

is not connected to a riser. The apparatus includes a restraint cone configured to fit within hydraulic cylinders of the riser tensioner, a hoist configured to extend and retract the restraint cone, and a tension member extending from a lower end of the restraint cone, the tension member configured to engage a lower end of the riser tensioner and maintain a wedging action between the restraint cone and the hydraulic cylinders.

The present inventor has devised and embodied this invention to overcome these shortcomings and to obtain further advantages.

Summary of the invention

The invention is set forth and characterized in the main claims, while the dependent claims describe other characteristics of the invention.

The purpose of the invention is to achieve a seafastening device for a DAT system or similar equipment which is safe and reliable, easy to assemble and disassemble, and does not subject the system to unwanted loads.

Another purpose of the invention is to provide a guiding device for aiding in the connection of the tensioner ring to the riser, and contribute to closing the hinged tension ring.

Another purpose of the invention is to provide a support element for DAT hoses, when the DAT system is in use in the moonpool.

It is thus provided a seafastening apparatus, including characterized by a movable frame having an opening configured for receiving and at least partially supporting an equipment unit via support regions on the seafastening apparatus, and by locking means configured for selective locking and releasing of the equipment unit and hence controlling lateral movements of the equipment unit relative to the apparatus.
The locking means comprise wires configured for connection to the equipment unit and tensioners configured for controlling the tension in each wire.

In one embodiment, the locking means comprise a pair of locking arms which by means of actuators are rotatable about respective joints on the frame and configured for extending at least partially around a circumference of the equipment unit in a region between the upper end and a lower end.

In one embodiment, the locking means comprise abutment portions for contact with corresponding abutment elements on the equipment unit. The abutment portions advantageously comprise an elastic, shock absorbing and abrasion reducing material.

In one embodiment, the locking means are arranged to rotate in a plane which is substantially perpendicular with respect to the equipment unit longitudinal axis.

The apparatus comprises in one embodiment one or more support devices for supporting hoses, cables and similar components extending from the equipment unit. The support device is advantageously rotatably connected to the frame at a

first end and is height adjustable with respect to the frame via actuation means. In one embodiment, the support device comprises an arc-shaped support tray.

In one embodiment, the apparatus comprises locking elements for fixing the locking means in position when they are in engagement with the equipment unit.

5 | As mentioned above~~In one embodiment~~, the locking means preferably comprise wires configured for connection to the equipment unit and tensioners configured for controlling the tension in each wire. A pair of extendible and retractable arms is arranged on the frame, each arm configured for conveying and guiding at least one of the wires.

10 In one embodiment, the opening is defined by support regions in the frame, said regions being shaped complementary with a corresponding portion of the equipment unit. The apparatus comprising in one embodiment fastening lugs for connection between the frame and selected portions of the equipment unit.

15 The apparatus advantageously comprises frame motion means and fixing means, whereby the apparatus is movable on a supporting surface and is releasably lockable with respect to the supporting surface. The motion means advantageously comprises wheels for interaction with rails and drive units. The apparatus and the equipment unit are in one embodiment arranged on a movable platform, such as a vessel floating in a body of water.

20 In one embodiment, the equipment unit comprises a Direct Acting Tensioner (DAT) unit, having a plurality of cylinders, each one suspended via a respective upper end to the structure above the apparatus, and each one connected at a respective lower end to a ring element for connection to a riser or similar.

Brief description of the drawings

25 These and other characteristics of the invention will be clear from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

Figure 1 is an elevation view of the device according to the invention next to a DAT system on a drilling rig, the DAT system being connected to a riser;

30 Figures 2 and 3 are perspective views of a first embodiment of the device according to the invention;

Figure 4 is an elevation view of the device illustrated in figures 2 and 3;

Figure 5 is a perspective view of the device illustrated in figures 2 and 3, with the locking arms in an open position;

35 Figure 6 is a plan view of the device illustrated in figures 2 and 3, with the locking arms in a closed position, enclosing the DAT tensioner cylinders;

Figures 7, 8 and 9 are a perspective view, front view, and top view, respectively, of a second embodiment of the device according to the invention;

Claims ~~(amended under 'Demand' 31/7 2012)~~

1. A seafastening apparatus ~~(20; 40)~~, comprising a movable frame ~~(23; 49)~~ having an opening ~~(A)~~ configured for receiving and at least partially supporting an equipment unit ~~(70)~~ via support regions ~~(50a-e)~~ on the seafastening apparatus, and by locking means ~~(25a,b; 43, 44, 45, 48)~~ configured for selective locking and releasing of the equipment unit and hence controlling lateral movements of the equipment unit relative to the apparatus, **characterized in that** the locking means comprise wires ~~(43, 44, 45)~~ configured for connection to the equipment unit ~~(70)~~ and tensioners ~~(53, 54, 55)~~ configured for controlling the tension in each wire ~~(43, 44, 45)~~.
2. The apparatus of claim 1, further comprising a pair of extendible and retractable arms ~~(46, 47)~~, each arm configured for conveying and guiding at least one of the wires.
3. The apparatus of one of the preceding claims, wherein the opening ~~(A)~~ is defined by the support regions ~~(50a-e)~~ in the frame, said regions being shaped complementary with a corresponding portion of the equipment unit.
4. The apparatus of any one of the preceding claims, further comprising fastening lugs ~~(48)~~ for connection between the frame and selected portions of the equipment unit.
5. The apparatus of any one of the preceding claims, further comprising frame motion means ~~(21, 22, 22')~~ and fixing means ~~(31)~~, whereby the apparatus is movable on a supporting surface ~~(6)~~ and is releasably lockable with respect to the supporting surface.
6. The apparatus of claim 5, wherein the motion means comprises wheels ~~(21)~~ for interaction with rails ~~(5)~~ and drive units ~~(22, 22')~~.
7. The apparatus of any one of the preceding claims, wherein the apparatus and the equipment unit are arranged on a movable platform, such as a vessel floating in a body of water.
8. The apparatus of any one of the preceding claims, wherein the equipment unit comprises a Direct Acting Tensioner (DAT) unit, having a plurality of cylinders ~~(73)~~, each one suspended via a respective upper end ~~(76)~~ to a structure ~~(8)~~ above the apparatus, and each one connected at a respective lower end to a tensioner ring ~~(72)~~ for connection to a riser ~~(1)~~ or similar.