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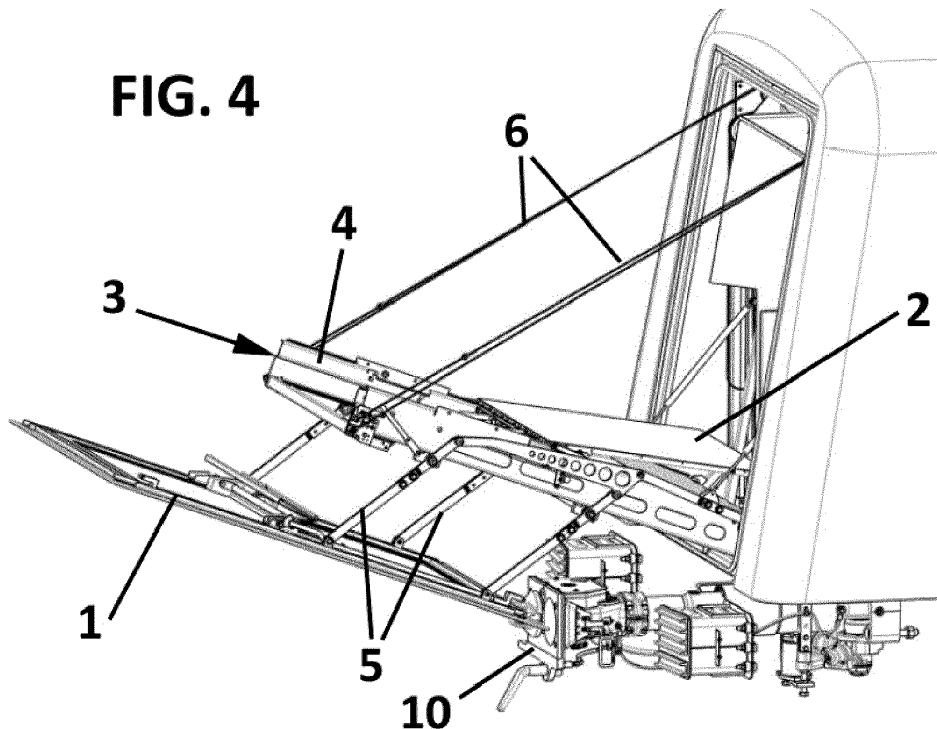
(54) **EVACUATION SYSTEM FOR RAILWAY VEHICLES**

(57) The evacuation system comprises a door (1) movable between a closed position and a use position; and a ramp (2) movable between a retracted position and an extended position; wherein the door (1) is movable with respect to the ramp (2) such that when the door (1) is in the closed position and the ramp (2) is in the retracted position, the door (1) is at a first distance from the ramp (2)

or in contact with the ramp (2), and when the door (1) is in the use position and the ramp (2) is in the extended position, the door (1) is a second distance from the ramp (2), the second distance being greater than the first distance.

When the door and the ramp are in their position of use and extended, they do not contact the latch.

FIG. 4



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Description

Object of the invention

[0001] The present invention refers to an evacuation system for railway vehicles.

Background to the invention

[0002] In general, railways have systems to evacuate passengers in the event of the need to evacuate the train unit due to a breakdown or any other cause that immobilises the train unit.

[0003] The easiest and quickest way to do this is through the side access doors, by means of ramps or ladders allowing descent to track level, or by means of gangways allowing passage to another train unit located parallel to the damaged unit.

[0004] However, in cases where the operation is on railway lines with tunnels and/or overpasses, the eventual breakdown may occur in places where passengers cannot exit through the side doors of the train. In these cases it is necessary to provide the vehicle with a system that allows front evacuation through the ends of the train unit.

[0005] Existing front evacuation systems consist of ramps or stairs behind a door that opens upwards, downwards or sideways, depending on the case.

[0006] In general the downward opening is less extended because, depending on the geometry of the train, pivoting the door open from the bottom may cause interference with the train hitch when completing the rotation.

[0007] Therefore, most of the front evacuation units provide for the door to open upwards due to the size and position of the hooks.

[0008] This arrangement requires gas springs to overcome the door's own weight and keep it in the open position, whereas, if the opening is downward, these springs are not necessary and their function is performed by the force of gravity.

[0009] The gas springs remain compressed when the equipment is closed and cause high internal stresses while the train is running, which are a problem as they can cause failure, deformation or unwanted displacement of the door.

Description of the invention

[0010] Therefore, an objective of the present invention is to provide an evacuation system for railway vehicles, which allows the door to open downwards, avoiding interference with the hitch, by displacing the door before completing the rotation and positioning itself on the hitch.

[0011] With the evacuation system for railway vehicles of the invention, the aforementioned disadvantages are solved, presenting other advantages that will be described below.

[0012] The evacuation system for railway vehicles ac-

ording to the present invention is described in claim 1, and the dependent claims include additional features that are optional.

[0013] In particular, the evacuation system for railway vehicles comprises:

- a door movable between a closed position and a use position; and
- a ramp movable between a retracted and an extended position; with the door being movable relative to the ramp, so that:
 - when the door is in the closed position and the ramp is in the retracted position, the door is at a first distance from the ramp or in contact with the ramp, and
 - when the door is in the use position and the ramp is in the extended position, the door is a second distance from the ramp, the second distance being greater than the first distance.

[0014] In this way, when the door and the ramp are in their use and extended positions, respectively, neither the door nor the ramp contacts the hitch of the railway vehicle.

[0015] Advantageously, the door is longitudinally and transversely movable with respect to the ramp, so that the door moves with respect to the railway vehicle and towards the track on which the railway vehicle is standing.

[0016] In a preferred embodiment, the ramp and the door are connected to each other by means of hinged bars.

[0017] In particular, the hinged bars are arranged on opposite sides of the door and the ramp, such as two hinged bars are arranged on one side of the door and the ramp and two hinged bars are arranged on another side of the door and the ramp.

[0018] In addition, the ramp preferably comprises a chassis comprising a plurality of telescopic beams, which allow the ramp to occupy all the space necessary to ensure the evacuation of passengers from the railway vehicle.

[0019] The evacuation system for railway vehicles according to the present invention also comprises support cables between the ramp and the railway vehicle, which perform a damping function of the door movement.

Brief description of the drawings

[0020] For a better understanding of what has been explained above, some drawings are included in which, schematically and only by way of a non-limiting example, a practical case of embodiment is shown.

Figure 1 is a perspective view of the rear of a train, where the evacuation system according to the present invention is installed, before use, with the door closed;

Figures 2 to 4 are perspective views of the evacuation system according to the present invention, during its deployment; and

Figure 5 is a perspective view of the evacuation system according to the present invention in its use position.

Description of a preferred embodiment

[0021] Figure 1 shows a rear end of a railway vehicle on which the evacuation system according to the present invention is installed.

[0022] This figure also shows that the railway vehicle comprises a hitch (10) for engaging another wagon of the railway vehicle.

[0023] The evacuation system according to the present invention comprises a door (1) which is movable between a closed position, shown in figure 1, and a use position, shown in figure 5, which will be described later.

[0024] As can be seen in figures 2 to 5, the evacuation system according to the present invention also comprises a ramp (2) which is movable between a retracted position, in which it is located occupying a plane defined by the door frame, and an extended position, shown in figure 5.

[0025] The ramp (2) comprises a chassis (3) consisting of a number of telescopic beams (4), so that the ramp (2) can be extended to the full length required for the users of the railway vehicle to evacuate it if necessary.

[0026] It should be noted that the ramp (2) could be replaced by a ladder with the same or equivalent characteristics as the ramp, as known in the art.

[0027] The door (1) is movable with respect to the ramp (2), so that:

- when the door (1) is in the closed position and the ramp (2) is in the retracted position, the door (1) is at a first distance from the ramp (2) or in contact with the ramp (2), and
- when the door (1) is in the in-use position and the ramp (2) is in the extended position, the door (1) is at a second distance from the ramp (2), the second distance being greater than the first distance.

[0028] Specifically, the door (1) can be moved longitudinally and transversely with respect to the ramp (2), as can be seen in figures 2 and 3.

[0029] For example, between the door (1) and the ramp (2) there are hinged bars (5) that are hinged to the door (1) and to the ramp (2). In particular, according to the embodiment shown, the hinged bars (5) are arranged on opposite sides of the door (1) and the ramp (2), such as two hinged bars (5) are arranged on one side of the door (1) and the ramp (2), and two hinged bars (5) are arranged on another side of the door (1) and the ramp (2).

[0030] Figures 2 to 4 show the door (1) and the ramp (2) moving together from their closed and retracted posi-

tions, respectively, to their use and extended positions, respectively.

[0031] As can be seen in figure 2, the door (1) first moves horizontally, with respect to the track where the railway vehicle is located, in order to move out of its frame. This movement is carried out by means of the hinged bars (5).

[0032] Then, as shown in figure 3, the ramp (2), together with the door (1), tilts with respect to a substantially horizontal axis, arranged in the lower part of the door (1) frame. This tilting movement is regulated or damped by any suitable means, preferably including support cables (6), which are located between the ramp (2) and the railway vehicle.

[0033] This tilting continues, as can be seen in figure 4, with the door (1) also being moved longitudinally in relation to the ramp (2) by means of the hinged bars (5).

[0034] Finally, the door (1) and the ramp (2) are placed in their use and extended positions, respectively, as shown in Figure 5. In this position, the door (1) is sufficiently far enough away from the railway vehicle to avoid any interference with the hitch (10) described above, which is located in a lower and rear position on the railway vehicle.

[0035] Although reference has been made to a specific embodiment of the invention, it is obvious to a person skilled in the art that the evacuation system for railway vehicles described is susceptible to numerous variations and modifications, and that all the details mentioned can be replaced by technically equivalent ones, without departing from the scope of protection defined by the appended claims.

Claims

1. Evacuation system for railway vehicles, comprising:

- a door (1) movable between a closed position and a use position; and

- a ramp (2) movable between a retracted and an extended position; **characterized in that** the door (1) is movable with respect to the ramp (2), so that:

- when the door (1) is in the closed position and the ramp (2) is in the retracted position, the door (1) is at a first distance from the ramp (2) or in contact with the ramp (2), and

- when the door (1) is in the use position and the ramp (2) is in the extended position, the door (1) is at a second distance from the ramp (2), the second distance being greater than the first distance.

2. Evacuation system for railway vehicles according to claim 1, wherein the door (1) is longitudinally and transversely movable with respect to the ramp (2).

3. Evacuation system for railway vehicles according to claim 1 or 2, wherein the ramp (2) and the door (1) are connected to each other by means of hinged bars (5).
4. Evacuation system for railway vehicles according to claim 3, wherein the hinged bars (5) are arranged on opposite sides of the door (1) and the ramp (2).
5. Evacuation system for railway vehicles according to claim 4, wherein two hinged bars (5) are arranged on one side of the door (1) and the ramp (2) and two hinged bars (5) are arranged on another side of the door (1) and the ramp (2).
6. Evacuation system for railway vehicles according to any one of the previous claims, wherein the ramp (2) comprises a chassis (3) comprising a plurality of telescopic beams (4).
7. Evacuation system for railway vehicles according to any one of the previous claims, comprising support cables (6) between the ramp (1) and the railway vehicle.

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FIG. 1

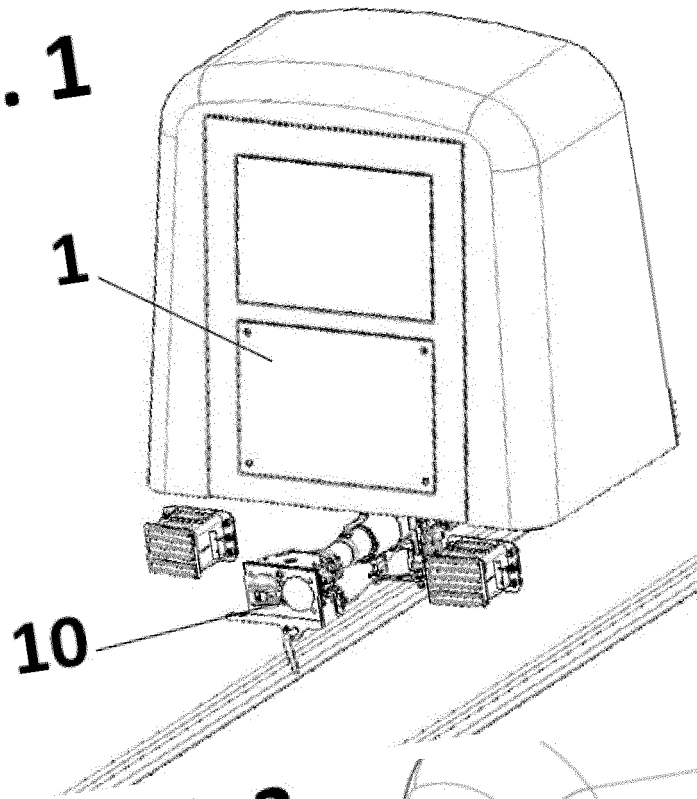


FIG. 2

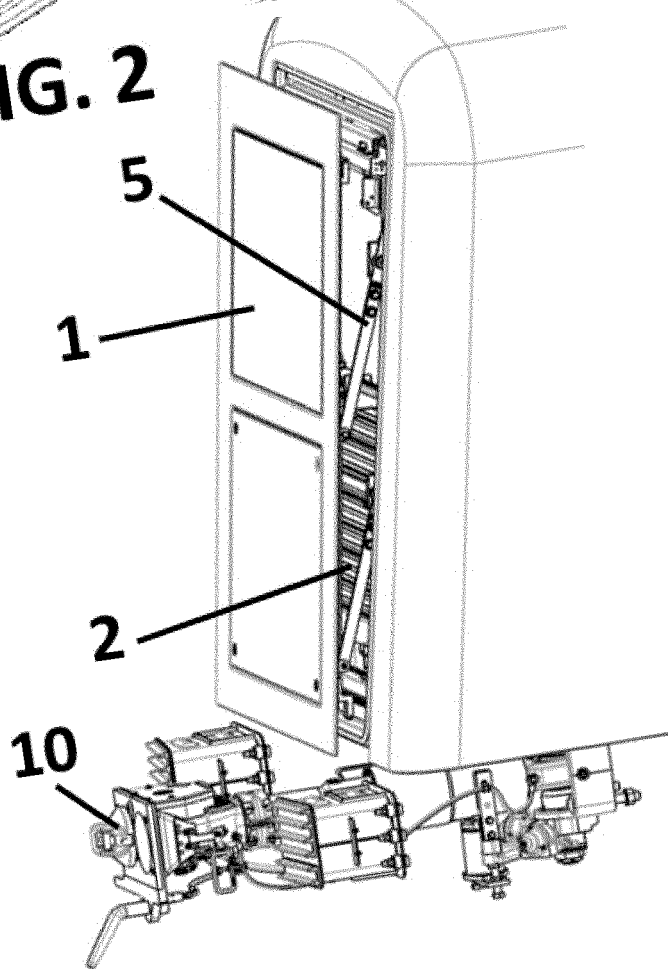


FIG. 3

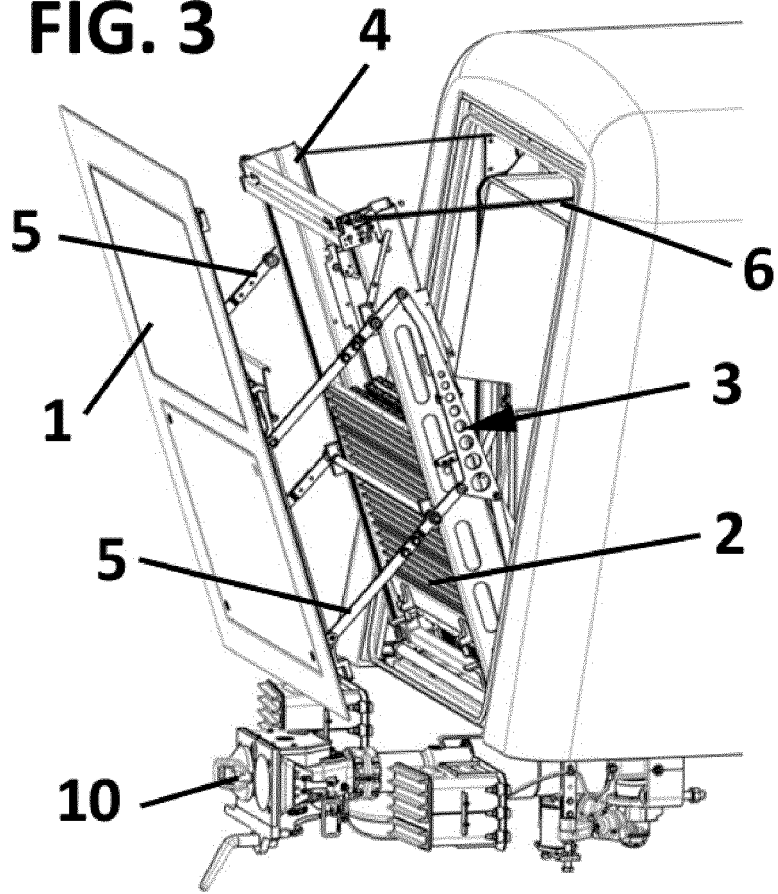
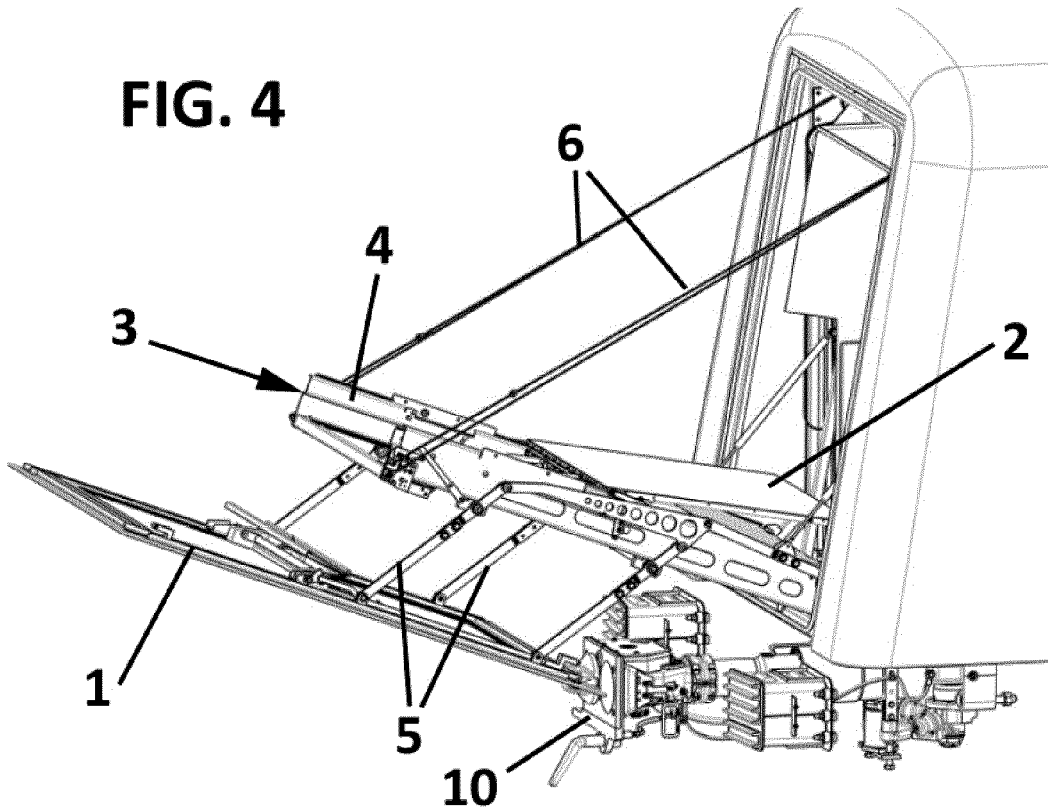


FIG. 4



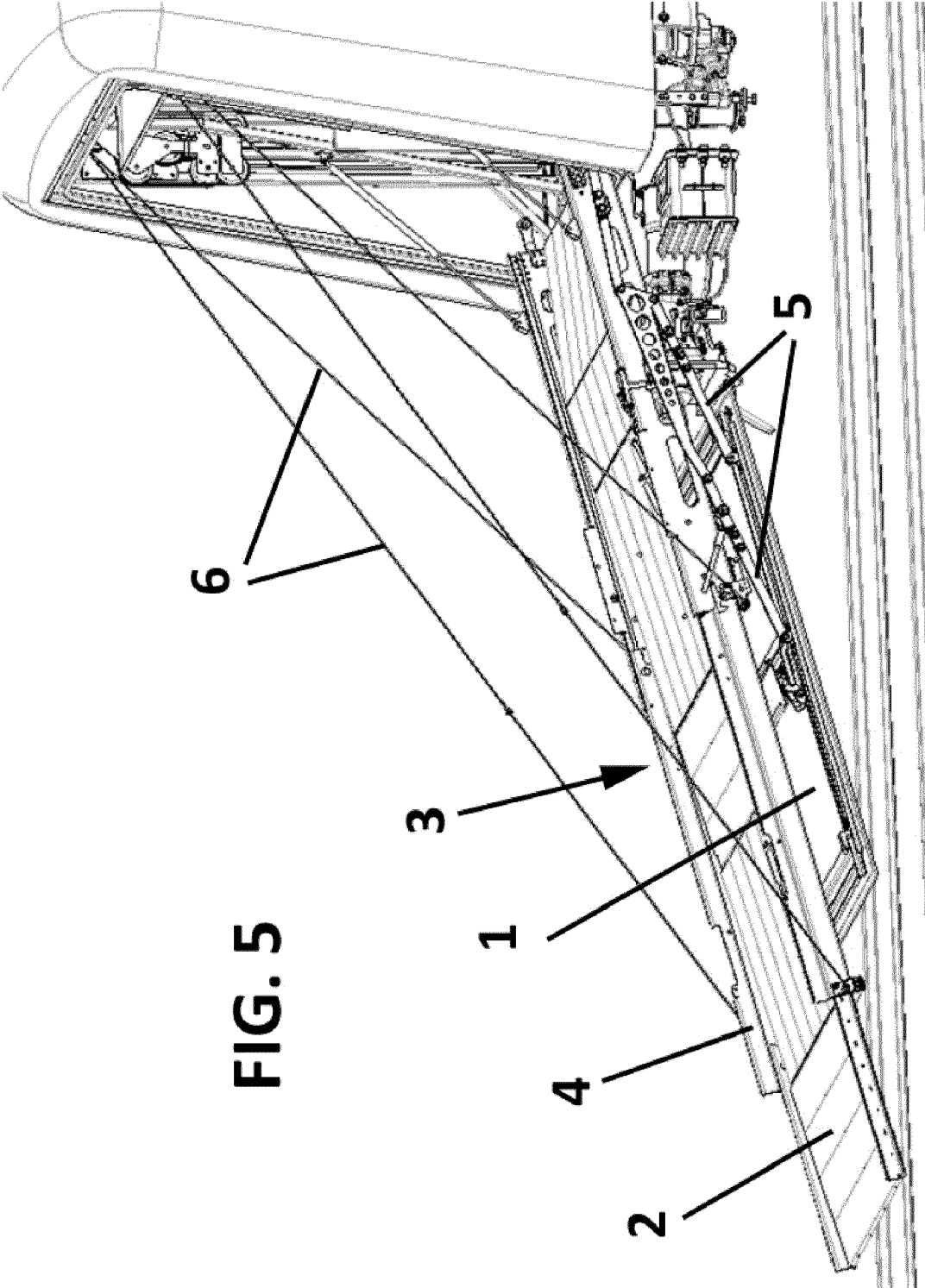


FIG. 5



EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 March 2024	Examiner Lorandi, Lorenzo
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