



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
13.06.2018 Bulletin 2018/24

(51) Int Cl.:
B63B 27/14 (2006.01) **E01D 15/24** (2006.01)
E04F 11/06 (2006.01) **E06C 5/00** (2006.01)
E06C 9/00 (2006.01)

(21) Application number: **15898840.2**

(22) Date of filing: **23.07.2015**

(86) International application number:
PCT/ES2015/070563

(87) International publication number:
WO 2017/013277 (26.01.2017 Gazette 2017/04)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

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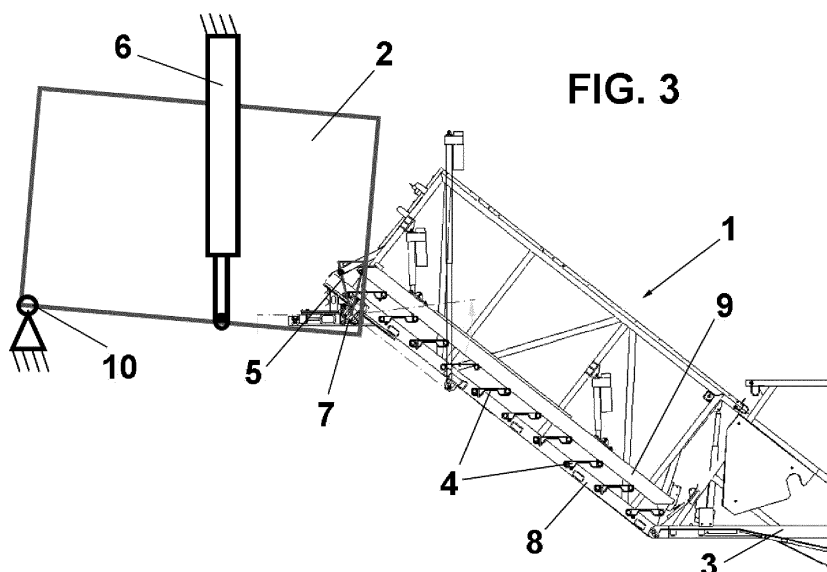
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(54) **BRIDGE FOR PASSENGER BOARDING AND ALIGHTING**

(57) The invention relates to a bridge that comprises a central structure (1) provided with cabin (2) at one end and a ramp (3) at the other end, said central structure (1) pivoting according to the relative position between said cabin (2) and said ramp (3). The central structure (1) comprises plates (4) that form a smooth floor or a staircase. The bridge comprises at least one sensor (5) that detects any change in the angle of inclination between

the central structure (1) and the cabin (2); and actuating means (6), such that when a change in said angle of inclination is detected, one end of said cabin (2) moves vertically to maintain a fixed separation in height between the plates (4).

The invention allows the vertical distance between the steps of the staircase to be kept constant, despite variations in the operating height.



Description

[0001] The present invention relates to a bridge for passenger boarding and alighting which allows passengers to board and alight a ship.

Background of the Invention

[0002] Bridges for passenger boarding and alighting that allow boarding and alighting in a comfortable and efficient manner are known. In the case of ships at port, these mechanisms are useful in those cases where embarking or alighting the ship are done from above the line of the dock because the ramp of the bridge must remain in the horizontal position (or have a slope that does not exceed the limit allowed).

[0003] In those ships the service door of which is located below the line of the dock, additional staircases are used that complicate the berthing maneuver and which in turn involve a risk for passenger safety and safety of the port facility itself.

[0004] To prevent the use of additional staircases when the service door is below the line of the dock, bridges in which the berthing walkway of the bridge is inclined and the plates making up the floor are arranged like steps are known. Part of the bridge is thereby converted into a staircase.

[0005] However, bridges of this type have the drawback that the distance between the steps varies when the operating height changes (caused by tides, waves, etc.), with the subsequent risk of the feet of those persons crossing the bridge becoming trapped between two steps.

[0006] Therefore, there is an evident need for a bridge for boarding and alighting that prevents the use of additional staircases when the service door is below the line of the dock, and, furthermore, completely eliminates the risk of the feet of those persons crossing the bridge becoming trapped between two steps, which allows tracking the vertical movement of the ship, maintaining a fixed distance between the steps, thereby providing a maximum level of safety in the process of boarding and alighting.

Description of the Invention

[0007] The aforementioned drawbacks are solved with the bridge for passenger boarding and alighting of the invention, which has other advantages that will be described below.

[0008] The bridge for passenger boarding and alighting according to the present invention comprises a central structure provided with a cabin at one end and a ramp at the other end, said central structure pivoting according to the relative position between said cabin and said ramp, and said central structure comprising a plurality of plates that form a smooth floor when said cabin is substantially at the same height as said ramp and that form a staircase

when said cabin is at a different height than said ramp, characterized in that it comprises at least one sensor that detects any change in the angle of inclination between the central structure and the cabin, and actuating means for actuating the vertical movement of the cabin, such that when the change of said angle of inclination is detected, at least one end of said cabin moves vertically to maintain a fixed separation in height between the plates.

[0009] Advantageously, said at least one sensor is arranged in an articulation between the cabin and the central structure, and according to a preferred embodiment said at least one sensor is an inductive sensor or a mechanical contact sensor.

[0010] Furthermore, according to a preferred embodiment, said actuating means comprise at least one hydraulic cylinder or one pneumatic cylinder.

[0011] Preferably, said central structure comprises on each side a support bar and a movable bar that can move with respect to said support bar, said support bar and said movable bar being substantially parallel to one another and the rear part of each plate being attached to the support bar and the front part of each plate being attached to the movable bar, such that the pivoting movement of the central structure causes a change in the angle between the plates and the support bar and movable bar.

[0012] Advantageously, said cabin comprises a rotating shaft at the end opposite the articulation for the attachment to the central structure.

[0013] The bridge for passenger boarding and alighting according to the present invention provides at least the following advantages:

- It allows proceeding to the passenger boarding and alighting in ships the service door of which is located below the line of the dock.
- Since the point of articulation of the berthing corridor is located further back, it can effortlessly be inclined by actuating means, and allows access to service doors in not so common and hard-to-access positions for the bridges that are conventionally used.
- It keeps the vertical distance between the steps of the staircase constant, despite variations in the operating height caused by vertical movements of the ship, with the subsequent increase in the safety of those persons who are using it.
- The position of the bridge in staircase mode allows the inclination of the berthing ramp to not entail a drawback for the passenger safety, making their boarding and alighting operation easier (complying with the law in force, which allows for a maximum inclination of 1:10).
- It provides safety and comfort to ships at port, since those ships the service door of which is located at the same level as or below the line of the dock had to proceed to the boarding or alighting by means of unprepared staircases or ramps, directly accessing the dock and getting in the way of those activities

that are conducted on said dock.

Brief Description of the Drawings

[0014] To better understand the foregoing description, a set of drawings is attached in which a practical embodiment is schematically depicted merely by way of non-limiting example.

Figure 1 is a side view of the bridge for passenger boarding and alighting according to the present invention, located in a position in which the central structure is horizontal, since the cabin and the ramp are substantially at the same height, and with the plates forming a planar surface; and Figures 2 and 3 are side views of the bridge for passenger boarding and alighting according to the present invention, located in two positions in which the central structure is inclined in two different inclinations, since the cabin and the ramp are at a different height, and with the plates forming a staircase.

Description of a Preferred Embodiment

[0015] As can be seen in the drawings, the bridge for boarding and alighting of the present invention comprises a central structure 1, a cabin 2 and a ramp 3, which is placed between a terminal and a ship. It should be pointed out that for the sake of simplicity, the cabin 2 is not depicted in Figure 1, but it can be seen in Figures 2 and 3.

[0016] The central structure 1 can be placed substantially horizontal or inclined, according to the relative height between the cabin 2 and the ramp 3. When the cabin 2 and the ramp 3 are substantially at the same height (Figure 1), the central structure 1 is horizontal, and when they are at a different height (Figures 2 and 3), the central structure 1 is inclined. In turn, the cabin 2 and the ramp 3 are substantially horizontal or very slightly inclined at all times.

[0017] The central structure 1 comprises a plurality of plates 4 which may define a planar surface or a staircase, according to the horizontal or inclined position of the central structure 1.

[0018] To that end, said central structure 1 comprises on each side a support bar 8 and a movable bar 9 with respect to said support bar 8, said support bar 8 and said movable bar 9 being substantially parallel to one another. The rear part of each plate 4 is attached to the support bar 8 and the front part of each plate 4 is attached to the movable bar 9, such that the pivoting movement of the central structure 1 causes a change in the angle between the plates 4 and the support bar 8 and movable bar 9.

[0019] The cabin 2 is attached to the central structure 1 preferably by means of an articulation 7, such that the angle of inclination between the central structure 1 and the cabin 2 may vary, for example, according to the tide.

[0020] To detect any change in this angle of inclination, at least one sensor 5 is placed between the central struc-

ture 1 and the cabin 2, such that when the change of said angle of inclination is detected, at least one end of said cabin 2 moves vertically through actuating means 6, such as one or more hydraulic or pneumatic cylinders, to maintain a fixed separation in height between the plates 4.

[0021] This movement of the cabin 2 can be observed in Figures 2 and 3, where it can be seen that the position of the cabin 2 varies, but the separation in height between the plates 4 is kept constant.

[0022] In order for this adjustment of the position of the cabin 2 to be automatic, the sensor 5 sends a signal to control means (not depicted in the drawings), which automatically actuate the actuating means 6.

[0023] Said sensor or sensors can be non-contact inductive sensors or they can be limit switch sensors with mechanical contact. These sensors may take the reading of a flat cone-shaped fan and send the signal to the control means.

[0024] Although reference has been made to a specific embodiment of the invention, it is evident for a person skilled in the art that the described bridge for passenger boarding and alighting is susceptible to a number of variations and modifications, and that all the mentioned details may be replaced with other technically equivalent details without departing from the scope of protection defined by the attached claims.

Claims

1. Bridge for passenger boarding and alighting, comprising a central structure (1) provided with a cabin (2) at one end and a ramp (3) at the other end, said central structure (1) pivoting according to the relative position between said cabin (2) and said ramp (3), and said central structure (1) comprising a plurality of plates (4) that form a smooth floor when said cabin (2) is substantially at the same height as said ramp (3) and that form a staircase when said cabin (2) is at a different height than said ramp (3), **characterized in that** it comprises at least one sensor (5) that detects any change in the angle of inclination between the central structure (1) and the cabin (2), and actuating means (6) for actuating movement of the cabin (2), such that when the change in said angle of inclination is detected, at least one end of said cabin (2) moves vertically to maintain a fixed separation in height between the plates (4).
2. Bridge for passenger boarding and alighting according to claim 1, wherein said at least one sensor (5) is arranged in an articulation (7) between the cabin (2) and the central structure (1).
3. Bridge for passenger boarding and alighting according to claim 1 or 2, wherein said at least one sensor (5) is an inductive sensor or a mechanical contact sensor.

4. Bridge for passenger boarding and alighting according to claim 1, wherein said actuating means (6) comprise at least one hydraulic cylinder or one pneumatic cylinder.
5. Bridge for passenger boarding and alighting according to claim 1, wherein said central structure (1) comprises on each side a support bar (8) and a movable bar (9) that can move with respect to said support bar (8), said support bar (8) and said movable bar (9) being substantially parallel to one another and the rear part of each plate (4) being attached to the support bar (8) and the front part of each plate (4) being attached to the movable bar (9), such that the pivoting movement of the central structure (1) causes a change in the angle between the plates (4) and the support bar (8) and movable bar (9).
6. Bridge for passenger boarding and alighting according to claim 3, wherein said cabin (2) comprises a rotating shaft (10) at the end opposite the articulation (7) for the attachment to the central structure (1).

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FIG. 1

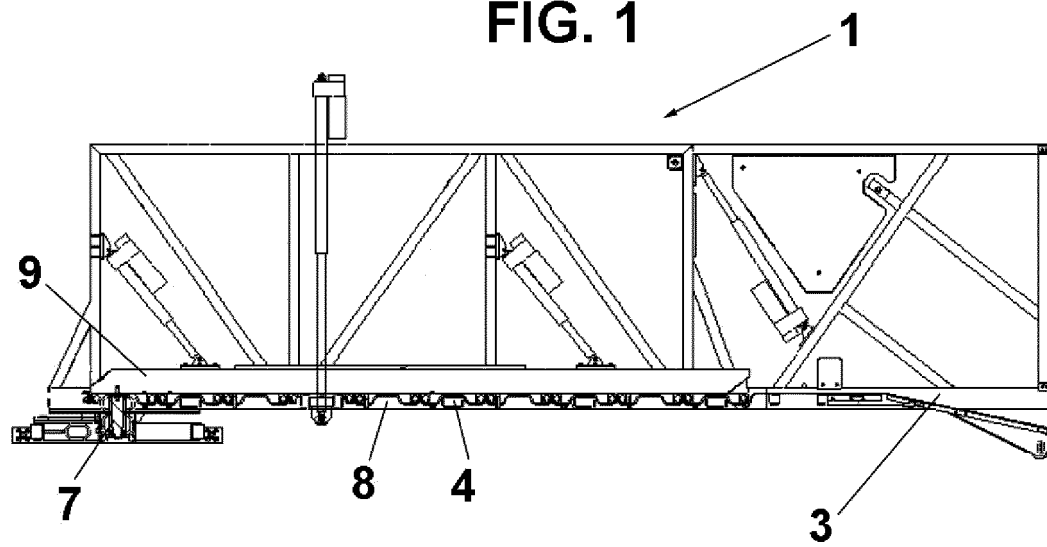
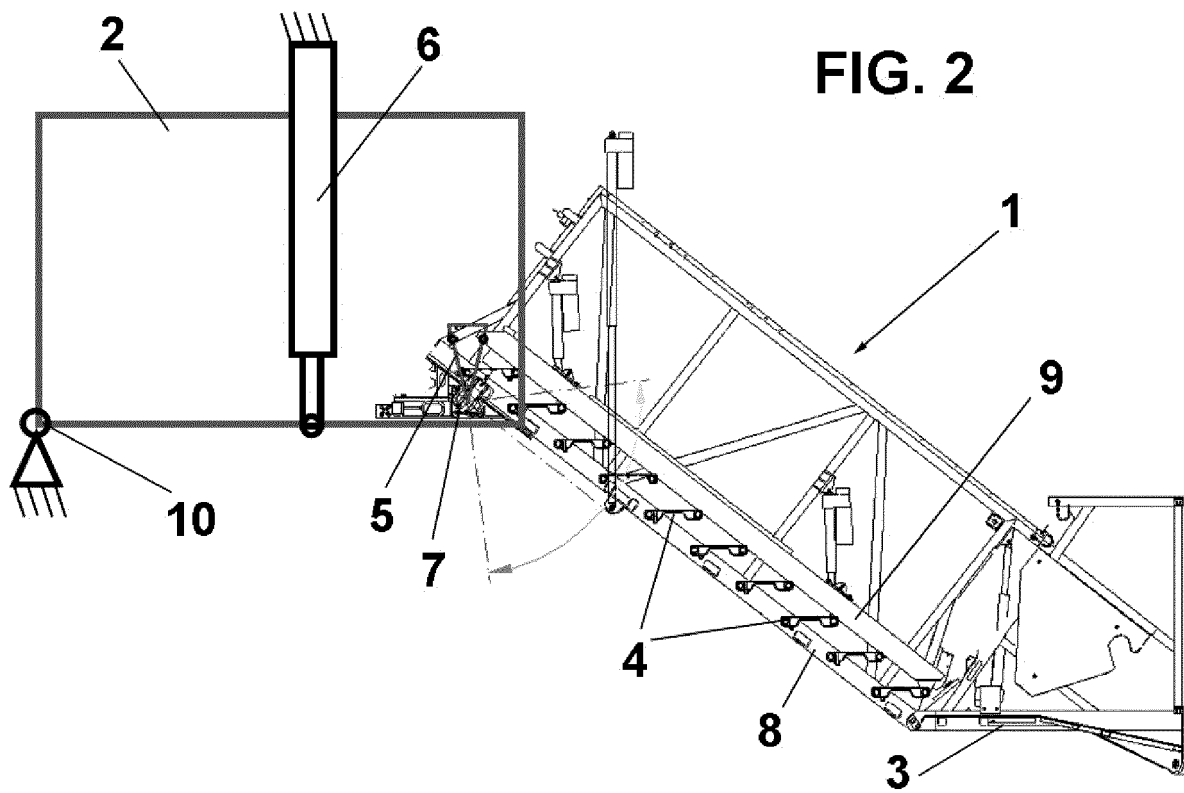
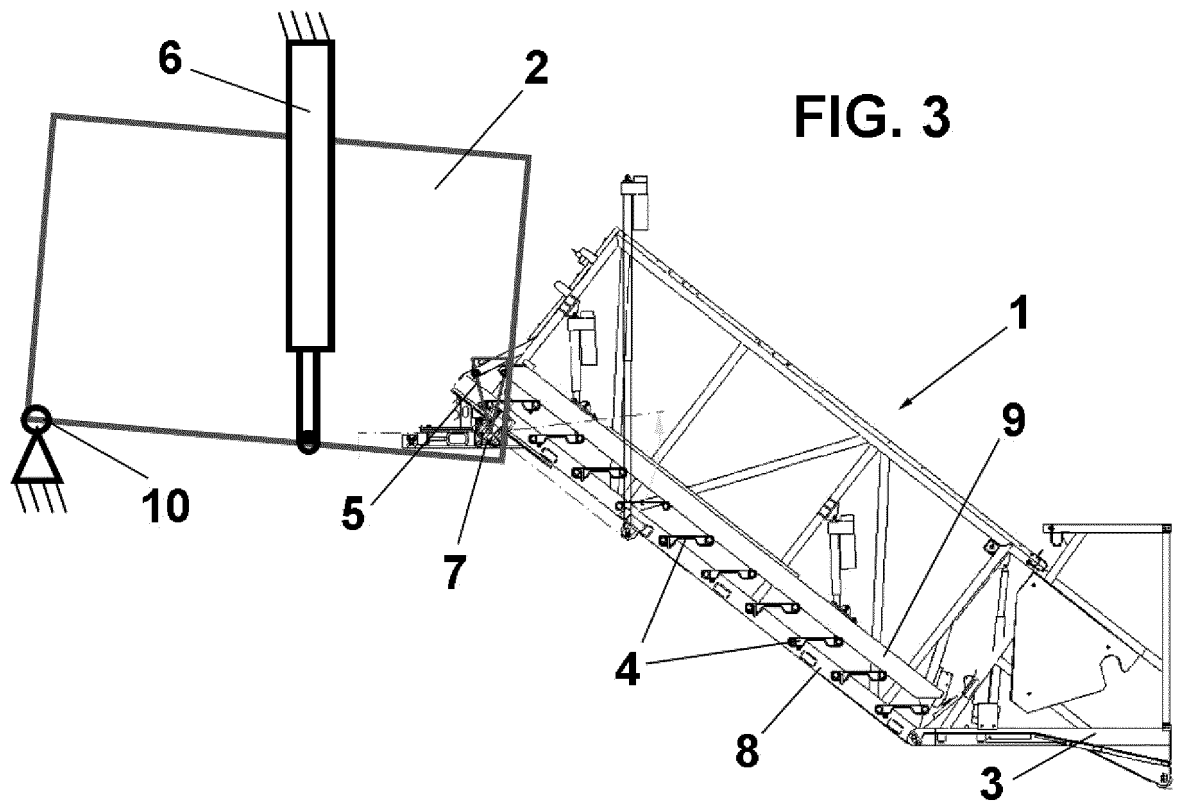


FIG. 2





INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2015/070563

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)
B64F, B63B, E01D, E04F, E06C

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)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 201023633Y Y (PLA ZHENJIANG SHIPPING COLLEGE) 20/02/2008, Abstract from DataBase EPODOC. Retrieved from EPOQUE; figures.	1
A	US 2005235437 A1 (CARRIGAN STEPHEN A) 27/10/2005, abstract; figures.	1
A	US 4168764 A (WALTERS TOM) 25/09/1979, abstract; figures.	1
A	CN 202626817U U (BEIJING HUGO INDUSCO TECHNOLOGY CO LTD) 26/12/2012, abstract from DataBase EPODOC. Retrieved from EPOQUE; figures.	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search
07/03/2016

Date of mailing of the international search report
(08.03.2016)

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Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2015/070563

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
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US2005235437 A1	27.10.2005	US7159261 B2 US2007101516 A1 US7383600 B2	09.01.2007 10.05.2007 10.06.2008
CN201023633Y Y	20.02.2008	NONE	
CN202626817U U	26.12.2012	NONE	

Form PCT/ISA/210 (patent family annex) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2015/070563

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CLASSIFICATION OF SUBJECT MATTER

B63B27/14 (2006.01)

E01D15/24 (2006.01)

E04F11/06 (2006.01)

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E06C5/00 (2006.01)

E06C9/00 (2006.01)

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