a loss of torque for the tong which is difficult to demonstrate or measure its extent. In some cases the friction may also vary with the torque.

There is a need for a tong which can rotate over larger angles than hitherto known, thereby making it possible to screw the pipes together with sufficient torque in one operation, without having to take a new grip. There is furthermore a need for a rotatable tong which provides a constant force, without the need for sensors or the like in order to calculate torques or forces as is the case in the prior art.

Summary of the invention

EmbodimentsThe object of the invention seekis to remedy or reduce at least one of the disadvantages of the prior art.

The object is achieved according to the invention by the features indicated in the description below and in the following patent claims.

According to the first aspect ofWith the present invention, a device is provided for rotation of a torque tong with at least one circular arc-shaped segment and gripping devices for holding a pipe substantially perpendicularly to the torque tong's radial plane, whereincharacterised in that to the at least one segment and in abutment thereto there is provided at least one elongated flexible drive element which is operatively connected to support units and devices for movement of the at least one drive element, with the result that the torque tong is rotated in the radial plane. The devices for movement of the individual drive element comprise a pair of second support units rotatably mounted on a respective movement element arranged for rectilinear movement in the torque tong's radial plane, and where a portion of the drive element which is located between one of the first support units and a respective securing portion is mounted on the respective second support unit.

In an embodiment of the present invention a device is provided for rotation of a torque tong with at least two diametrically opposite circular arc-shaped segments and gripping devices for holding a pipe substantially perpendicularly to the torque tong's radial plane, characterised in that to each segment and in abutment thereto there is provided at least one elongated flexible drive element which is operatively connected to support units and devices for movement of the respective drive element, with the result that the torque tong is rotated in the radial plane.

The individual drive element is preferably attached at its first and second ends to respective securing portions and further comprises an engagement portion which is in engagement with and/or abutment against a segment.

In a preferred embodiment the support units for the individual drive element comprise a pair of first support units rotatably mounted in the area at each end of the respective engagement portion.

The devices for movement of the individual drive element preferably comprise a pair of second support units rotatably mounted on a respective movement element arranged for rectilinear movement in the torque tong's radial plane, and where a

~~portion of the drive element which is located between one of the first support units and a respective securing portion is mounted on the respective second support unit.~~

In an embodiment the movement element comprises a cylinder housing which is slidably mounted on a stem which is attached at its first and second ends to respective fastenings and where a cylinder piston of a known type with oppositely directed piston areas is provided on the stem in the housing's internal chamber, with the result that the cylinder housing is movable along the stem when a hydraulic fluid is supplied to the chamber on one side or the other of the piston.

In an embodiment the torque tong comprises a substantially circular body in the said radial plane, and an opening for insertion of a pipe which is to be gripped by the gripping devices.

In an embodiment a first set of drive elements is assigned to a first segment and a second set of drive elements is assigned to a second segment, where the drive elements in each set are placed one above the other and are movable in the torque tong's radial plane.

In an embodiment the individual drive element is secured to its respective segment at an attachment point on the torque tong, where the attachment point is located substantially halfway between the ends of the segment when the torque tong is in a central position.

The drive element may comprise a lifting chain which is fixed to the tong at an attachment point. The torque tong is preferably supported in the axial direction by a plate, preferably via friction-reducing means.

The support units are preferably rotatably attached to the plate, the securing portions for the individual drive element are attached to the plate and the fastenings for the cylinder stem are attached to the plate.

According to a second aspect, a method is ~~also~~ provided for rotation of the torque tong according to the first aspect of the invention, characterised by causing / implementing a rectilinear movement of a first of said movement elements, while simultaneously causing / implementing a rectilinear movement of the second of said movement elements in the opposite direction to and substantially parallel to the movement of the first movement element.

With the torque tong according to the invention it is possible to obtain angles of rotation of between 60° - 90° in one rotation, in addition to the ability to handle larger torques than hitherto known.

On account of the torque tong's geometry and relative positioning of support units and movement devices, a predictable and balanced power picture is achieved, without the need for sensors or the like for monitoring and/or measurement of

CLAIMS

1. A device for rotation of a torque tong ~~(16)~~ with at least one circular arc-shaped segment ~~(16a,b)~~ and gripping devices ~~(17)~~ for holding a pipe substantially perpendicularly on the torque tong's radial plane, wherein, to the at least one segment ~~(16a,b)~~ and in abutment thereto there is provided at least one elongated flexible drive element ~~(18 a-d)~~ which is operatively connected to support units ~~(24a-d)~~ and devices ~~(26a,b, 28a-d, 30a,b)~~ for movement of the at least one drive element ~~(18a-d)~~ so that the torque tong is rotated in the radial plane, characterised in that said devices ~~(26a,b, 28a-d, 30a,b)~~ comprise a pair of second support units ~~(28a,b)~~ rotatably mounted on a respective movement element ~~(26a,b)~~ arranged for rectilinear movement in the torque tong's radial plane, and in that a portion of the drive element ~~(18a-d)~~ located between one of the first support units and a respective securing portion ~~(22)~~ is mounted on the respective second support unit.

2. A device according to claim 1,
characterised in that the torque tong ~~(16)~~ has at least two circular arc-shaped segments ~~(16a,b)~~ which are diametrically opposite and that at least one elongated flexible drive element ~~(18a-d)~~ is assigned to each segment ~~(16a,b)~~ and in abutment thereto.

3. A device according to claim 1 or 2,
characterised in that the individual drive element ~~(18a-d)~~ is attached at its first and second ends to respective securing portions ~~(22)~~ and further comprises an engagement portion ~~(19a-d)~~ which is in engagement with an/or abutment against a segment ~~(16a,b)~~.

4. A device according to claim 3,
characterised in that the support units ~~(24)~~ for the individual drive element ~~(18a-d)~~ comprise a pair of first support units ~~(24a-d)~~ rotatably mounted in the area at each end of the respective engagement portion ~~(19a-d)~~.

5. A device according to claim 1,
characterised in that the movement element ~~(26a,b)~~ comprises a cylinder housing ~~(26a,b)~~ which is slidably mounted on a stem which is attached at its first ~~(30a)~~ and second ~~(30b)~~ ends to respective fastenings ~~(31)~~ and where on the stem in the housing's internal chamber there is provided a cylinder piston of a known type with oppositely directed piston areas ~~(32a,b)~~, in such a manner that the cylinder housing is movable along the

stem when a hydraulic fluid is supplied to the chamber on one side or the other of the piston.

6. A device according to any of the preceding claims,
characterised in that the torque tong ~~(16)~~ comprises a substantially circular body in the said radial plane, and an opening ~~(16')~~ for insertion of a pipe which is to be gripped by the gripping devices ~~(17)~~.

7. A device according to any of the preceding claims,
characterised in that the individual drive element ~~(18a-d)~~ is attached to its respective segment ~~(16a,b)~~ at an attachment point ~~(20)~~ on the torque tong ~~(16)~~, where the attachment point ~~(20)~~ is located substantially halfway between the ends of the segment when the torque tong ~~(16)~~ is in a central position.

8. A device according to any of the preceding claims,
characterised in that the individual drive element ~~(18a-d)~~ comprises a lifting chain which is fixed in the tong at an attachment point ~~(20)~~.

9. A device according to any of the preceding claims,
characterised in that the torque tong ~~(16)~~ is supported in the axial direction by a plate ~~(10)~~, preferably via friction-reducing means.

10. A device according to any of the preceding claims,
characterised in that the support units ~~(24a-d)~~ are rotatably attached to the plate ~~(10)~~.

11. A device according to any of the claims 3 - 10~~11~~,
characterised in that the securing portions ~~(22)~~ for the individual drive element ~~(18a-d)~~ are attached to the plate ~~(10)~~.

12. A device according to any of the claims 6-11~~12~~,
characterised in that the fastenings ~~(31)~~ for the cylinder stem are attached to the plate ~~(10)~~.

13. A device according to any of the preceding claims,
characterised in that a first set of drive elements ~~(18a,b)~~ is assigned to a first segment ~~(16a)~~ and a second set of drive elements ~~(18c,d)~~ is assigned to a second segment ~~(16b)~~, where the drive elements in each set are placed one above the other and are movable in the torque tong's radial plane.

14. A method for rotation of the torque tong ~~(16)~~ as indicated in any of the preceding claims, characterised by implementing a rectilinear movement of a first of said

movement elements ~~(26a)~~, and simultaneously implementing a rectilinear movement of the second of said movement elements ~~(26b)~~ in the opposite direction to and substantially parallel to the movement of the first movement element.