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(54) **A marine evacuation system**

(57) The present invention relates to a marine evacuation system (1) for rapid evacuation of persons from an evacuation area (2) of a vessel (3). The system comprises a plurality of inflatable liferafts (4), a plurality of evacuation chutes (5) having substantially vertical extensions and extending from the evacuation area (2) to the inflatable liferafts (4), and a bowsing system (6) adapted to position the inflatable liferafts (4) in relation to the vessel (3). Furthermore, the invention relates to a vessel (3) comprising the marine evacuation system (1).

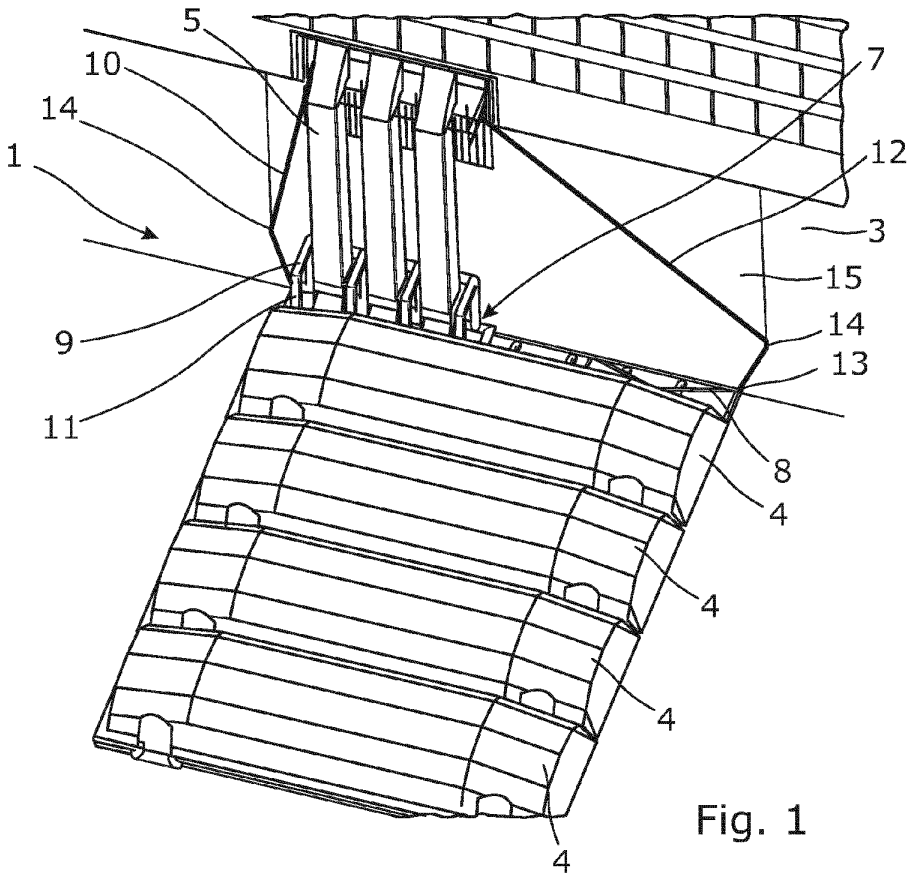

Fig. 1

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Description

Field of the invention

[0001] The present invention relates to a marine evacuation system for rapid evacuation of persons from an evacuation area of a vessel and to a vessel comprising the marine evacuation system.

Background art

[0002] In known marine evacuation systems, chutes and liferafts are packed separately but abut each other and are connected by lines while being installed onboard the vessel. At discharge, the liferaft is inflated in the water and the chute is pulled down into the liferaft via the lines where it is fastened by a crew member. During such inflation, the lines often become entangled or get stuck or wrapped around raft parts, which hinders correct inflation of the liferaft or correct retraction of the chute into the vessel.

[0003] In large system having substantial evacuation capacity, several evacuation chutes are arranged, for instance three. However, with three chutes, a high number of lines must be kept under control in the liferaft, which is a very complex task with a high risk of failure.

[0004] Furthermore, there are often high loads on the bowsing of these systems, and the liferafts need to be strengthened to be able to handle such loads.

Summary of the invention

[0005] It is an object of the present invention to wholly or partly overcome the above disadvantages and drawbacks of the prior art. More specifically, it is an object to provide an improved marine evacuation system facilitating rapid evacuation from a vessel.

[0006] The above objects, together with numerous other objects, advantages and features, which will become evident from the below description, are accomplished by a solution in accordance with the present invention by a marine evacuation system for rapid evacuation of persons from an evacuation area of a vessel, the system comprising

- a plurality of inflatable liferafts,
- a plurality of evacuation chutes having substantially vertical extensions and extending from the evacuation area to the inflatable liferafts, and
- a bowsing system adapted to position the inflatable liferafts in relation to the vessel,

wherein an inflatable unit is arranged between the inflatable liferafts and the vessel, the inflatable unit comprising a base part and a plurality of chute support parts, the chute support parts extending upwards from the base part and being connected with the plurality of evacuation chutes at their outlet ends, and the bowsing system from the evacuation area of the vessel being connected to the inflatable unit, and one or more of the inflatable liferafts being connected to the inflatable unit.

[0007] Hereby, the work related to handling the lines and pulling the evacuation chutes into the liferafts is avoided, which minimises the risk of failure in the process of inflating the inflatable components in the system. Furthermore, it reduces the space necessary within the liferafts for the persons being evacuated leaving the evacuation chutes, since the evacuation chutes end in the inflatable unit. Also, providing the inflatable unit in the marine evacuation system facilitates bowsing of the inflatable liferafts via the inflatable unit.

[0008] In one embodiment, the inflatable liferafts may have first and second sides, first and seconds ends and a length, a first inflatable liferaft of the plurality of inflatable liferafts at its first side being positioned opposite to and connected with the inflatable unit, and the remainder of the plurality of inflatable liferafts being positioned on the second side of the first liferaft side by side in relation to each other.

[0009] In addition, two inflatable liferafts may be arranged end to end, both being positioned opposite to and connected with the inflatable unit. Other of the plurality of inflatable liferafts may then be positioned on the second side of the liferafts being connected with the inflatable unit side by side and end to end in relation to each other.

[0010] Furthermore, one or more deflated liferafts may be arranged between and/or below the sides of two oppositely positioned inflatable liferafts.

[0011] Moreover, the evacuation chutes may comprise a berth part arranged at the outlet end, the berth part having an extension which is between 45 and 90 degrees compared to the vertical extension of the evacuation chute.

[0012] In an embodiment, the berth part may be arranged in connection with the inflatable unit.

[0013] Furthermore, the system may comprise two, three, four, five or six evacuation chutes.

[0014] In addition, the base part may have a length substantially corresponding to the length of the inflatable liferafts.

[0015] Further, the base part may have a length which is less than the length of the inflatable liferafts.

[0016] Additionally, the base part may have a first end and a second end, first and second sides and a length.

[0017] In one embodiment, the chute support parts may comprise a frame structure being connected to the base part and extending upwards from the base part, the frame structure being configured in such a way that the evacuation chutes extend into the frame structure.

[0018] Moreover, the frame structure may comprise a plurality of vertical beams and at least one horizontal beam arranged at the end opposite the end facing the base part, and the horizontal beam is positioned at the side of the inflatable unit facing a side of the vessel.

[0019] Also, the frame structure may comprise one or more projecting part(s) projecting from the inflatable unit

towards the inflatable liferafts and being adapted to extend into the inflatable liferafts to assist in positioning the inflatable liferafts in relation to the outlets of the evacuation chutes.

[0020] Furthermore, the outlet of the evacuation chutes and the berth parts may be substantially positioned outside the inflatable liferafts.

[0021] In addition, the frame structure may have a height of between 0.5 to 4 meters.

[0022] Moreover, the bowsing system may comprise one or more winches arranged on the vessel, a first bowsing line extending from the evacuation area and being connected with the first end of the inflatable unit, and a second bowsing line extending from the evacuation area and being connected with the second end of the inflatable unit.

[0023] Further, the first and second bowsing lines may extend from the evacuation area to the inflatable unit via turning points arranged on a side of the vessel.

[0024] In an embodiment, the turning points may be arranged with horizontal distance which is larger than the length of the inflatable unit.

[0025] Furthermore, the design and capacity of the plurality of inflatable liferafts may be substantially identical.

[0026] In addition, each inflatable liferaft may have a capacity of above 80 persons, preferably above 100 persons.

[0027] The present invention furthermore relates to a vessel comprising a marine evacuation system as described above.

Brief description of the drawings

[0028] The invention and its many advantages will be described in more detail below with reference to the accompanying schematic drawings, which for the purpose of illustration show some non-limiting embodiments and in which

Fig. 1 shows a marine evacuation system according to the invention,

Fig. 2 shows an embodiment of an inflatable unit of the marine evacuation system,

Fig. 3 shows the outlets of the evacuation chutes outside the liferafts,

Fig. 4 shows a vertical decent of persons being evacuated through the evacuation chutes,

Fig. 5 shows the person being evacuated moving from the evacuation chutes through the liferafts,

Figs. 6 and 7 show the liferafts being released from each other and towed away and additional deflated liferafts waiting to be inflated,

Figs. 8a-8f show a sequence of deploying the marine evacuation system from a vessel,

Fig. 9 show different embodiments of positions of the chute support parts on the base part of the inflatable unit,

Fig. 10 shows an embodiment of the chute support part having the berth part without side parts,

Fig. 11 shows the embodiment of Fig. 10wherein the berth part has side parts,

Fig. 12 shows an embodiment of the inflatable unit having three evacuation chutes and a length being less than the length of the inflatable liferafts,

Fig. 13 shows an embodiment of the inflatable unit with four evacuation chutes,

Fig. 14 shows an embodiment of the inflatable unit with six evacuation chutes,

Fig. 15 shows an embodiment of the chute support part,

Fig. 16 shows the chute support part of Fig. 15 in another view,

Fig. 17 shows yet another embodiment of the chute support part,

Fig. 18 shows an additional embodiment of the chute support part, and

Fig. 19 shows a further embodiment of the chute support part.

[0029] All the figures are highly schematic and not necessarily to scale, and they show only those parts which are necessary in order to elucidate the invention, other parts being omitted or merely suggested.

Detailed description of the invention

[0030] Fig. 1 shows a marine evacuation system 1 for rapid evacuation of persons from an evacuation area 2 of a vessel 3 according to the present invention. In the embodiment shown, the marine evacuation system 1 comprises four inflatable, floatable liferafts 4 arranged side by side. The marine evacuation system 1 further comprises a plurality of evacuation chutes 5 having substantially vertical extensions and extending from the evacuation area 2 to the inflatable liferafts 4. The evacuation chutes 5 are adapted to lead persons to be evacuated from the vessel 3 to the liferafts 5 in a safe manner. The evacuation system 1 also comprises a bowsing system 6 adapted to position the inflatable liferafts 4 in re-

lation to the vessel 3.

[0031] According to the inventive idea, the marine evacuation system 1 also comprises an inflatable unit 7 arranged between the inflatable liferafts 4 and the vessel 3 so that it may inter alia function as a buffer element between the liferafts 4 and the vessel 3, enabling it to absorb the sudden movements of the liferafts 4 against the vessel 3 caused by wind, current and waves. The inflatable unit 7 comprises a base part and a plurality of chute support parts 9, the chute support parts 9 extending upwards from the base part 8 and being connected with the plurality of evacuation chutes 5 at their outlet ends. Hereby, the evacuation chutes are supported by the inflatable unit, thereby rendering it unnecessary for crew members to pull the evacuation chutes into the liferafts before an evacuation of persons. Furthermore, the bowsing system 6 is, from the evacuation area 2 of the vessel 3, connected to the inflatable unit 7, and one or more of the inflatable liferafts 4 is/are connected to the inflatable unit 7.

[0032] In this embodiment, the bowsing system 6 comprises one or more winches (not shown) arranged on the vessel 3, preferably in the evacuation area 2, a first bowsing line 10 extending from the evacuation area 2 and being connected with a first end 11 of the inflatable unit 7, and a second bowsing line 12 extending from the evacuation area 2 and being connected with a second end 13 of the inflatable unit 7. The first and second bowsing lines 10, 12 extend from the evacuation area 2 to the inflatable unit via turning points 14 arranged on a side 15 of the vessel 3.

[0033] In the embodiment shown in Fig. 2, the inflatable unit 7 is positioned in the water next to the vessel side 15 without any liferafts. In this embodiment, three evacuation chutes 5 having berth parts 16 end in the inflatable unit 7. The berth parts 16 will be described further below. The inflatable unit 7 comprises an inflatable base part 8 from which the chute support parts 9 extend. The chute support parts 9 are adapted to support the evacuation chutes 5 to ensure that they are maintained and secured in their intended position. The chute support parts 9 are also inflatable. In the embodiment shown, the bowsing lines are not connected to the vessel.

[0034] Figs. 3-5 show persons being evacuated using the marine evacuation system 1. Fig. 3 shows the three evacuation chutes 5 ending in the inflatable unit 7 and three arrows indicating the route for the persons leaving the evacuations chutes 5 to follow into the liferafts 4. Fig. 4 shows the descent of the persons being evacuated from the evacuation area 2 down through the vertical evacuation chutes 5 and to the inflatable unit 7 from where they enter the liferafts 4. In Fig. 5, the liferafts 4 are shown without their canopies, and as can be seen, persons may be led rapidly from the evacuation chutes 4 through the liferafts 4. In this way, the outermost liferaft is filled with persons first and can be disconnected from the adjacent liferaft and towed away, as shown in Figs. 6-7.

[0035] In Fig. 6, two liferafts have been disconnected from the other liferafts 4 and towed away. Furthermore, a waiting deflated liferaft 17 may be arranged between and/or below the sides of two oppositely positioned inflatable liferafts. When the outermost liferaft of the two liferafts between which the waiting deflated liferaft 17 is arranged has been towed away, the waiting deflated liferaft may be inflated so that it is ready for receiving additional persons to be evacuated. Hereby, a flexible system having a high capacity is provided. As shown in Fig. 7, the marine evacuation system may comprise an additional waiting deflated liferaft 17 arranged adjacent to the innermost liferaft 4. In the embodiment shown in Figs. 6-7, two waiting deflated liferafts 17 are arranged, however, in other embodiments, additional deflated liferafts may be positioned between and/or below the inflated liferafts.

[0036] The inflatable liferafts 4 each have a first side 18 and a second side 19, a first end 20 and a second end 21 and a length L. The first inflatable liferaft 4 of the plurality of inflatable liferafts, as shown in Fig. 7, is at its first side 18 positioned opposite to and connected with the inflatable unit 7, and the remainder of the plurality of inflatable liferafts is positioned on the second side 19 of the first liferaft side by side in relation to each other.

[0037] Figs. 8a-8f show a sequence of a deployment of the marine evacuation system 1 according to the present invention. The marine evacuation system 1 is housed in a container 22 arranged on board the vessel 3. The container 22 has a height which is preferably below 2.7 meters so that it may be arranged on a deck of the vessel 3. The container 22 has a door 23 protecting the marine evacuation system 1 while being stored on the vessel in a deflated state. In Fig. 8b, the door 23 of the container 22 has been opened to make the evacuation system 1 is ready to be deployed. The deflated liferafts 4 and deflated unit (not shown) are moved out of the container 22 by means of a hydraulic sliding device (not shown) so that it may subsequently be lowered via a winch and wire device (not shown) into the water in a deflated state, as shown in Figs. 8c-8e. When the deflated liferafts 4 and deflated unit 7 reach the water, they are inflated (except if there are any waiting deflated liferafts in the system), after which the evacuation chutes 5 are deployed and connected with the inflatable unit 7. Subsequently, the evacuation system 1 is ready to evacuate persons from the vessel 3 into the liferafts 4.

[0038] Fig. 9 shows three embodiments of the evacuation system. Applying the inflatable unit 7 to the evacuation system makes it possible to support the evacuation chutes 5 in different positions in relation to the liferafts 4. For instance, in the embodiment shown to the left in Fig. 9, the evacuation chutes 5 are arranged on the right side of the inflatable unit 7. In the embodiment shown in the middle of Fig. 9, the evacuation chutes 5 are arranged in the centre of the inflatable unit, and in the embodiment shown to the right of Fig. 9, the evacuation chutes 5 are arranged on the left side of the inflatable unit 7.

[0039] Fig. 10 shows a part of the inflatable unit 7 supporting the evacuation chute 5. The evacuation chute 5 comprises a berth part 16 arranged at the outlet end of the evacuation chute 5, the berth part 16 having an extension 25 which is between 45 and 90 degrees compared to the vertical extension of the evacuation chute 5. The berth part 16 is adapted to lead the persons from the vertical extension of the evacuation chute 5 out of the evacuation chute 5, and to help de-accelerate the persons being evacuated. The berth part 16 is arranged in connection with the inflatable unit 7 so that when the persons leave the evacuation chute and berth part 16, they enter the liferaft (not shown). In this embodiment, the berth part 16 is shown without any side parts. The projecting part 30 is adapted to extend into the inflatable liferafts (not shown) to assist in positioning the inflatable liferafts in relation to the outlets of the evacuation chutes 5.

[0040] In Fig. 11, the berth part 16 comprises side parts 26 which are supported by a projecting part 30 projecting from the inflatable unit 7 towards the inflatable liferaft (not shown).

[0041] Furthermore, the chute support parts 7 may comprise a frame structure 27 being connected to the base part 8 and extending upwards from the base part 8, the frame structure 27 being configured in such a way that the evacuation chutes 5 extend into the frame structure 25 and are protected and supported by it.

[0042] The frame structure 27 may comprise a plurality of vertical beams 28 and at least one horizontal beam 29 arranged at the end opposite the end facing the base part 8, and the horizontal beam 29 may be positioned at the side of the inflatable unit 7 facing a side 15 of the vessel 3. Hereby, the chute support parts 7 also function as a distance element providing a distance between the evacuation chute 5 and the vessel 3, thereby minimising the risk of the evacuation chute slamming against the vessel side 15.

[0043] Fig. 12 shows an embodiment wherein the base part 8 of the inflatable unit 7 has a length L_B being less than the length of the inflatable liferafts (not shown). Furthermore, the chute support part 9 supports three evacuation chutes 5 and thereby has the same length as the base part 8.

[0044] The base part 8 has a first end 32 and a second end 33, first and second sides 34, 35 and a length L_B, as shown in Fig. 13. In this embodiment, the length L_B of the base part 8 substantially corresponds to the length of the inflatable liferafts (not shown). In Fig. 13, the evacuation system is shown with four evacuation chutes 5.

[0045] The embodiment shown in Fig. 14 has six evacuation chutes 5, whereby the chute support part 9 of the inflatable unit 7 has the same size as the base part 8.

[0046] Fig. 15 shows an embodiment of the inflatable unit 7, wherein the chute support part comprises the frame structure 27. The frame structure 27 comprises six vertical beams 28 connected by two square rings of horizontal beams 29. In this embodiment, the frame structure 27 has two spacial rooms within each ring, wherein evacuation chutes may be arranged and supported. At one end of the inflatable unit, the first bowsing line 10 may be connected. The frame structure 27 may have a height of between 0.5 and 4 meters.

[0047] In Fig. 16, the chute support part of the inflatable unit 7 of Fig. 15 is shown in another view. The square rings defined by the horizontal beams 29 have a rectangular design, and each ring may be adapted to receive one or more evacuation chutes (not shown).

[0048] In Fig. 17, an additional embodiment of the inflatable unit 7 is shown. In this embodiment, the frame structure 27 only has one square ring defined by the horizontal beams 29. The square ring has substantially the same design as the rings shown in Fig. 16. The frame structure 27 is positioned above the base part 8.

[0049] Fig. 18 shows yet another embodiment of the inflatable unit 7 being substantially the same as that shown in Fig. 17. However, in this embodiment, the frame structure 27 also comprises an inclined beam 31 extending from the square ring defined by the horizontal beams 29 to the base part 8 at its second end 33.

[0050] In Fig. 19, a further embodiment of the inflatable unit 7 is shown. In this embodiment, the frame structure 27 comprises three vertical beams 28 extending from the base part 8 up to the horizontal beam 29. The frame structure 27 also comprises three inclined beams 31 also connecting the base part 8 with the horizontal beam 29.

[0051] Although the invention has been described in the above in connection with preferred embodiments of the invention, it will be evident for a person skilled in the art that several modifications are conceivable without departing from the invention as defined by the following claims.

Claims

1. A marine evacuation system (1) for rapid evacuation of persons from an evacuation area (2) of a vessel (3), the system comprising

   - a plurality of inflatable liferafts (4),
   - a plurality of evacuation chutes (5) having substantially vertical extensions and extending from the evacuation area (2) to the inflatable liferafts (4), and
   - a bowsing system (6) adapted to position the inflatable liferafts (4) in relation to the vessel (3),

   wherein an inflatable unit (7) is arranged between the inflatable liferafts (4) and the vessel (3), the inflatable unit (7) comprising a base part (8) and a plurality of chute support parts (9), the chute support parts (9) extending upwards from the base part (8) and being connected with the plurality of evacuation chutes (5) at their outlet ends, and the bowsing system (6) from the evacuation area (2) of the vessel

being connected to the inflatable unit (7), and one or more of the inflatable liferafts (4) being connected to the inflatable unit (7).

2. A marine evacuation system (1) according to claim 1, wherein the inflatable liferafts (4) have first and second sides (18, 19), first and seconds ends (20, 21) and a length, a first inflatable liferaft of the plurality of inflatable liferafts at its first side being positioned opposite to and connected with the inflatable unit (7), and the remainder of the plurality of inflatable liferafts being positioned on the second side of the first liferaft side by side in relation to each other.

3. A marine evacuation system (1) according to any of the preceding claims, wherein one or more deflated liferafts (17) is/are arranged between and/or below the sides of two oppositely positioned inflatable liferafts.

4. A marine evacuation system (1) according to any of the preceding claims, wherein the evacuation chutes comprise a berth part (16) arranged at the outlet end, the berth part (16) having an extension which is between 45 and 90 degrees compared to the vertical extension of the evacuation chute.

5. A marine evacuation system (1) according to any of the preceding claims, wherein the chute support parts (9) comprise a frame structure (27) being connected to the base part (8) and extending upwards from the base part, the frame structure (27) being configured in such a way that the evacuation chutes (5) extend into the frame structure.

6. A marine evacuation system (1) according to claim 5, wherein the frame structure (27) comprises a plurality of vertical beams (28) and at least one horizontal beam (29) arranged at the end opposite the end facing the base part (8), and the horizontal beam (29) is positioned at the side of the inflatable unit (7) facing a side (15) of the vessel.

7. A marine evacuation system (1) according to claim 5 or 6, wherein the frame structure (27) comprises one or more projecting part(s) (30) projecting from the inflatable unit (7) towards the inflatable liferafts (4) and being adapted to extend into the inflatable liferafts to assist in positioning the inflatable liferafts in relation to the outlets of the evacuation chutes.

8. A marine evacuation system (1) according to any of the preceding claims, wherein the outlet of the evacuation chutes and the berth parts (16) are substantially positioned outside the inflatable liferafts.

9. A marine evacuation system (1) according to any of the preceding claims, wherein the bowsing system (6) comprises one or more winches arranged on the vessel, a first bowsing line (10) extending from the evacuation area and being connected with the first end (11) of the inflatable unit, and a second bowsing line (12) extending from the evacuation area and being connected with the second end (13) of the inflatable unit.

10. A marine evacuation system (1) according to claim 9, wherein the first and second bowsing lines (10, 12) extend from the evacuation area to the inflatable unit via turning points (14) arranged on a side (15) of the vessel.

11. A vessel (3) comprising a marine evacuation system (1) according to any of the preceding claims.

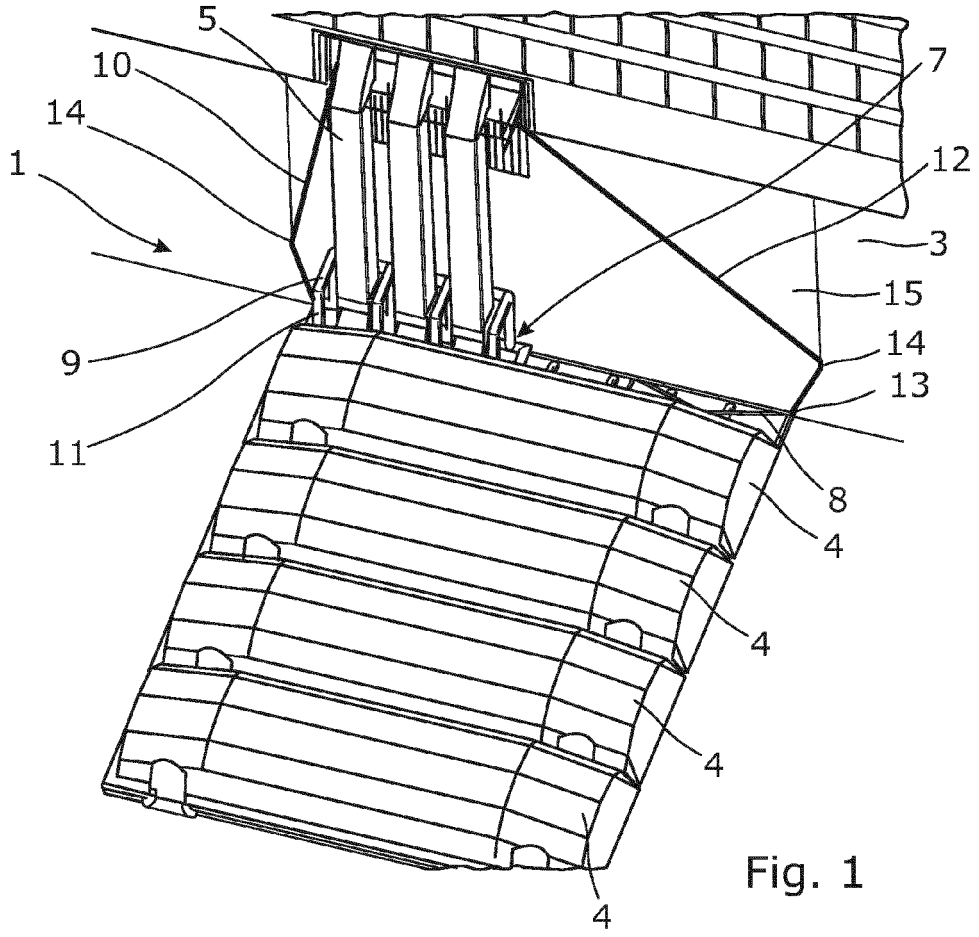

Fig. 1

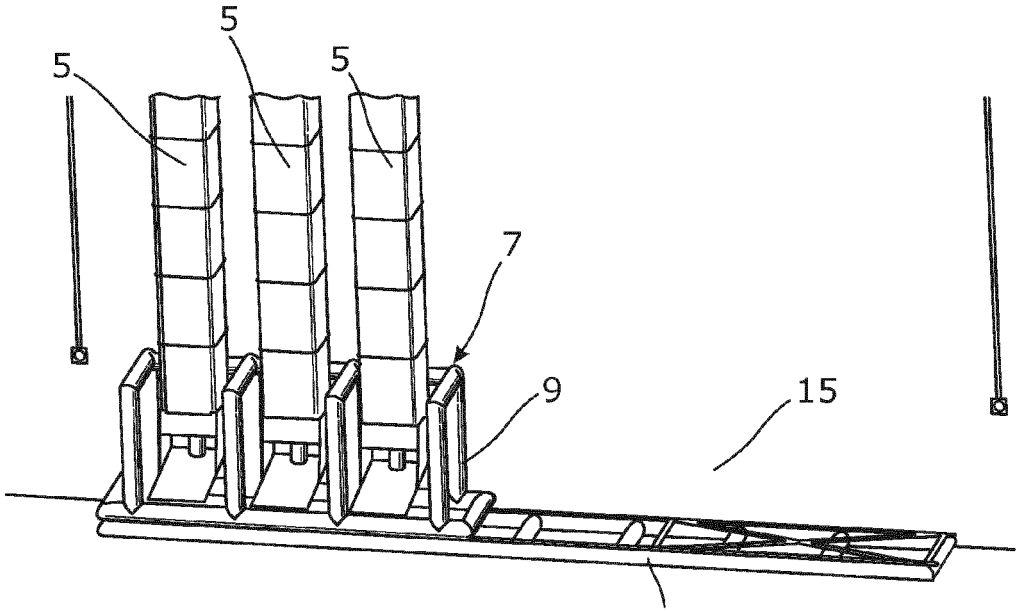

Fig. 2

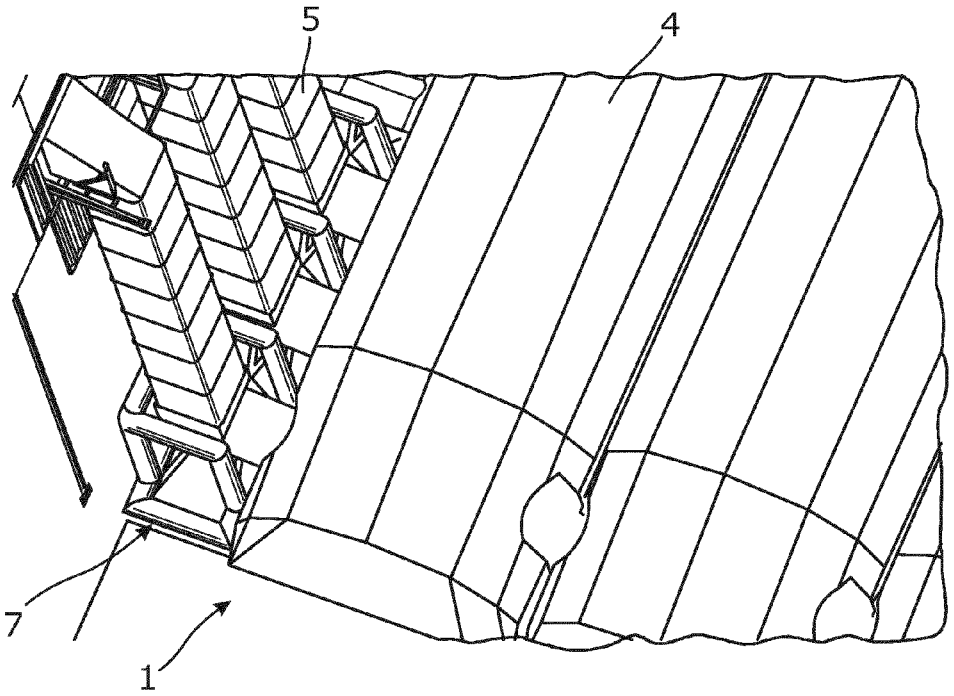

Fig. 3

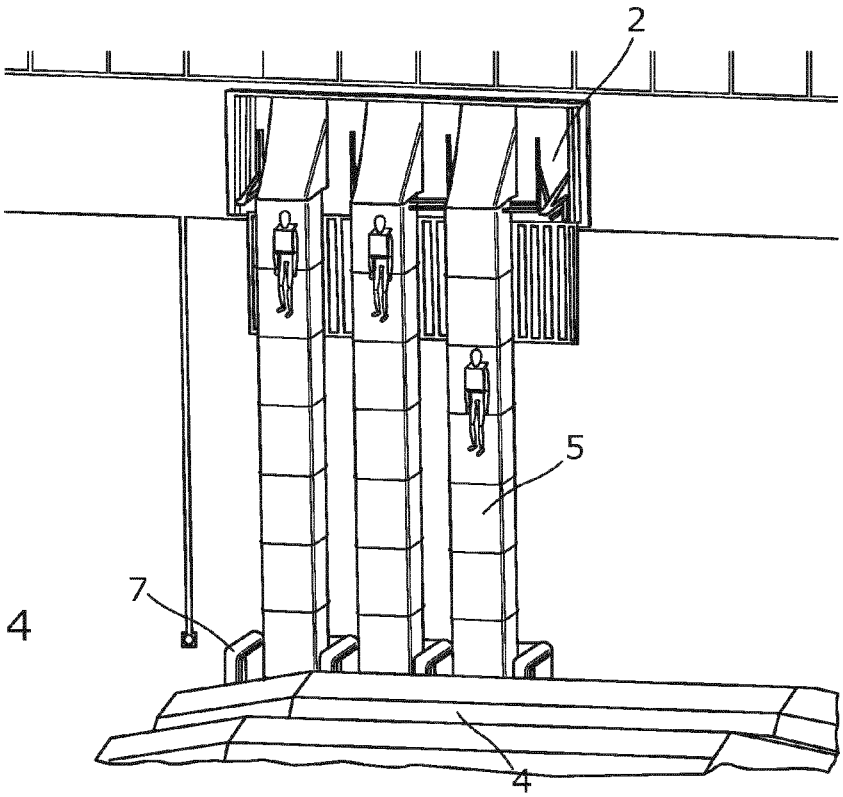

Fig. 4

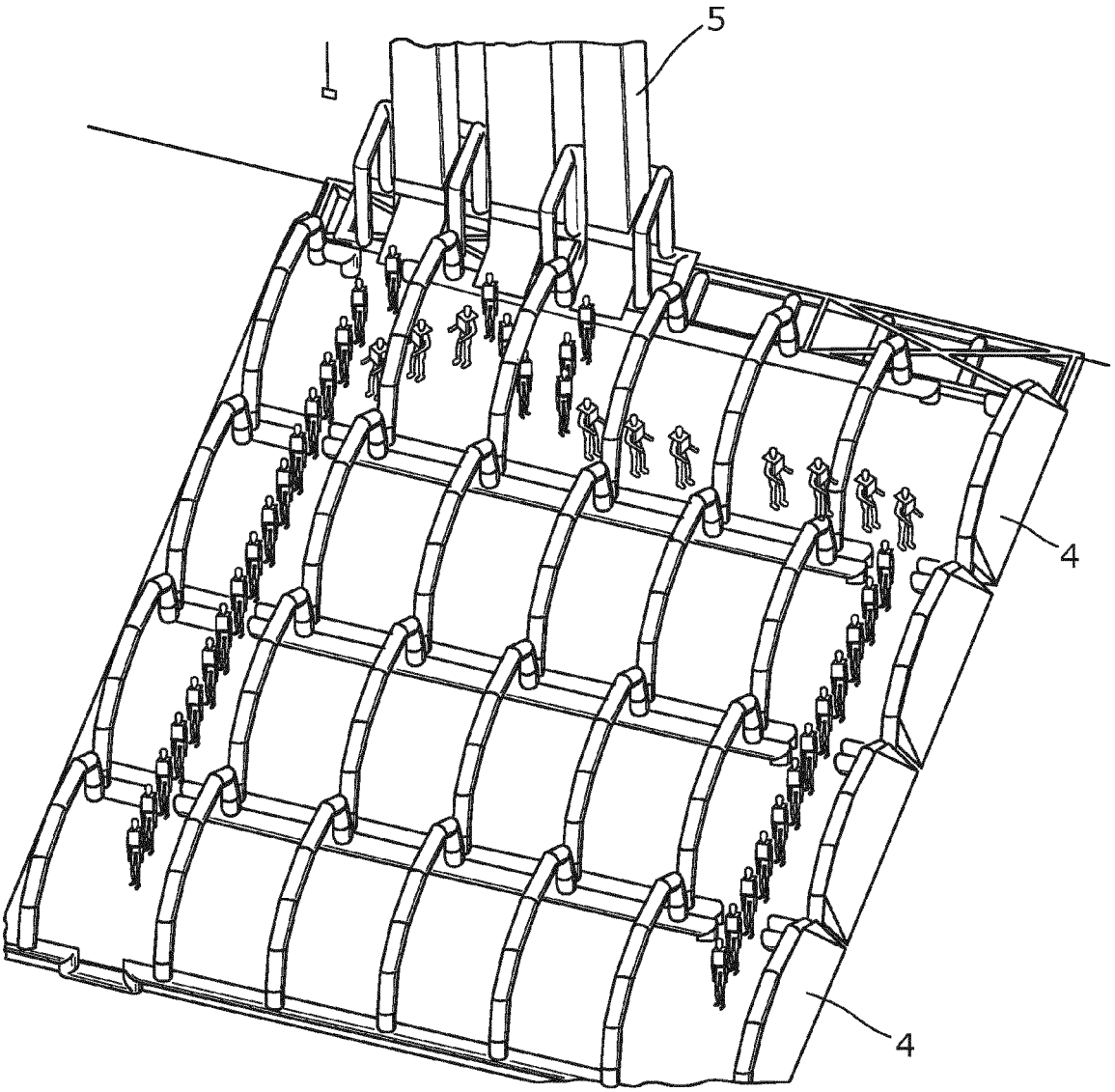

Fig. 5

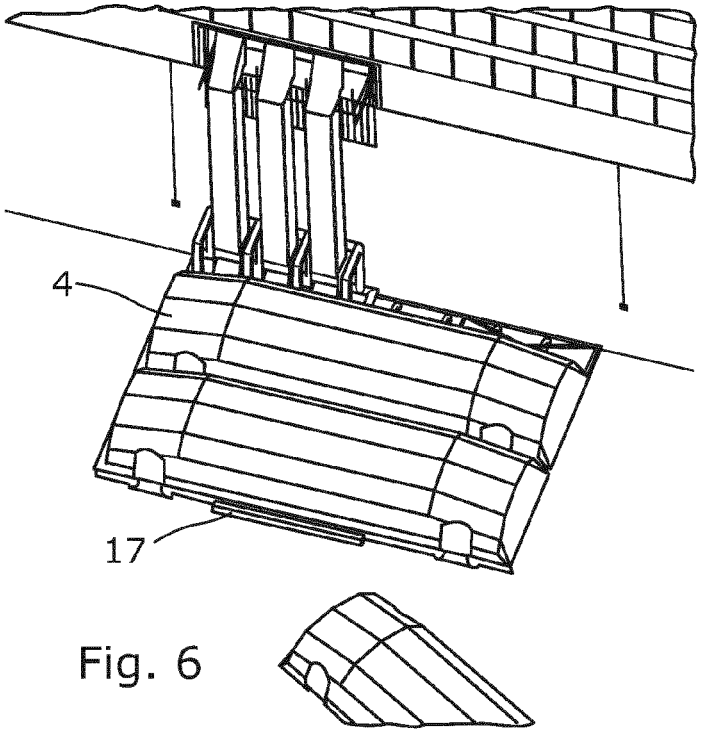

Fig. 6

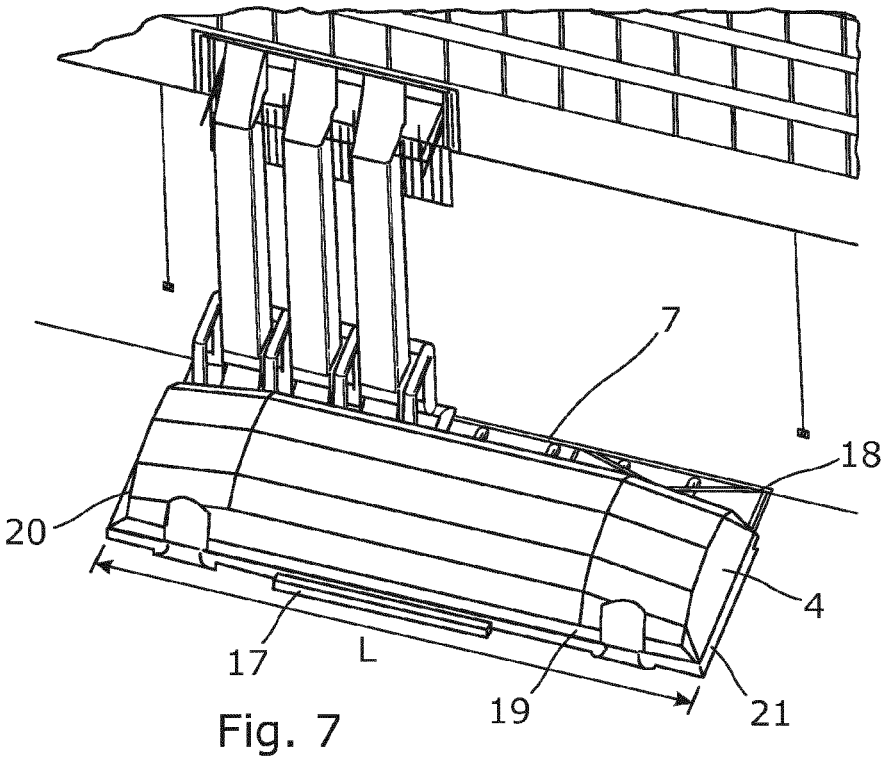

Fig. 7

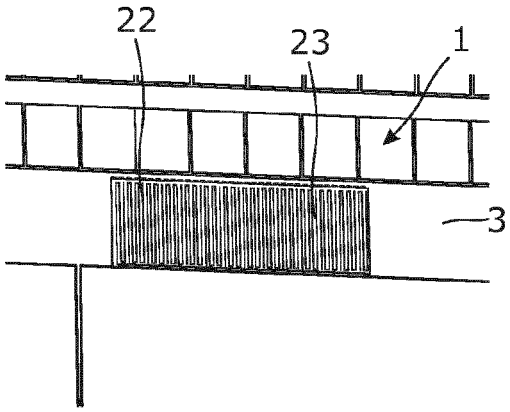

Fig. 8a

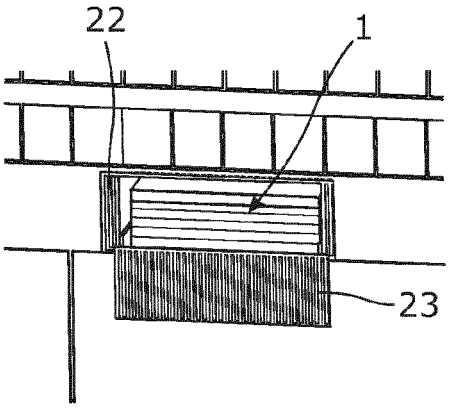

Fig. 8b

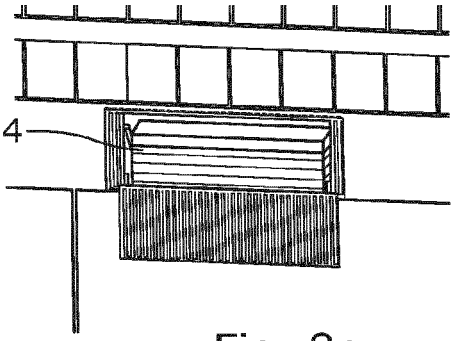

Fig. 8c

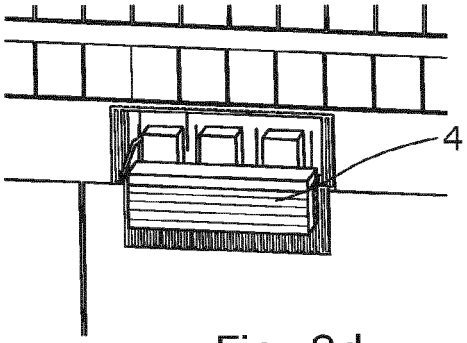

Fig. 8d

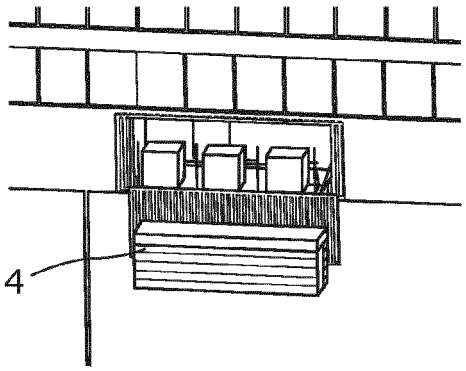

Fig. 8e

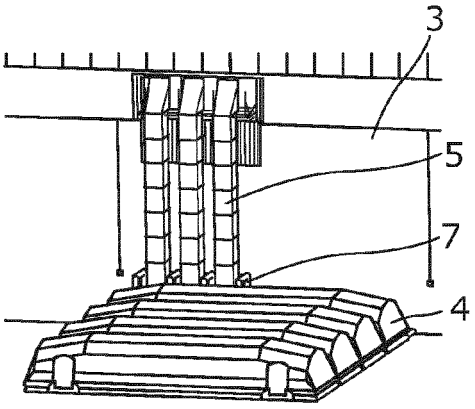

Fig. 8f

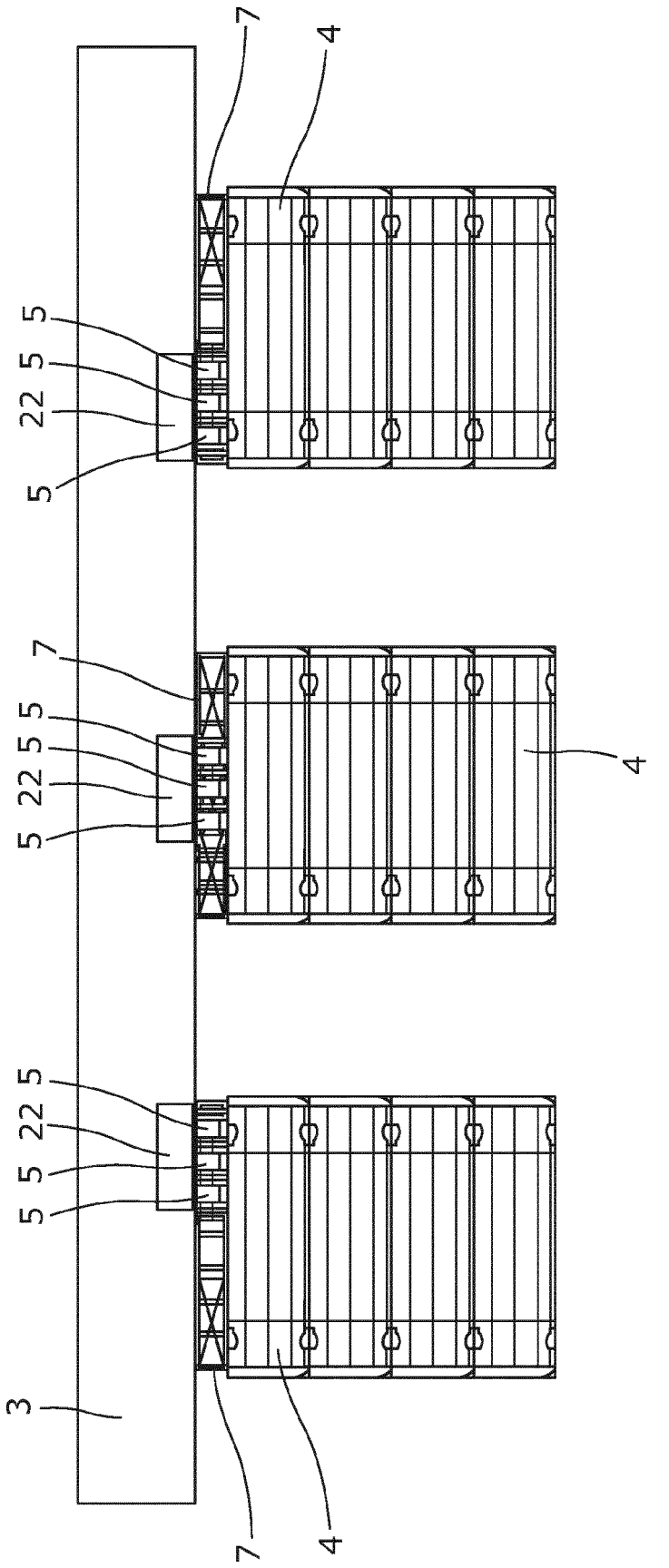

Fig. 9

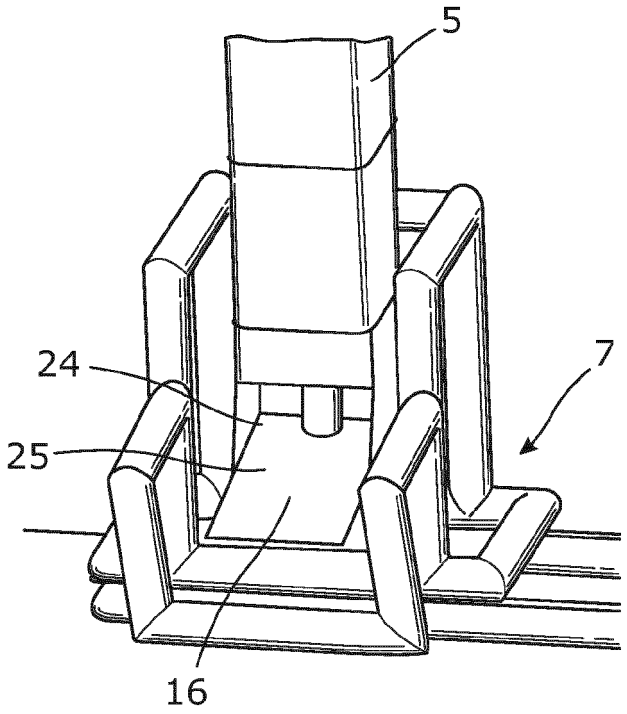

Fig. 10

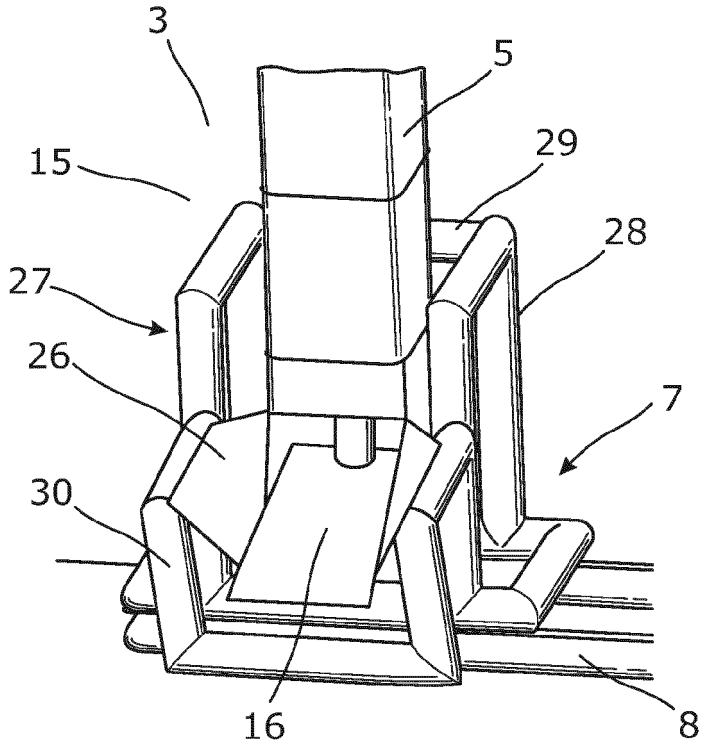

Fig. 11

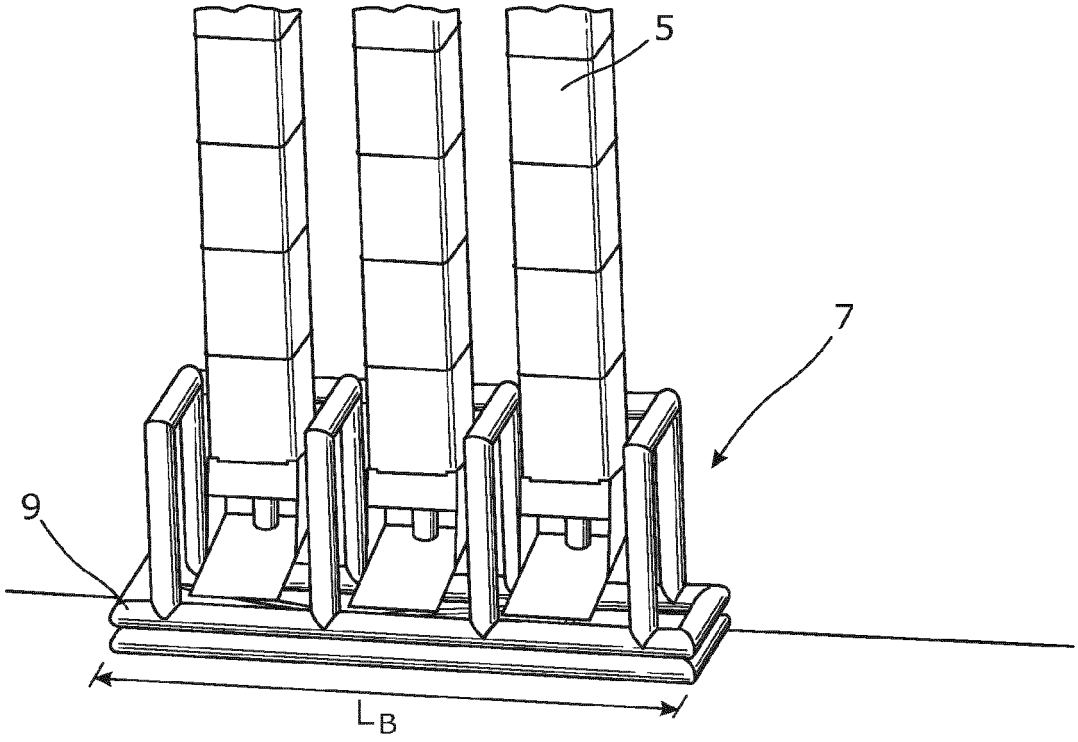

Fig. 12

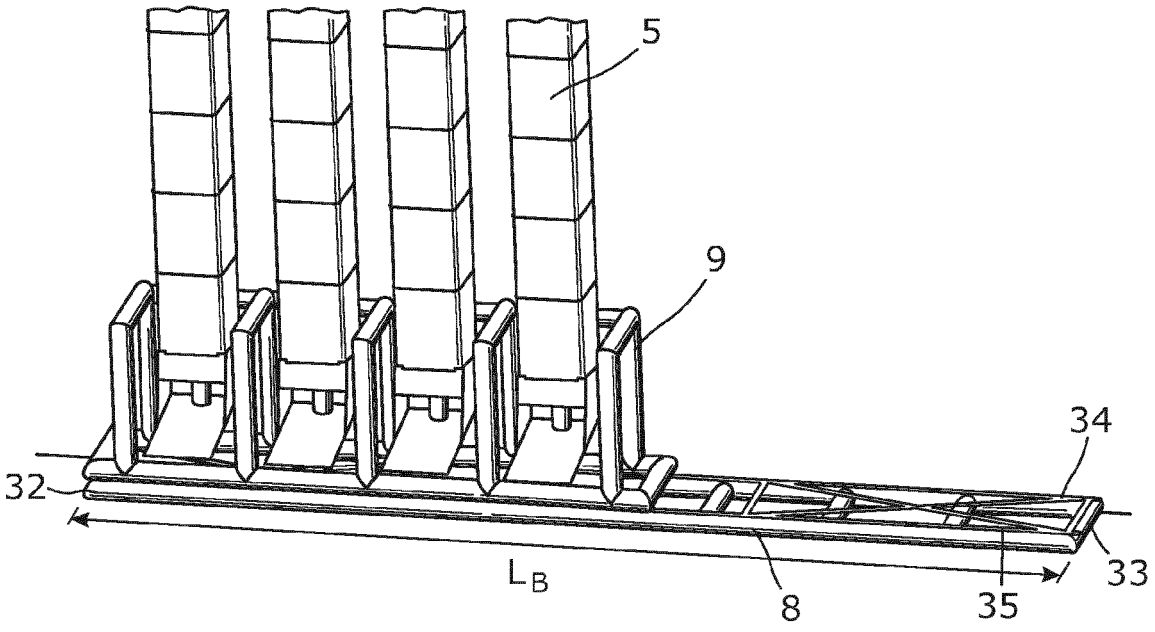

Fig. 13

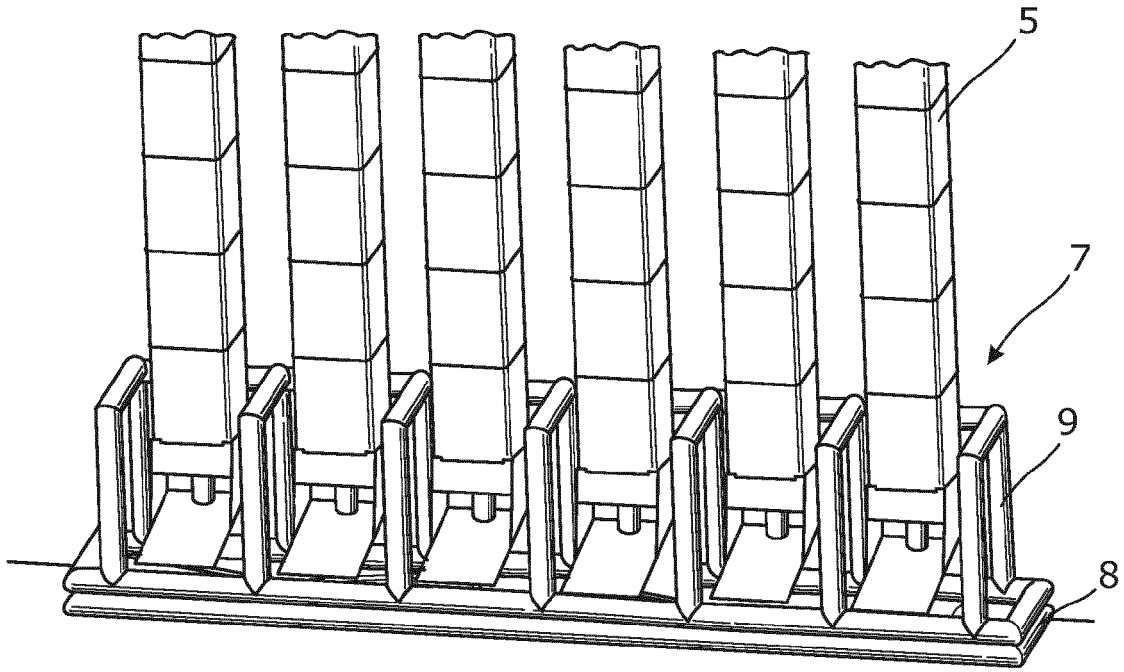

Fig. 14

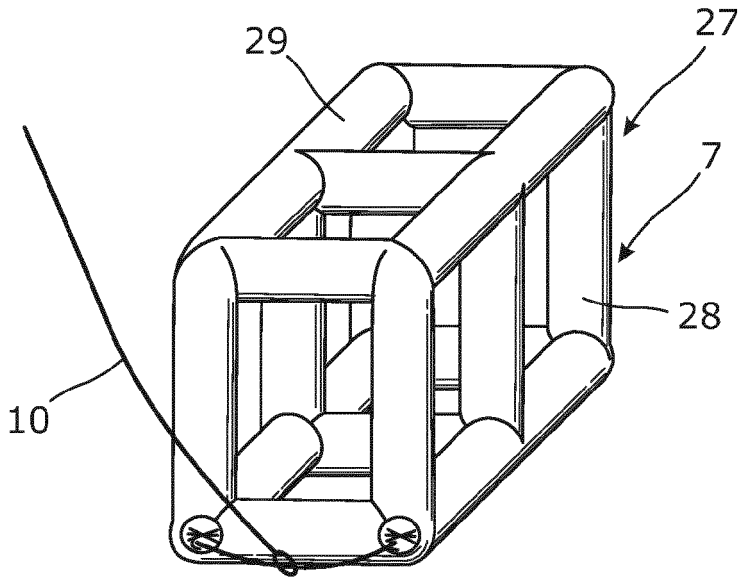

Fig. 15

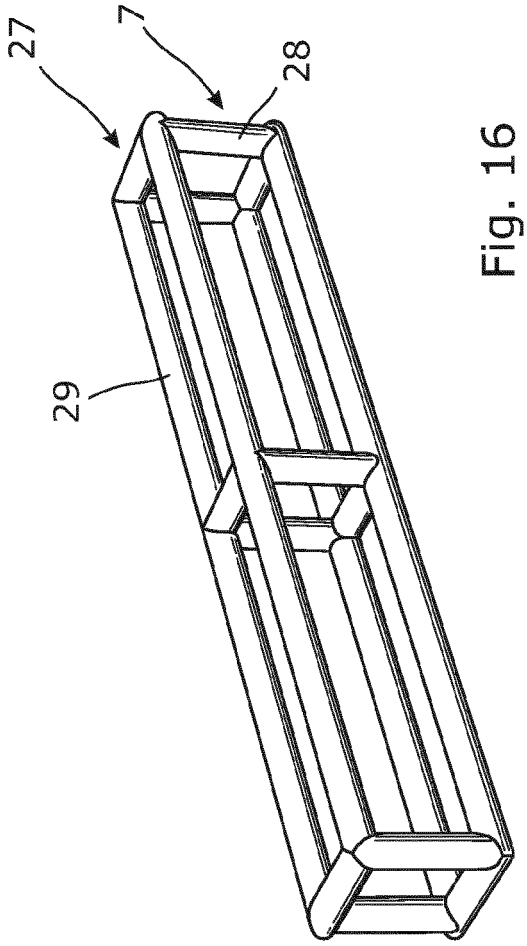

Fig. 16

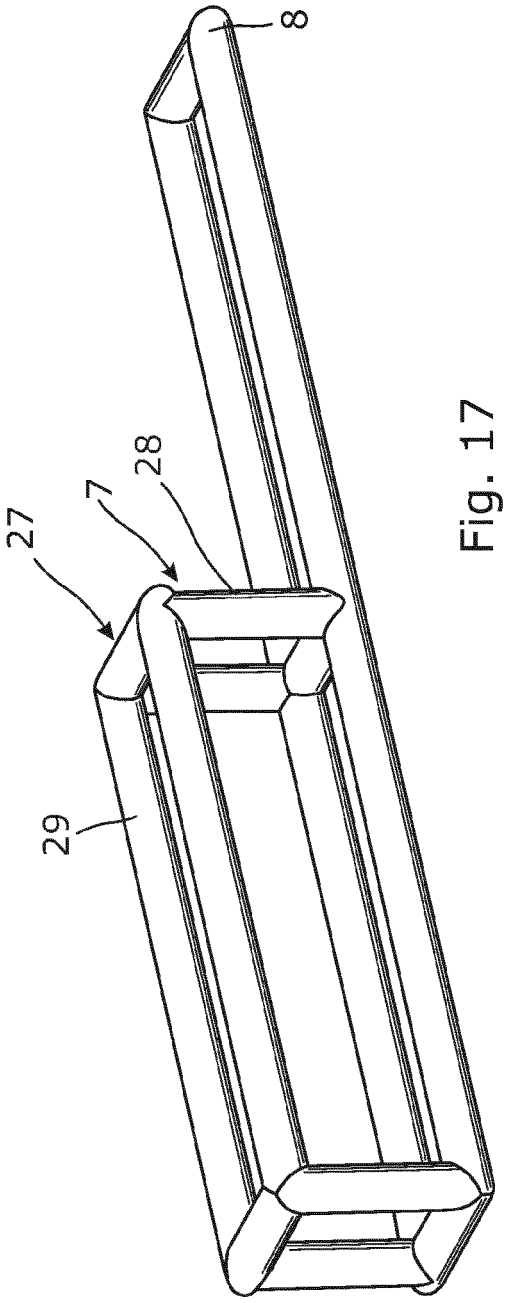

Fig. 17

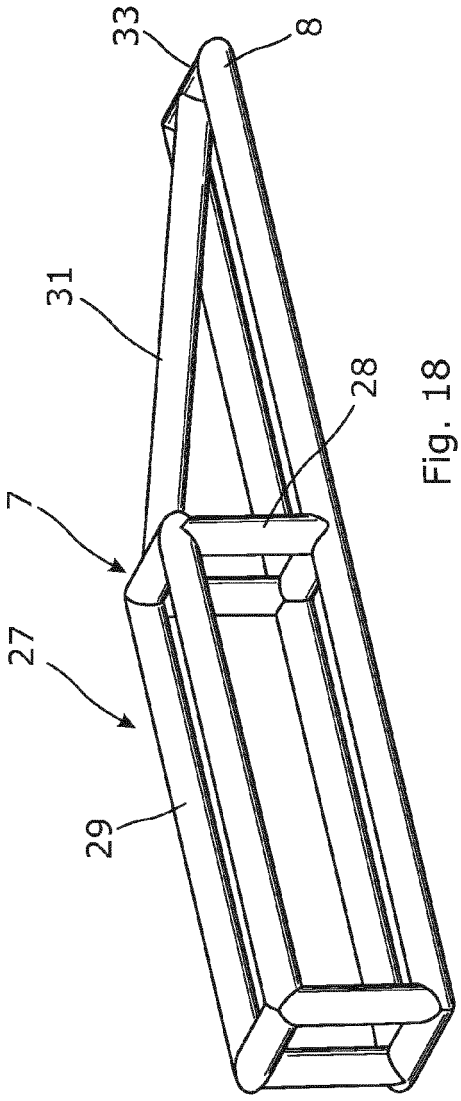

Fig. 18

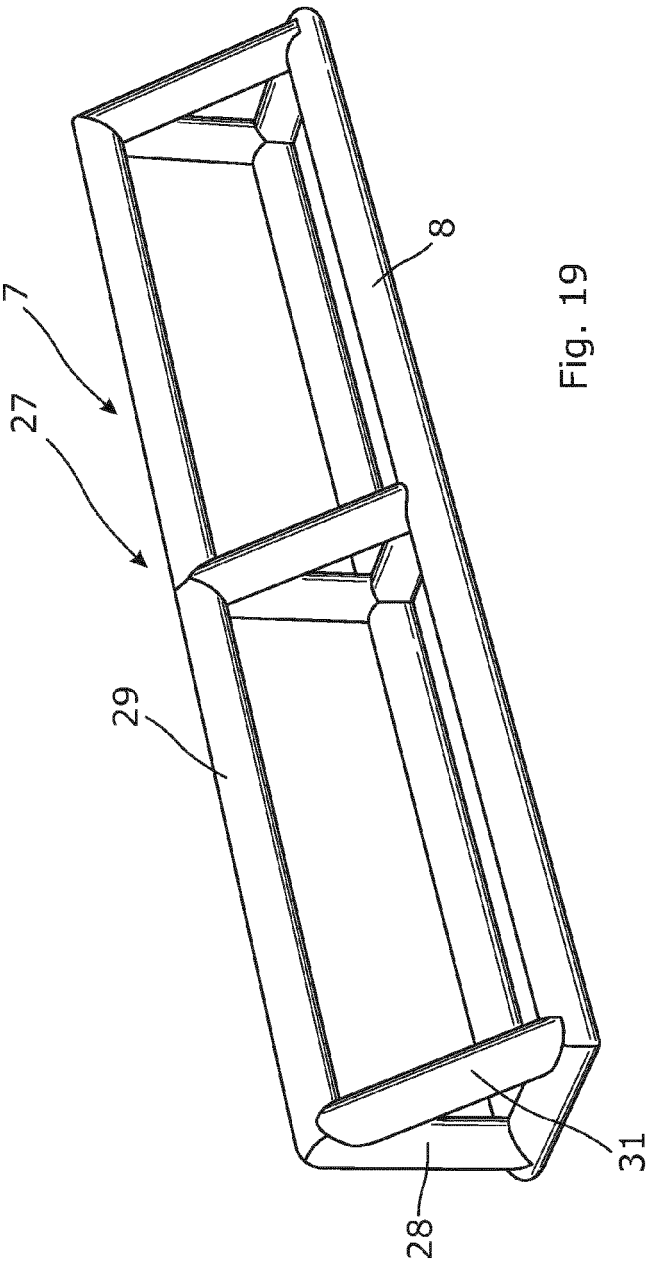

Fig. 19

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EUROPEAN SEARCH REPORT

Application Number
EP 13 15 7206

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B63B
B63C
A62B

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 July 2013	Gardel, Antony

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