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(54) **SEA-WORTHY CONTAINER CATCHING SYSTEM**

(57) A description is given of a container catching system which is sea proof, comprising movable arms, which may or may not be hinged, and which can be moved away from each other, said arms being arranged at a distance from each other such that a container fits between the arms. In practice, the container, being suspended from a hoisting device, is guided past the arms

in order to be lowered between the arms in a predetermined position, or to be hoisted up. In a possible embodiment, one or more arms are composed of portions which include an angle with one another such that when the container is made to land on a cam, the arm portions move in the direction of the container so as to retain the container between said arm portions.

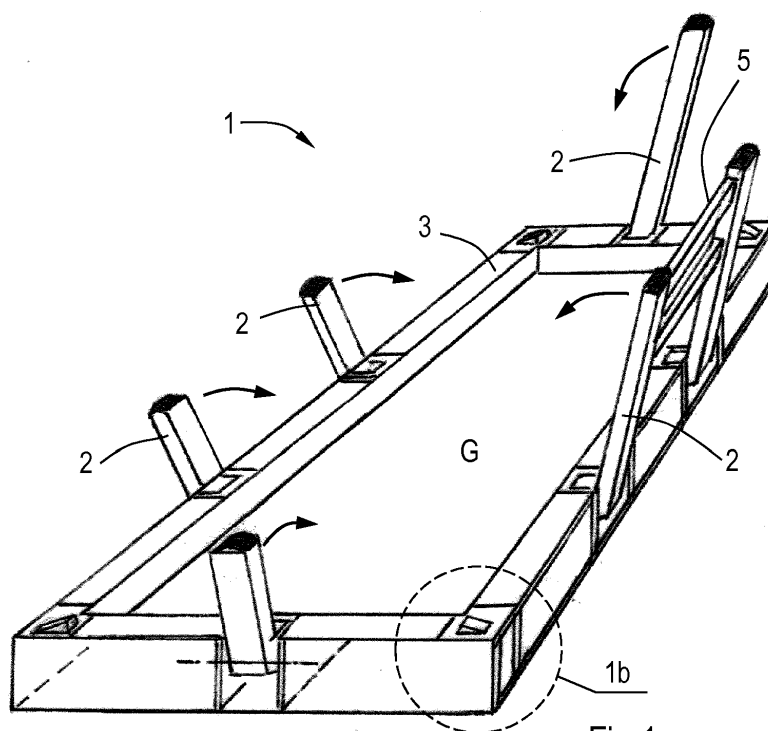


Fig.1a

Description

[0001] The present invention relates to a container catching system which is sea proof and to an associated method.

[0002] It is an object of the present invention to provide a more universal, but also safely applicable, container catching system, which can be used also in rough weather conditions at sea to bring containers, in particular sea containers, on board of a ship and secure them in situ.

[0003] To achieve this, the container catching system which is sea proof according to the invention is characterized in that it comprises arms, which may or may not be hinged, and which can be moved away from each other and towards each other, said arms being arranged at a distance from each other such that a container fits between the arms.

[0004] The corresponding method according to the invention is characterized in that a container butts against one or more arms which have been moved outwards, and which are arranged at a distance from each other such that a container fits between them, and the container which has been guided past the arms is lowered between the arms in a predetermined position.

[0005] An advantage of the invention resides in that, by virtue of the fact that the arms, which may or may not be hinged, can be moved at least away from each other, a container can be manoeuvred relatively easily within the area bounded by said arms, in order to be guided eventually to a predetermined position between the arms where it is put down. By virtue thereof, the invention can be used in a safe manner in turbulent water such as at sea, without the intervention of deck personnel, for example for lifting containers from and/or placing them on the deck of a supply vessel.

[0006] Advantageously, in an embodiment of the container catching system according to the invention, it is not necessary for all arms to be movable or hinged; the catching system according to the invention may alternatively comprise one or more fixed, if necessary arranged at a desired angle, arms which are of a more solid construction. By virtue thereof, large impacts during lifting containers on or from board can be better taken care of.

[0007] A further embodiment of the container catching system according to the invention is characterized in that neighbouring, movable or hinged arms are connected to one another by means of girders.

[0008] By connecting the arms to one another, and by being or not being collectively movable or hinged, said interconnected arms become mechanically stronger, enabling them to better take up the substantial impact forces caused by swinging containers without damage being caused.

[0009] An automatically operating catching system according to the invention is obtained if one or more of the movable arms are provided with arm end portions which are fixed with respect to one another, and which include an angle with one another such that when a container is

placed on the lower arm end portion, the upper arm end portion is moved towards the container.

[0010] In said case, the container which has been lowered onto the lower end portion generates sufficient force to make the respective arms move or hinge, so that the upper end portion of the arm moves automatically towards the container. In principle, this does not require additional power-consuming measures, such as actuators, to retain the container between the arms in the predetermined position.

[0011] A subsequent embodiment of the container catching system according to the invention is characterized in that the container catching system comprises one or more depressible cams, which are positioned such that when the container depresses one or more cams, the movable arms more closely retain the container.

[0012] By retaining the container in this way, the hinged arms can be moved or hinged mechanically by means of said cams and/or they can be moved or hinged through actuators which can be activated by means of said cams.

[0013] A container catching system which is capable of handling substantial impact forces is characterized in that at least one of the arms is composed of portions which are slightly movable in transverse direction with respect to each other. Said impact forces are handled safely by being flexibly damped as it were, by virtue of the fact that the portions are capable of yielding slightly in the transverse direction, usually under spring force.

[0014] Further detailed, possible embodiments explained in the other claims are mentioned, together with the associated advantages, in the following description.

[0015] The container catching system which is sea proof and the associated method according to the present invention will now be explained in greater detail with reference to the figures mentioned below, in which corresponding elements are indicated by means of the same reference numerals. In the figures:

Figure 1a shows an embodiment of said system comprising in general two or more movable arms;

Figure 1b shows a detail of a variant of the catching system of figure 1a provided with a cam which can be switched by a container to be placed thereon; and Figures 2a, 2b, 3 and 4 show alternative subsequent positions of a container lowered between the arms; and

Figure 5 is an exploded view of a detailed embodiment of the system according to the invention.

[0016] Figure 1a shows a container catching system 1 which is sea proof, comprising arms 2 which can move in the direction of the arrows and in the opposite direction, said arms being secured, in the embodiment shown, on a frame 3. In principle, the use of the frame 3 is not necessary, because the movable arms 2 can also be secured individually to a suitable base. However, the use of the frame 3 has the advantage that it can be manufactured in one rigid piece and subsequently transported to a ves-

sel where it is secured, detachably or undetachably, by means of, for example, clamps, at a desired location on the deck of the vessel.

[0017] The arms 2 can be moved to and fro by means of, as desired, electrical, mechanical, electromechanical, pneumatic or hydraulic actuators, which may or may not be sensor controlled. Such actuators, which can be properly fitted, are known per se and hence not shown here. By moving the at least two or more arms 2 outwards, in the figures by means of hinges, with respect to a base G, within which a container 4 must be placed, an at least partly prismatic spatial form is obtained of which the outside area is larger than the base G and the bottom of the container 4. Within said larger outside area, which is bounded by the tallest arms 2, manoeuvring and guiding, by means of a crane, of a container 4 suspended from said crane is easier. The situation in which a container is lowered is diagrammatically shown in figures 2b, 2a, 3 and 4.

[0018] In addition to a few arms 2 which are necessarily arranged so as to be movable or hinged, the above-mentioned system 1 may comprise one or more fixedly arranged arms 2 which, if necessary, may be of extra robust construction, in order to cushion in particular the first shocks from the container 4, without damage to the system, said container usually being suspended in a hoisting sling and swinging back and forth. For the same reason, it may be desirable to interconnect a number of arms 2 by means of girders 5, causing said interlinked movable arms 2 to move jointly.

[0019] Advantageously, the arms 2 are of different length, as is shown in figure 1a. If the container 4 of figure 1a - also see figure 2b - is suspended from a hoisting device, not shown in the figures, which comes from the left, then the not shortened arms 2 present on the feed-in side of said container would only be in the way during the feed-in operation. Even more so because the ship, which may be for example a supply vessel, is also subject to vertical movement, induced by the wave motion, with respect to the container to be loaded or unloaded. In the embodiment of figure 1a, the system 1 comprises three short and three long arms 2.

[0020] Figure 2a shows that one or more arms 2 are composed of portions 2-1, 2-2 which include an angle with one another such that when the container 4 is placed on the lower arm portion 2-1, the upper arm portion 2-2 moves, in this case automatically and, as yet, not necessarily in an actuator-controlled manner, in the direction of the container 4.

[0021] Figure 3 shows the situation where the container 4, being guided along the long arm 2-2, is lowered further between the long and short arms 2. If the bottom part of the container 4 presses on the arm portion 2-1, then the force F shown in the figure causes the arm portion 2-2 to move in the direction of in particular the side walls 4-1 of the container 4, thereby causing them to be retained between the raised arms 2. As shown in the figure, the arms 2 are predominantly L-shaped for this

purpose. Conversely, if the container moves upwards from the position shown in figure 4, the arms can move in opposite directions to obtain sufficient freedom of movement and space for the container 4 which is moving upwards.

[0022] Figures 2a and 3 further show that, in this case, the arm portion 2-2 is composed of two portions which are movable in the transverse direction with respect to each other, which are referenced 2.1 and 2.2 in figure 5. In this case said portions are separated from each other by a spring 6, and they can move in the transverse direction with respect to each other if a container impacts the upper portion 2-2. By virtue thereof, impact forces are cushioned which would otherwise permanently damage the system 1 and/or the container 4.

[0023] In the situation shown in figure 4, the container is safely retained in the area G of figure 1a between the raised arm portions 2-2; and the container rests on the depressed arm portions 2-1.

[0024] Figures 2a, 3 and 4 show that, underneath the projected bottom of the container 4, if there is a frame, said frame 3 accommodates hinge pins 7. Such hinge pins 7 are provided in the lower arm portion 2-1 and, in this case, the movable arms 2 hinge about said pins. In addition, the construction and the arms 2 are aligned and dimensioned such that the container 4 accurately fits in the area G. If the arms 2-2 are hinged outwards, a large spatial area, as explained hereinabove, is obtained within which, in the first instance, a better manoeuvrability of the container 4 is achieved.

[0025] In the case of an actuator-controlled method of catching the container 4 and moving or hinging the arms outwards or back in the opposite direction, the actuator may be located directly on the rotatably driven hinge pin 7 or the actuator can interconnect neighbouring lower arm portions 2-1 in an indirect manner through a vertically movable beam 8.

[0026] The container catching system 1 may comprise one or more depressible or hinged cams 9, which are positioned such that after lowering and placing the container 4 between the opened arms 2-2, one or more cams 9 are depressed. This triggers the actuators, if any, to hinge the arms 2-2 and, if necessary more closely, retain the container 4.

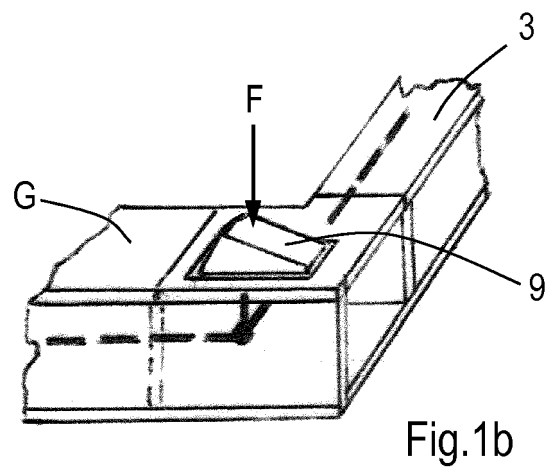
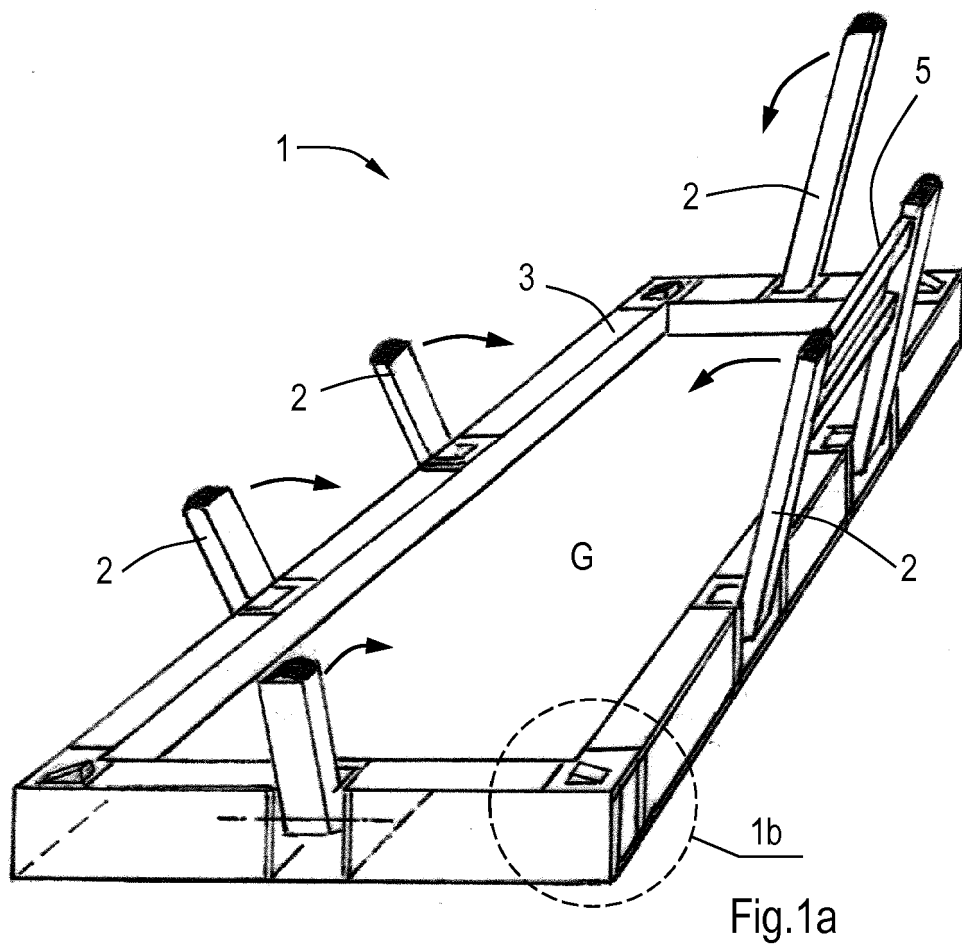
[0027] In practice, said movement of the arms 2 can be realized in a simple and reliable manner with a minimum number of means by using arms 2 which can be hinged. Without actuators, the normally raised cams 9, when depressed as a result of the placement of the container 4, would be able to transfer the force completely mechanically to the hinged arms 2 by means of the beam 8. This passive depression of the cam and the resultant rotary movement of the arms 2 is diagrammatically shown in figure 1b by means of an interrupted line as well as in the exploded view of figure 5.

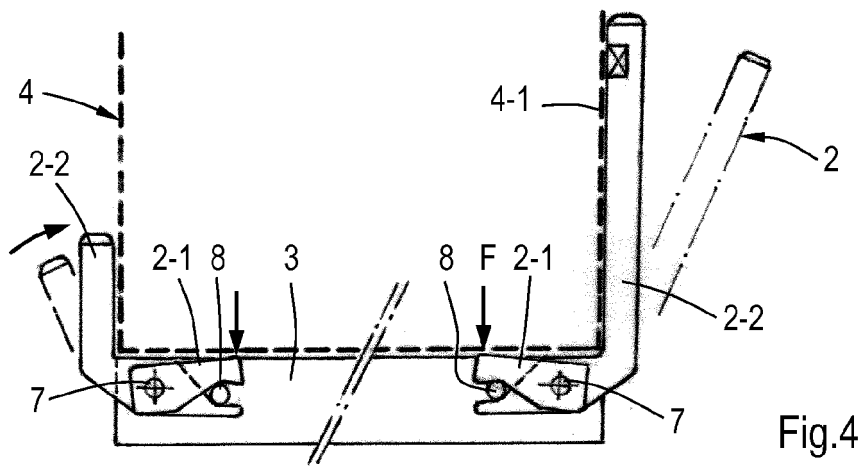
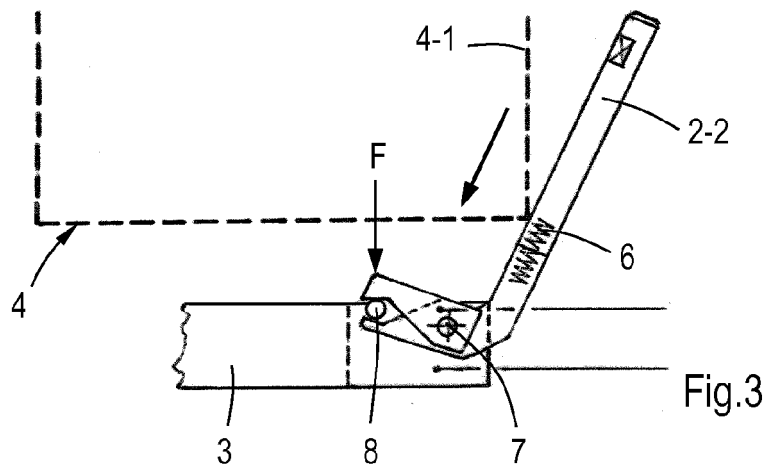
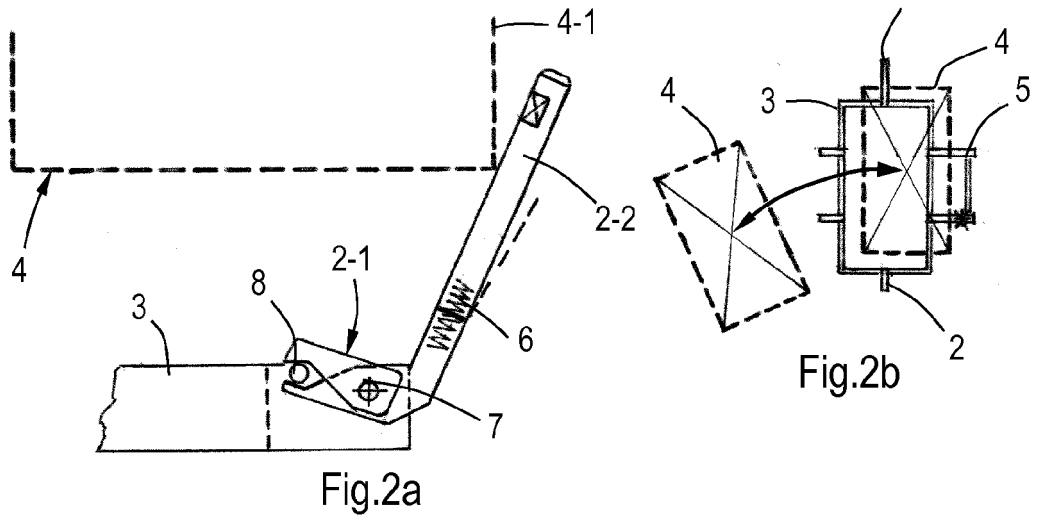
[0028] Preferably, at least one of the cams 9 is provided on a container-detection corner point of the area G, as shown in detail in figure 1b, within which the container is

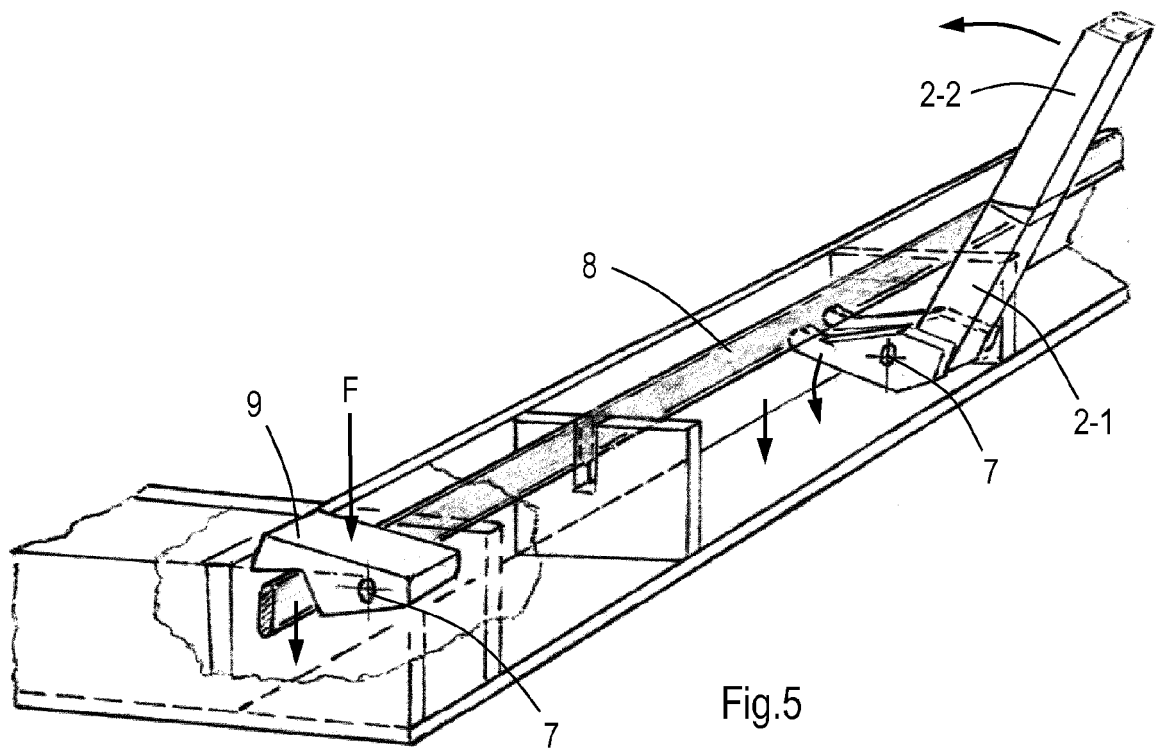
expected and hence to be placed, so that the container, when exerting a downward force F on said corner point, operates the cam 9. As a result, the beam 8 moves in a downward direction, causing the arm portions 2-2 to hinge towards each other. In practice, the cams 9 are placed on unequivocal reference positions in the area G where the so-termed corner fittings of the container 4 are expected.

Claims

1. A container catching system which is sea proof, comprising arms, which may or may not be hinged, and which can be moved away from each other and towards each other, said arms being arranged at a distance from each other such that a container fits between the arms. 5
2. The container catching system according to claim 1, **characterized in that** the container catching system comprises a frame on which the arms are secured. 10
3. The container catching system according to claim 1 or 2, **characterized in that** the container catching system or the frame is constructed so as to be mountable on a vessel. 15
4. The container catching system according to any one of the claims 1 to 3, **characterized in that** the container catching system comprises one or more fixedly arranged arms. 20
5. The container catching system according to any one of the claims 1 to 4, **characterized in that** a number of arms are interconnected by means of girders. 25
6. The container catching system according to any one of the claims 1 to 5, **characterized in that** one or more arms are composed of portions which include an angle with one another such that when the container is placed on the lower arm portion, the upper arm portion moves in the direction of the container. 30
7. The container catching system according to any one of the claims 1 to 6, **characterized in that** the container catching system comprises one or more depressible cams, which are positioned such that when the container depresses one or more cams, the arms retain the container, if necessary, more closely. 35
8. The container catching system according to claim 7, **characterized in that** at least one of the cams is provided on a corner point of the area within which the container is to be placed. 40
9. The container catching system according to claim 7 or 8, **characterized in that** the container catching system comprises electrical, mechanical, electro-mechanical, pneumatic or hydraulic actuators, which may or may not be sensor controlled, which are connected to the at least one cam, and which are constructed so as to make the arms move to and fro or to make them hinge. 45
10. The container catching system according to any one of the claims 1 to 9, **characterized in that** at least one of the arms is composed of portions which are movable, in transverse direction, with respect to each other. 50
11. The container catching system according to any one of the claims 1 to 10, **characterized in that** the arms are of different length, wherein, in particular, the arms on the input side, along which containers pass, are lower than the other arms. 55
12. A method in which a container butts against one or more arms which have been moved outwards, and which are arranged at a distance from each other such that a container fits between them, and the container which has been guided past the arms is lowered between the arms in a predetermined position.
13. The method according to claim 12, **characterized in that** the arms are moved or hinged in the direction of the container.
14. The method according to claim 12 or 13, **characterized in that** the container, being suspended from a hoisting device, butts against the arms and is lowered between said arms.
15. The use of the sea-proof container catching system, according to any one of the claims 1 to 11, in applying the method according to any one of the claims 12 to 14 for loading or hoisting containers onto, or unloading or hoisting containers from, a vessel provided with the container catching system, in particular containers which may or may not be rescue containers for people or sea containers, or for corresponding service operations.









EUROPEAN SEARCH REPORT

Application Number
EP 16 19 3031

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			B63B B65G B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 October 2016	Examiner Schmitter, Thierry
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82