentioned projections. In this way, it is achieved that the anti-lift assembly is safer and works in an optimal manner because the retention achieved by the mentioned flanges on the arrow-shaped projection prevents the lifting of the door in the event that there is an obstacle during the movement of the door.

[0017] The second sliding guide rail has at least one semicircular projection configured to be coupled, with the possibility of sliding, in the sliding means of the second sliding element, which means consist of two parallel flanges with inner projections arranged in the mentioned second sliding element, retaining the mentioned projections. In this way, it is achieved that the anti-derailing assembly is connected at all times to the second guide rail during the sliding of the door. The rounded shape of the projection further facilitates the sliding at the same time that it serves as a surface for depositing the accumulated dirt.

[0018] The system can have at least one anti-lift assembly for each door, two assemblies normally being used.

[0019] Cleaning felt strips for the second sliding guide rail are incorporated in the sliding means of the second sliding element, said cleaning felt strips are located between the flanges forming the sliding means of the second sliding element, being fixed thereto thanks to a notch or the like and adapting their shape to the shape of the semicircular projection which the second sliding guide rail has. Said cleaning felt strips are responsible for sweeping away the dirt deposited on the semicircular projection when the door is moving, such that it is achieved that the sliding of the door on the second rail is smoother and there are no derailments due to an excessive accumulation of dirt.

[0020] The sliding means of the first element further comprise at least two opposing asymmetric roller guides separated by a distance such that they allow the passage of the first sliding guide rail in a tight manner, preventing the door from rubbing against said first sliding guide rail.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] A series of drawings which aid in better understanding the invention and expressly related with several embodiments of said invention set forth as illustrative and non-limiting examples thereof are very briefly described

below.

Figure 1 shows a perspective view and a side view of the anti-lift assembly forming the safety system object of the present invention.

Figure 2 shows a perspective view and a side view of the anti-derailing assembly forming the safety system object of the present invention.

Figure 3 shows an exploded perspective view of the first sliding device of the anti-lift assembly.

Figure 4 shows a perspective view and a sectional view of the first sliding guide rail.

Figure 5 shows an exploded perspective view of the second sliding device of the anti-derailing assembly.

Figure 6 shows a sectional view of the second sliding guide rail.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

[0022] The anti-lift and anti-derailing safety system with its respective guides for sliding doors and the like comprises either an anti-lift assembly 1 or an anti-derailing assembly 2, or both simultaneously, and at least a rolling carriage (not shown in the Figure) which is located immediately behind the anti-derailing assembly 2.

[0023] As can be observed in Figures 1 and 3, the anti-lift assembly 1 comprises a first sliding guide rail 3 and a first sliding device comprising a first casing 4 and a first sliding element 5.

[0024] For this embodiment of the invention, the first casing 4 is fixed to the door 6, specifically to one of the faces of the door, near its upper edge by means of through holes 7 in each of which a screw (not shown) is located. The first sliding element 5 consists in turn of an approximately Z-shaped flat bar, being able to slide with respect to the first casing 4 in a vertical direction. Said first sliding element 5 has sliding means enabling the movement of the door 6 with respect to the first sliding guide rail 3. The mentioned sliding means consist of the arrangement in the upper branch of the first sliding element of a pair of parallel flanges 8 provided with respective ribs 9 in an internal direction, complemented with at least two roller guides 10 arranged on both sides of the mentioned flanges, which roller guides are asymmetric and opposing and separated by a distance such that they allow the passage of the first sliding guide rail 3 in a tight manner, preventing the door from rubbing against said first sliding guide rail.

[0025] The first sliding guide rail 3 has at least one arrow-shaped projection 11 which starting from the bottom of the rail is parallel to the side walls thereof. In this preferred embodiment of the invention, the first sliding guide rail 3 has two side walls 12 and a central partition 13, Figure 4, defining two spaces between which the mentioned projections 11 are arranged.

[0026] The ribs 9 of the sliding means of the first sliding element 5 are coupled to the wings of the arrow of the projection 11, the retention of said first sliding element in the first sliding guide rail 3 is thus achieved.

[0027] The first sliding element 5 further has a lower branch by way of an end flap 14 surpassing the lower part of the first casing 4, the first sliding element 5 not being able to be removed from the first casing 4 once the anti-lift assembly 1 is assembled on the door 6.

[0028] With this configuration, the first sliding element 5 moves vertically with respect to the first casing 4, the mentioned end flap 14 serving as a stop, defining a certain freedom in the vertical movement of the door 6 so as to absorb the movements thereof in the event that there is an obstacle during its movement.

[0029] For its part and as can be observed in Figures 2 and 5, the anti-derailing assembly 2 comprises a second sliding guide rail 15 and a second sliding device comprising a second casing 16 and a second sliding element 17.

[0030] For this embodiment of the invention, the second casing 16 is fixed to the door 6, specifically to the one of the faces of the door, near its lower edge by means of a plurality of through holes 18 in each of which a screw (not shown) is located.

[0031] The second sliding element 17 consists of an approximately rectangular body, being able to slide with respect to the second casing 16 in a vertical direction, to that end the second casing 16 has respective side partitions 19 in the union of which to the mentioned body there are notches 20 in which respective projections 21 defined in the second sliding element 17 are fitted, which projections allow the mentioned relative movement between the second sliding element 17 and the second casing 16.

[0032] The second sliding element 17 has sliding means enabling the movement of the door 6 with respect to the second sliding guide rail 15. The mentioned sliding means consist of arranging a pair of parallel flanges 28 provided with respective inner ribs 22 in the lower part of the body forming the second sliding element 17.

[0033] The second sliding guide rail 15 has at least one projection 23 starting from the bottom of the rail and parallel to the side walls thereof and having a semicircular rounded end.

[0034] As can be observed in Figure 6, in this preferred embodiment of the invention the second sliding guide rail 17 has two side walls 24 bent inwardly and a T-shaped central partition 25, the mentioned projections are arranged above one of the side walls 24 and the central partition 25.

[0035] The inner ribs 22 of the sliding means of the second sliding element 17 are coupled to the projections 23, the retention of the second sliding element 17 in the second sliding guide rail 15 being achieved.

[0036] The second sliding device has fixing means consisting of a threaded housing 27 in the second casing 16 and a channel 26 made in the second sliding element 17, the latter being arranged according to the direction of the relative movement between both, allowing to fix

the relative height of the door 6 with respect to the second sliding guide rail 15 by means of a screw 30.

[0037] In this preferred embodiment of the invention, the sliding means of the second sliding element 17 incorporate cleaning felt strips 29 for the second sliding guide rail 15, said cleaning felt strips 29 are located between the flanges 28, being fixed thereto thanks to a notch or the like and adapting their shape to the shape of the projections 23 arranged in the second sliding guide rail 15.

[0038] Possible lifting and derailments of the door when it moves in its opening and closing movement are prevented thanks to the described configuration of the system.

Claims

1. An anti-lift and anti-derailing safety system with its respective guides for sliding doors and the like comprising either an anti-lift assembly (1), or an anti-derailing assembly (2), or both simultaneously, and at least one rolling carriage, the anti-lift assembly (1) of which comprises a first sliding guide rail (3) and a first sliding device comprising in turn a first casing (4) and a first sliding element (5) with the possibility of relative sliding with respect to the first casing (4) in a substantially vertical direction and having sliding means on the first sliding guide rail (3), and the anti-derailing assembly (2) of which comprises a second sliding guide rail (15) and a second sliding device comprising in turn a second casing (16) and a second sliding element (17) with the possibility of relative sliding with respect to the second casing in a substantially vertical direction, and having second sliding means on the second sliding guide rail (15) and fixing means between said second casing (16) and said second sliding element (17), **characterized in that** the first sliding element (5) has an end flap (14) surpassing the lower part of the first casing (4) and is configured so that once said first sliding element (5) has been introduced in the first casing (4), it cannot be removed therefrom during the sliding of the door (6), preventing the lifting of the first sliding device and therefore of the door (6) with respect to the first sliding guide rail (3), and **in that** the anti-derailing assembly (2) is independent of the rolling carriage, acting before said rolling carriage during the sliding of the door (6).

2. A system according to claim 1, **characterized in that** the anti-lift assembly (1) is fixed to the upper edge of the door (6) and the anti-derailing assembly (2) is fixed to the lower edge of the door (6).

3. A system according to claims 1 and 2, **characterized in that** the fixing means of the second sliding device consist of a threaded housing (27) in the second casing (16) and a channel (26) in the second sliding element (17) arranged according to the direction of the relative movement between both, configured so as to allow fixing the relative height of the door (6) with respect to the second sliding guide rail (15).

4. A system according to any of the previous claims, **characterized in that** the first sliding guide rail (3) has at least one arrow-shaped projection (11) configured to be coupled, with the possibility of sliding, in the sliding means of the first sliding element (5), which means consist of two parallel flanges (8) with inner ribs (9) arranged in the mentioned first sliding element (5), retaining the mentioned projections (11).

5. A system according to any of the previous claims, **characterized in that** the second sliding guide rail (15) has at least one semicircular projection (23) configured to be coupled, with the possibility of sliding, in the sliding means of the second sliding element (17), which means consist of two parallel flanges (28) with inner ribs (22) arranged in the mentioned second sliding element (17), retaining the mentioned projections (23).

6. A system according to any of the previous claims, **characterized in that** at least one anti-lift assembly is arranged for each door.

7. A system according to any of the previous claims, **characterized in that** cleaning felt strips (29) for the second sliding guide rail (15) are incorporated in the sliding means of the second sliding element.

8. A system according to any of the previous claims, **characterized in that** the sliding means of the first sliding element (5) further comprise at least two opposing asymmetric roller guides (10) separated by a distance such that they allow the passage of the first sliding guide rail (3) in a tight manner, preventing the door (6) from rubbing against said first sliding guide rail (3).

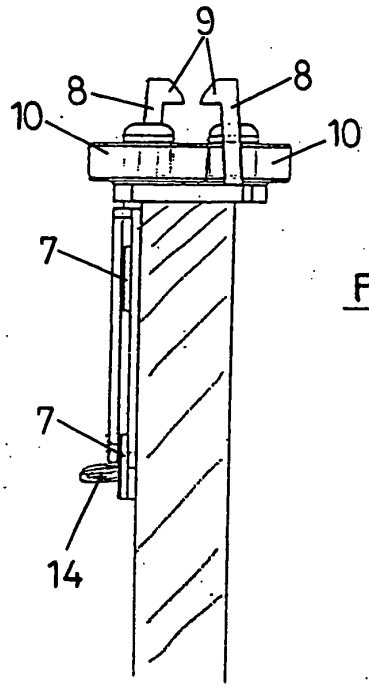
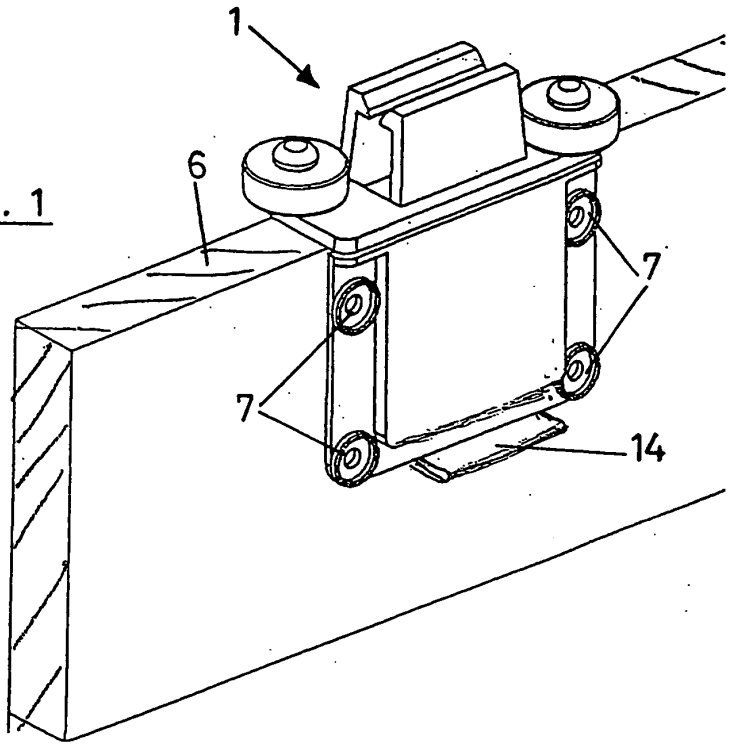


FIG. 1



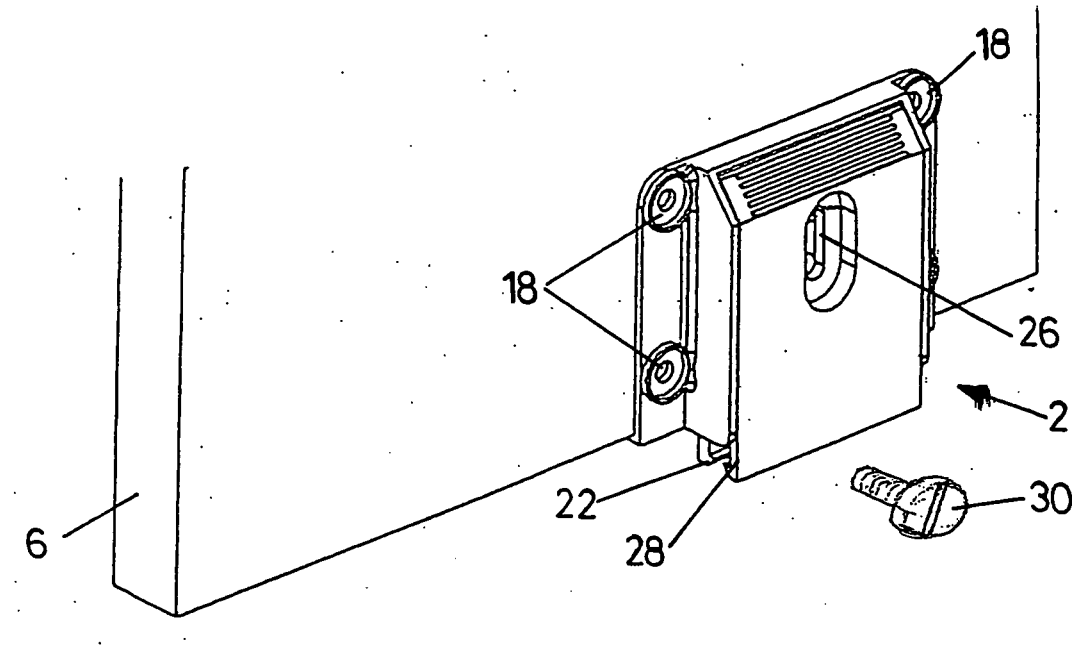
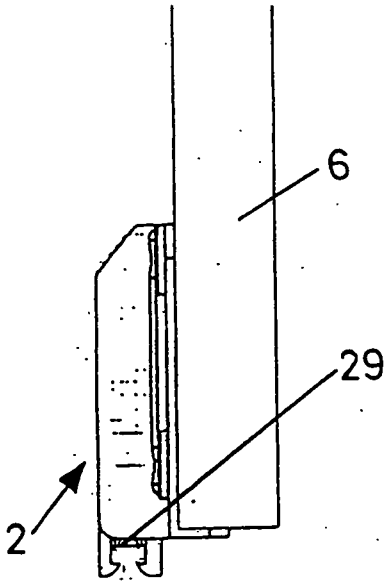


FIG. 2



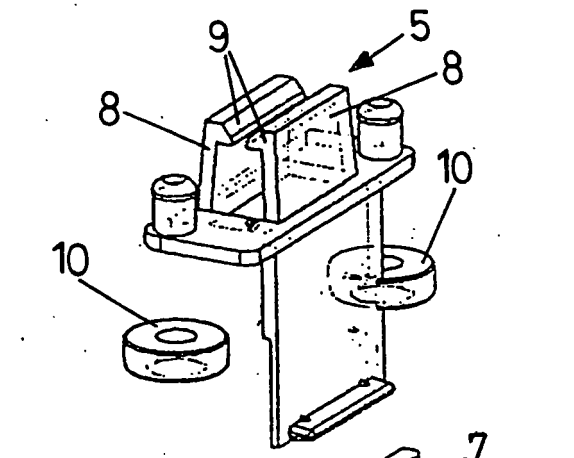
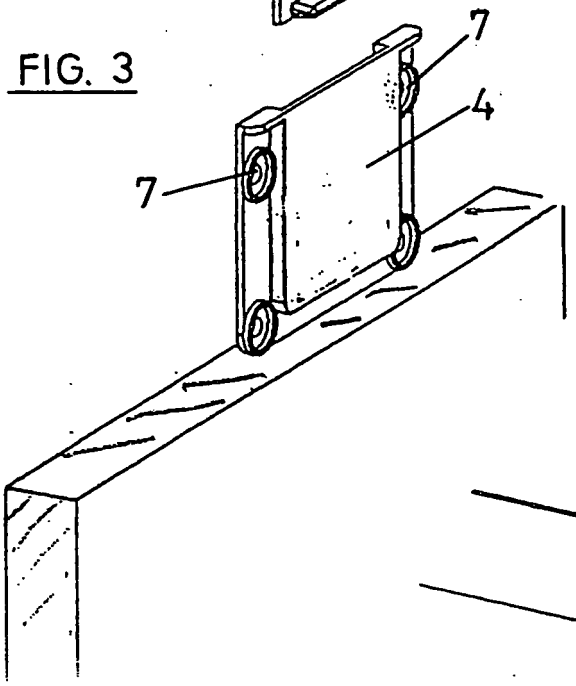


FIG. 3



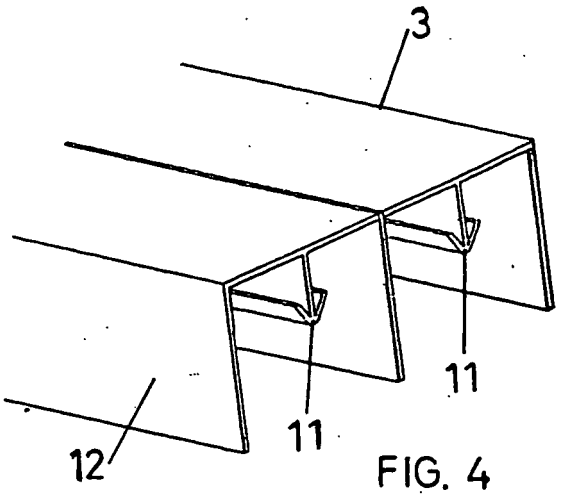
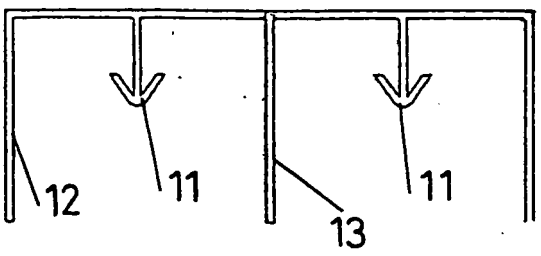


FIG. 4



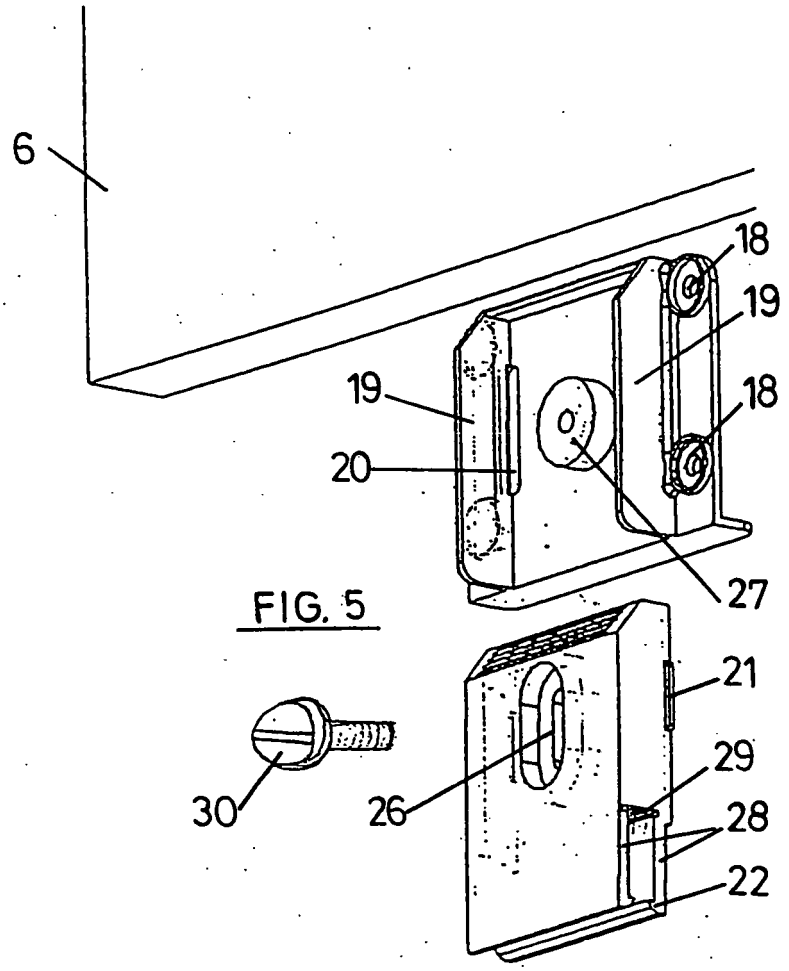


FIG. 5

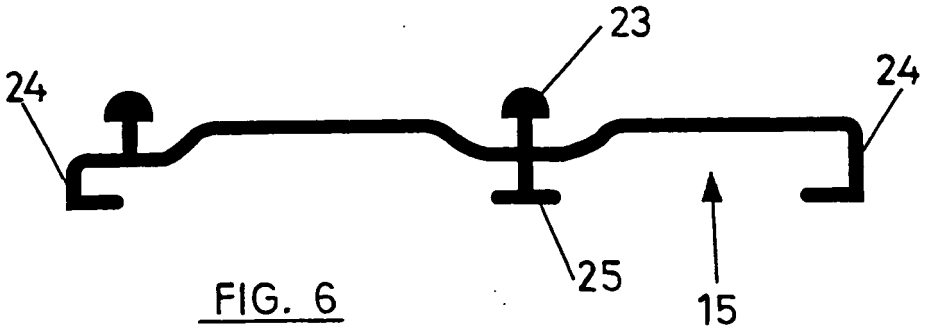


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2005/000170

A. CLASSIFICATION OF SUBJECT MATTER

IPC.7 E05D15/06, E06B3/42, E06B5/01

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)

IPC.7 E05D, E06B

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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	DE 4407818 A (HUWIL WERKE GMBH) 14.09.1995 ; **abstract; figure 2.**	1,2,8
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A	US 4633615 A (MOOSE JAMES R) 06.01.1987; **abstract; figures** 6-9.	1,2,5,6
A	US 5148630 A (LLORENS MARIO) 22.09.1992; **the whole document**	1,2,5,6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
27.05.2005	- 7 JUN 2005
Name and mailing address of the ISA/ **SPTO** Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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- ES 1012194 U **[0003]**
- ES 1023635 U **[0004]**
- ES 2115243 **[0005]**
- ES 242289 U **[0006]**