A device for connecting and disconnecting pipe segments of drill pipes, includes an adjustable retaining element in the form of a collar. For firmly holding the pipe segments introduced into the collar, segments acting as clamping jaws are used for retention. The clamping jaws can be adjusted vertically by servo elements for reducing the receiving diameter. The segments have a conical outside contour and a conical guide on the collar and a corresponding conical guide is provided on the collar, so that, when the segments are vertically displaced, the receiving diameter is reduced.
DEVICE FOR HOLDING DRILL PIPE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a device for the adjustable vertical holding of drill pipe consisting of a plurality of pipe segments connected to each other in a row by connecting elements, for use on drilling platforms, with a removable holder on the rotating table for inserting and removing drill pipe.

[0003] where a retaining element, which can be used to install or to remove the connecting elements between the pipe segments and to allow handling by winches is connected to the drill pipe;

[0004] where the retaining element is in the form of a collar, which can be placed on the drill pipe, and which has elements in its outer area which allow it to be connected to the winch; and

[0005] where the interior space of the retaining element for receiving the drill pipe has by means of vertically adjustable segments as clamping jaws for changing the receiving diameter with a cylindrical receiving area.

[0006] 2. Description of the Related Art

[0007] These types of arrangements are used in the area of offshore drilling platforms to connect and to disconnect the large number of pipe segments which are arranged in a row and which are connected to each other by connecting elements. It is known that retaining elements can be turned into the end of the pipe segment for handling, and that a winch, located above the end of the pipe, can act on these retaining elements by means of appropriate connections so that adjacent pipe segment can be connected to each other or disconnected from each other. The drill pipe is also held in place on the rotary table in this way to prevent it from sliding off and from sinking in the water.

[0008] Arrangements for handling and holding drill pipe are known from DE 42 27 645 A1 and DE 697 24 670 T2. In these cases, however, pipe shoulders must be present on the drill pipe so that it can be handled. It is also necessary to use an intermediate ring, a so-called "setting ring", which presses down the wedge-shaped elements.

[0009] These designs often cause damage and have the result that the elevator rings used do not close properly.

SUMMARY OF THE INVENTION

[0010] The object of the invention is to create a simple retaining element which ensures that the pipe segment will be held securely even in the absence of pipe shoulders or adapter pieces with the necessary security and that the retaining forces in the collar of the retaining element will be adjusted automatically by the weight of the connected pipe segments.

[0011] This object is met according to the invention in that the adjustable segments have a conical external contour and can slide along a corresponding conical guide in the collar of the retaining element to adjust the diameter of the receiving opening, where the clamping hold on the drill pipe being held can be adjusted by means of controllable servo cylinders, which are installed above the segments and which shift the segments vertically with respect to the collar of the retaining element, thus narrowing the receiving opening, where the servo cylinders act by way of ribs formed on the external area of the segments, and the ribs on the segments with corresponding ribs on the collar of the retaining element hold a guide rod for holding, which guides a compressible compression spring between the ribs.

[0012] As a result of this arrangement, the pipe segments can be easily handled by placing the collar onto the drill pipe to serve as a retaining element and by adjusting the initial clamping action by way of the relatively small servo cylinders acting on the segments. The actual retaining forces are adjusted automatically by the weight of the pipe segments themselves, during which the segments shift while the retaining ring serves as a bearing. Thus the servo cylinders are not required to generate the holding forces for the pipe segments but instead serve merely to produce the initial clamping action for carrying the pipe segments.

[0013] An advantageous embodiment is created in that, to adjust the position of a segment, each of the servo cylinders mounted on the collar of the retaining element acts by way of a sleeve on a rib of the segment.

[0014] A simple embodiment is obtained in that the adjusting elements for adjusting the segments are formed by compressed-air cylinders mounted on the collar.

[0015] To ensure a uniform force distribution, it is proposed that the mounted compressed-air cylinders used as adjusting elements for the segments be connected to each other.

[0016] To improve the fit and to increase the holding power, it is proposed that the receiving surface of the segments for the drill pipe have by means of inserted clamping elements with contact surfaces in the form of a sawtooth profile.

[0017] In addition, the retaining element is designed as a collar which can be opened and locked closed.

[0018] The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of the disclosure. For a better understanding of the invention, its operating advantages, specific objects attained by its use, reference should be had to descriptive matter in which there are described preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWING

[0019] In the drawing:

[0020] FIG. 1 is a side view of a retaining element;

[0021] FIG. 2 is a top view of the element according to FIG. 1;

[0022] FIG. 3 is a partial cross sectional view along line III-III of FIG. 2; and

[0023] FIG. 4 is an enlarged view, in isolation, of the area marked IV in FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] In the illustrated arrangement, a retaining element 1 for receiving a drill pipe (not shown) in the form of a pipe
segment is shown in the form of an openable collar. This collar 1 is formed by two elements 2 and 3, which can swing open in a hinge-like manner. The collar can then be placed around a pipe segment and then closed and locked. Of course, the retaining element could be designed as a closed collar 1 with a central receiving opening 4, into which a pipe segment can be inserted.

The cross section of the receiving opening 4 can be adjusted by the use of four segments 5, where the segments 5 are designed as clamping jaws acting on the received pipe segment and are vertically adjustable. For this purpose, the segments 5 have a conical outside contour 6 and a corresponding guide 7 in the collar 1 serving as retaining element 1.

The segments 5 are held in the collar 1 by guide rods 8, and the guide rods 8 are held on the segments 5 by the ribs 9 and on the collar 1 by the ribs 10.

Above the segments 5 are pneumatic servo cylinders 11, which can be controlled by way of lines 12 and which adjust the segments 5 vertically downward by way of an intermediate sleeve 13. As a result of the cooperation between the conical surfaces 6 and 7, the servo cylinders reduce the size of the receiving opening 4 and thus exert a clamping action on the received pipe segment.

The servo cylinders 11 with the interposed sleeves 13 act on the ribs 9 of the segments 5.

To increase the restoring force when the clamping action is released, compressible compression springs 14 are installed on the guide rods 8 between the ribs 9 of the segments 5 and the ribs 10 of the collar 1.

The servo cylinders 11 are held in place on the collar 1 by a housing 15.

In this embodiment, the cylindrical receiving surface of the segments 5 for the pipe segments is formed by inserting clamping elements 16 with a sawtooth profile.

To insert the drill pipe and to pull it back out again, a winch is installed above the collar 1 holding the received pipe segment. The winch acts on the collar 1 from both sides by way of elements 17, which serve as receivers for shackles 18 or the like, as indicated in FIG. 2.

As a result, the collar 1 can be fixed in place on a pipe segment to hold and adjust it, thus allowing the winch to adjust the position of the pipe segment as desired so that the connecting elements between the pipe segments can be installed or removed.

While specific embodiments of the invention have been described in detail to illustrate the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

We claim:
1. A device for an adjustable vertical holding of drill pipe having a plurality of pipe segments connected to each other in a row by connecting elements, for use on drilling platforms having a removable holder on a rotating table for inserting and removing drill pipe, the device comprising:

a retaining element (1) connected to the drill pipe for installing and removing the connecting elements between the pipe segments and for handling by winches;

wherein the retaining element (1) is a collar adapted to be placed on the drill pipe, and having elements (17) in an outer area thereof which allow the retaining element to be connected to the winch;

wherein an interior space (4) of the retaining element (1) for receiving the drill pipe has a cylindrical receiving area comprised of vertically adjustable segments (5) as clamping jaws for changing the receiving diameter;

wherein the adjustable segments (5) have a conical external contour (6) and are slidable along a corresponding conical guide (7) in the collar of the retaining element (1) to adjust the diameter of the receiving opening (4);

wherein the clamping hold on the drill pipe being held can be adjusted by means of controllable servo cylinders (11), which are installed above the segments (5) and which shift the segments vertically with respect to the collar of the retaining element (1) for narrowing the receiving opening (4);

wherein the servo cylinders (11) act by way of ribs (9) on external areas of the segments, and the ribs on the segments (5) with corresponding ribs (10) on the collar of the retaining element (1) hold a guide rod (8) for holding, which guides a compressible compression spring (14) between the ribs (9, 10).

2. The device according to claim 1, wherein the servo cylinders (11) mounted on the collar of the retaining element (1) act by way of sleeves (13) on the ribs (9) of the segment (5) to adjust them.

3. The device according to claim 1, wherein the servo cylinders (11) for adjusting the segments (5) are compressed-air cylinders mounted on the collar (1).

4. The device according to claim 3, wherein the compressed air cylinders (11) are connected to each other.

5. The device according to claim 1, wherein receiving surfaces of the segments (5) for the drill pipe are formed by inserted clamping elements (16) with contact surfaces in the form of a sawtooth profile.

6. The device according to claim 1, wherein the retaining element (1) is a collar which can be opened and locked.

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