DEVICE FOR LIFTING A SEAGOING CONSTRUCTION SUCH AS A DRILLING RIG, PROVIDED WITH LIFTING MEMBERS RUNNING MUTUALLY PARALLEL

The invention relates to a device for lifting a seagoing construction such as a drilling rig, which device comprises two or more floater bodies located on either side of the seagoing construction, one or more beam-like lifting members supported movably on a floater body and running parallel or practically parallel to each other and supported on at least two support points of the floater body.

Different methods for lifting such constructions at sea have already been proposed, such as described for instance in the American patent 5829919. Use is made herein of two floater bodies on either side of the construction for lifting, wherein lifting devices are arranged projecting along the longitudinal sides thereof. The drawback of such an embodiment is that the constituent components of the lifting means limit the free movement of the construction for lifting relative to the floater bodies. It is herein noted that the swell of the sea requires a continuous compensation of the relative movements of the floater bodies in relation to the construction to be lifted.

The invention has for its object to obviate the above stated drawback and to propose a lifting embodiment which enables an optimal freedom of movement of the construction for lifting relative to the floater bodies and which satisfies the requirement of movement compensation.

The device according to the invention is distinguished in that in the case of each lifting member at least one support point is adjustable in vertical and~~/or~~ horizontal direction, at least the other support point allowing rotation of the beam-like lifting member in a horizontal or vertical plane, and the free end part of the lifting member has a pressure

point coming into contact with the construction ~~for~~ to be lifted.

As a result of the beam-like lifting members according to the invention it is possible for the free end part projecting over the longitudinal side of the floater body to be embodied without space-requiring rods or cylinders, wherein the support point displaceable in vertical and horizontal direction for the beam-like lifting member is situated at a distance from the lifting point, this such that the lifting members can move vertically and horizontally independently of each other, thereby providing the optimal freedom of movement and movement compensation for the construction for lifting.

The invention further proposes to provide the said vertical and horizontal movable support point on the floater body with at least one cylinder, preferably a hydraulic cylinder, in order to control the vertical and horizontal displacement of the lifting member.

The other support point functions here more or less as pivot, wherein according to the invention this support point is preferably situated on the top side of the beam-like lifting member.

In another embodiment the one support point provided with two pendulum arms for suspending movably in all directions a lifting member or a pair of lifting members extending parallel adjacently of each other.

It is herein possible to embody the pendulum arms themselves as cylinders or to suspend the pendulum arms from a separate pivot arm which is supported by an associated cylinder.

The invention will be further elucidated in the figure description hereinbelow of a number of embodiments.

In the drawing:

fig. 1 shows an upright side view of a seagoing construction, here a drilling rig, along which a prior art device for lifting the upper part of the construction is shown,

fig. 2 and 3 show respectively a top and side view of a first embodiment of the device according to the invention,

fig. 4 shows a side view corresponding with fig. 1 of a second embodiment of the device according to the invention,

fig. 5 and 6 show respectively a top and an upright side view of a third embodiment according to the invention,

fig. 7 is a perspective view of the lifting side of the device of fig. 6.

Referring to fig. 1, this shows the prior art wherein the lifting device is arranged on either side of a drilling rig, which consists of a jacket J and a superstructure B placed thereon, which superstructure B must be lifted and then removed.

For this purpose a separation is arranged in the vertical posts C at the top side in the jacket once the superstructure B is supported by the prior art device. This consists of floater bodies 1 for placing on either side of the jacket, a carriage construction 2 which is arranged displaceably relative to floater bodies 1 and on the side of which directed toward the jacket is arranged a lifting device 4 provided with pendulum arms 5.

It will be apparent that this construction is in the structure of the jacket, whereby the relative freedom of movement of floater bodies 1, carriage construction 2 and the jacket is obstructed.

Fig. 2 and 3 show an embodiment wherein a pair of beam-like lifting members 10 are arranged in mutually parallel direction on each of the floater bodies 1.

The number of pairs of beam-like lifting members 10 is for instance four per floater body, this number depending on the number of vertical posts C of the jacket.

Each beam-like lifting member 10 is supported by floater body 1 at the one support point 11 respectively the other support point 12. The end of each beam-like lifting member 10 projecting outside floater body 1 is provided with a pressure point 13 which is arranged under a cam N of a sleeve M arranged round the post C of the jacket, see fig. 7.

In the embodiment of fig. 2 and 3 the one support point is provided with a hydraulic cylinder 14 for the vertical movement of support point 11 in upward respectively downward direction. Said cylinder is arranged pivotably to said floating member 1 and beam-like member in order to allow horizontal displacement in a horizontal plane to said support point. The other support point 12 is provided with a pull rod 15 which is mounted pivotally on both the floater body 1 and the beam-like lifting member. A hydraulic cylinder 16 is arranged effecting or controlling a horizontal displacement of lifting member 10, while in top view a third cylinder 17 is placed to bring about or control the lateral freedom of movement of the lifting member. Pressure point 13 is thus movable in a three-way coordinate system, with respect to the floating member.

Because each beam-like lifting member 10 can be adjusted individually, a high degree of freedom of movement and co-displacement with the swell of the sea is possible.

Fig. 4 shows an embodiment wherein the beam-like lifting member 10 is supported slidably at the one support point 11 on a cross beam 20 which is itself supported on more than one vertically operating cylinder 14 for the vertical adjustment thereof.

The other support point 12 is embodied with a trestle 21 against which the top side of beam-like lifting member 10 supports such that a longitudinal movement, a rotation in a vertical or horizontal plane of said lifting member 10 remains possible.

In the embodiment of fig. 5 and 6 two beam-like lifting members 10 are supported in each case at the one support point 11 by a common horizontal beam 20 which is suspended from pendulum arms 25 such that they can pivot in all directions along the three spatial main axes X, Y and Z, see fig. 7. Pendulum arms 25 are themselves suspended for pivoting in all directions on a pivot arm construction 26, wherein between the housing-like construction 27 arranged on floater body 1 and pendulum arms 25 there is placed a cylinder 28 to enable movement in vertical direction of pendulum arms 25, and thereby of beam-like lifting members 10. The other support point for beam-like lifting members 10 is arranged in the housing-like part 27 and can be realized in the manner as shown in fig. 4 respectively fig. 2.

It will be apparent from the foregoing that each of the pressure points 13 of lifting members 10 has a freedom of movement in all directions which are largely independent of each other. It is thereby possible to raise the superstructure of a drilling rig under very safe conditions, irrespective of the swell of the sea. The invention is not limited to the above described embodiment.

CLAIMS

1. Device for lifting a seagoing construction such as a drilling rig, which device comprises two or more floater bodies located on either side of the seagoing construction, one or more beam-like lifting members supported movably on a floater body and running parallel or practically parallel to each other and supported on at least two support points of the floater body, **characterized in that** in the case of each lifting member at least one support point is adjustable in vertical and~~/or~~ horizontal direction, **at least the other support point allowing rotation of the beam-like lifting member in a horizontal or vertical plane**, and the free end part of the lifting member has a pressure point coming into contact with the construction ~~for~~ to be lifted.

2. Device as claimed in claim 1, **characterized in that** the one support point of the floater body located close to the construction for lifting is provided with at least one cylinder, preferably a hydraulic cylinder, for vertical displacement of the lifting member.

3. Device as claimed in claim 2, **characterized in that** a group of lifting members of a floater body is supported by a common cross beam on which the or each cylinder engages.

4. Device as claimed in claim 3, **characterized in that** at least the other support point allows a longitudinal displacement ~~and rotation of the beam-like lifting member in a horizontal or vertical plane~~ of the beam-like lifting member.

5. Device as claimed in claim 4, **characterized in that** the other support point is arranged on the top side of the beam-like lifting member.

6. Device as claimed in claim 2, **characterized in that** the one support point is provided with two pendulum arms for

suspending movably in all directions the lifting member or a pair of lifting members extending parallel adjacently of each other.

7. Device as claimed in claim 6, **characterized in that** the or each pendulum arm is suspended from a pivot arm, which pivot arm is adjustable in the vertical plane by means of the cylinder.