CLAIMS

1. A device (1) for remotely coupling together two vessels, in particular a first vessel consisting of a first ship or floating support (10) and a second vessel consisting of a second ship (11), the device comprising:

- at least one floating and docking structure (3) comprising at least one docking float (3a, 3a1-3a4, 3a', 3a'1-3a'4) suitable for being ballasted and de-ballasted in order to enable said floating and docking structure to be immersed in controlled manner, and at least one docking element (3b) fastened to or suitable for being releasably fastened to the hull (11a, 11b) of a second vessel (11); and

- at least two actuators (2, 21-24), preferably at least three actuators, spaced in succession from one another in the longitudinal direction of the first vessel (10), one end of the actuator cylinder (2a) of each said actuator being fastened to said first vessel, preferably to the side (10a) of the hull of said first vessel (10), using a first fastener and pivot hinge device (2c1), and the end of the rod (2b) of each actuator being fastened to or being suitable for being fastened, preferably in releasable manner, to a said floating and docking structure (3) via a second fastener and pivot hinge device (2c2).

2. A device according to claim 1, characterized in that said actuators in the retracted position and fastened to said floating and docking structure via said second fastener and hinge devices (2c2) are suitable for being positioned together, vertically or in a position close to the vertical, against the hull (10a) of the first vessel (10), and out of the water when said floating and docking structure (3) is not fastened to a said second vessel and said docking float is de-ballasted.

3. A device according to claim 1 or claim 2, characterized in that said first and second fastener and pivot hinge devices (2c1, 2c2) at the end of each actuator (2, 21-24) each make possible at least a first pivoting movement of said actuator about a horizontal first axis (X1X1', X2X2') perpendicular to the longitudinal axis of said actuator, and a second pivoting movement of said actuator about a second axis (Y1Y1', Y2Y2') perpendicular to the longitudinal axis of said actuator and situated in a vertical plane containing the longitudinal axis of said actuator, and preferably said first and second fastener and pivot hinge devices (2c1, 2c2) at the ends of each actuator (2, 21-24) also made possible a third pivoting movement about the longitudinal direction of the actuator.

4. A coupling device according to any one of claims 1 to 3, characterized in that when the rod (2b) of each said actuator (2, 21-24) is fastened to a said floating and docking structure (3), said actuator is arranged above the surface of the sea (12) horizontally or with the actuator rod sloping relative to a horizontal plane at an angle of less than 15 degrees while remaining out of the water, the cylinders of said actuators preferably being fastened to the side (10a) of the hull of said first vessel at the same height.

5. A coupling device according to any one of claims 1 to 4, characterized in that when said actuators (2, 21-24) are fastened to said floating and docking structure (3), they are arranged parallel to one another and/or sloping at an angle of less than 30 degrees relative to a vertical plane perpendicular to the vertical plane that is tangential to the side of the first vessel.

6. A coupling device according to any one of claims 1 to 5, characterized in that said actuators are double-acting

hydraulic actuators having rods (2b) that are set to an initial coupling extension position, preferably at half-stroke, and having a hydraulic circuit that is adjusted and/or automatically controlled in such a manner that any departure from said initial coupling extension position is corrected in order to reestablish the desired spacing between the two vessels, and in particular to reestablish the initial extension of the actuator rods.

7. A coupling device according to any one of claims 1 to 6, characterized in that said floating and docking structure comprises at least one attachment element (3b1) suitable for attaching to the second vessel while said float is ballasted at least in part and said attachment element is underwater, said attachment element presenting an arrangement and/or shape making it suitable for being positioned under the bottom (11b) of the second vessel by ballasting said docking float and then for pressing against and/or facing the bottom (11b) of the second vessel by partially de-ballasting said docking float.

8. A coupling device according to claim 7, characterized in that said attachment element suitable for being underwater is situated on said floating and docking structure at a height such that when the float is de-ballasted and said actuators are safely positioned against the first vessel, said attachment element is out of the water.

9. A coupling device according to any one of claims 7 to 8, characterized in that said attachment element of the floating and docking structure for attaching to said second vessel includes magnetic or pneumatic suction cups (3b, 3b1, 3b2) suitable for pressing against the side and/or the bottom of the second vessel.

10. A coupling device according to any one of claims 7 to 9, characterized in that said attachment element (3b) is constituted or supported by a portion of the floating and docking structure (3) that forms a fork (33) suitable for extending under the bottom (11b) of the hull of the second vessel from side to side and supporting magnetic or pneumatic suction cups suitable for bearing against the bilges (11c) of the hull of the second vessel.

11. A coupling device according to any one of claims 1 to 10, characterized in that it has a single said floating and docking structure (3) constituted by beams and/or tubes (31, 32a-32b, 33a-33b) assembled together in a truss assembly forming a tower, preferably a tubular structure of rectangular parallelepiped shape, having at least one said float (3a) underwater suitable for being ballasted, preferably in the form of a cylinder and/or a rectangular caisson (3a1-3a4, 3a'1-3a'4) that is integrated in or supported by said floating and docking structure.

12. A coupling device according to any one of claims 1 to 11, characterized in that said floating and docking structure extends:

a) heightwise from under the hull of said second vessel to at least above the deck of said second vessel, preferably over a height lying in the range 60 m to 100 m; and

b) in the longitudinal direction of the second vessel over a length (L1) that is at least one-fourth of the length of said second vessel.

13. An assembly of two vessels remotely coupled together using a coupling device according to any one of claims 1 to 12.

14. An assembly of two vessels according to claim 13, characterized in that said coupling device (1) provides coupling between a first vessel (10) which is a floating support of the type including an installation for liquefying or regassifying gas, and a second vessel (11) of the methane tanker type.

15. A method of implementing a coupling device according to any one of claims 1 to 12, characterized in that the following steps are performed:

a) with said actuators (2, 21-24) being in a retracted position and said floating and docking structure (3) with at least one said de-ballasted float (3a) being fastened to said actuators via said second fastener and hinge devices (2c2), and said actuators being pressed at least in part out of the water against and/or above the hull of the first vessel, said float(s) is/are ballasted in order to immerse said floating and docking structure to a depth for fastening it to the second vessel, and said actuators are pivoted and deployed together in order to fasten said floating and docking structure against the second vessel;

b) with said actuators deployed in an initial coupling position and with said floating and docking structure fastened to said actuators via said second fastener and hinge devices (2c2) and being fastened to said second vessel via said attachment element(s) (3b), with a said float being ballasted, said actuators are actuated in extension and/or said actuators are controlled automatically so that said actuators and the two vessels remain in their initial position or return towards the initial position with a distance between the two vessels being controlled in the event that they depart therefrom; and

c) with said actuators being deployed in an initial coupling position and said floating and docking structure being fastened to said actuators and to said second

vessel, and with said float ballasted, said floating and docking structure is separated from said second vessel, and then said actuators are retracted and said float is de-ballasted in order to cause the actuators to pivot and be pressed at least in part out of the water against and/or above the hull of the first vessel.