A tool for installing units in a well

The present invention relates to a tool for installation of units in connection with oil wells.

Throughout the working life of a well, a number of units normally have to be installed and/or replaced. A plurality thereof are screwed into a well element. In order to release them, a tool is required which can grip and unscrew these units from engagement with the well element. An example of such an element is a valve which is located in the wellhead Christmas tree material, inside a gate valve, on an opening in the Christmas tree. In this case a tool has to grip the valve and unscrew it from engagement with the Christmas tree. During this process the tool will be exposed to the pressures under which the valve operates: the well pressure for the valve. This may be a casing pressure and/or other pressure in connection with the well.

The tool comprises a housing which is attached to the wellhead Christmas tree, and an internal element for unscrewing the valve from the Christmas tree must be rotated relative to the housing. This rotation gives rise to frictional forces, which are also partly dependent on the well pressure to which the tool is subjected. To carry out this rotation of the internal element places great demands on the system and with increasing force requirements, a larger force unit must be employed in order to achieve the desired rotation. This can be costly both with regard to production of the tool and during its use since the tool will also be heavier and therefore more difficult to handle. Thus there is a need for a tool where the rotation of the internal element is achieved with a relatively smaller tool.

The units which have to be installed or removed may often be difficult of access and the tool will normally have a telescopic function, where an inner movable element is moved in a telescopic function relative to the housing in order to become engaged with the unit and/or install/position the unit. If the distance between attachment point and engagement point is great, a possible solution is to make the tool as long as necessary in order to be able to carry out the activity. This results in a tool which may be difficult to handle and use on account of its great length. An alternative solution is to provide a telescopic function with several telescoping elements. A problem with such a telescopic member is to monitor where an outer end of the telescoping element is located. There is, moreover, also a need to retract the telescopic member into the housing so that the tool can be released. A simple solution is required here in order to achieve this.

~~An object~~Embodiments of the present invention ~~is~~seek to provide a tool which is more independent of frictional forces which arise on account of the well pressure to which the tool is exposed during operation. Furthermore, embodiments of the present invention seek~~a second object is~~ to provide a telescoping solution which can be retracted in a simple manner.

~~At least one of these objects is achieved with a tool as indicated in the following claims.~~

According to an aspect of the invention, there is provided a tool for installation of units in connection with oil wells, comprising a housing with an attachment device for attachment to a well installation, an internal movable element comprising a telescopic device for extension of the tool, a torsional force transmission device for rotation of the internal movable element of the tool, where the internal movable element comprises a pressure face, which in an operative condition is exposed to a well pressure and a counter-pressure face, with a sealing arrangement between the housing and the internal movable element provided between these pressure faces, characterised in that the internal movable element further comprises devices which are arranged in such a manner that a pressure can be applied to the counter-pressure face, the internal movable element further comprising a return system for retracting at least one telescoped internally located part of the telescopic device to an initial position arranged approximately inside an outer part of the telescopic device of the movable element, the return system comprising a pressure face both on the internally located part and the outer part, which pressure faces in pairs are facing in opposite directions and devices for applying a pressure to these pressure faces which exert forces on the at least one telescoped internally located part, causing it to be retracted to an initial position.

According to an embodiment of the invention a tool is provided for installation of units in connection with oil wells, comprising a housing with an attachment device for attachment to the well installation, a telescopic device for extension of the tool and a torsional force transmission device for rotation of an internal movable element of the tool. The well installation may, for example, be a wellhead Christmas tree, tubing, where the unit which has to be installed may be a valve, a plug, a measuring device or the like. The telescopic device may be arranged in such a manner that an internal movable element is moved relative to the housing, thereby enabling it to be moved so that an end of this movable element is moved past the attachment device for attachment, whereby it can extend into the well installation. The torsional force transmission device is arranged in such a manner that the internal movable element can be rotated relative to the tool housing. This rotation can be employed to screw or unscrew elements into or out of engagement with the well installation, thereby enabling them to be installed or removed. The attachment device may, for example, be a flange facing abutting a flange facing of the well installation and secured thereto. Alternatively, it may be threaded devices for securing or clamping devices or other means for securing the tool to the well installation.

According to an aspect of the invention the internal movable element comprises a pressure face, which in an operative condition is subjected to the well pressure and a counter-pressure face, with a sealing arrangement between these surfaces and devices which are arranged in such a manner that a pressure can be applied to the counter-pressure face. This pressure on the counter-pressure face is advantageous since it substantially cancels out the forces on the movable element as a result of the well pressure on the pressure face. Alternatively, as a consequence of the pressure exerted on the counter-pressure face, the forces may be slightly less than the forces as a result of the well pressure on the pressure face.

The pressure face and the counter-pressure face will naturally face in opposite directions and the combination of fluid pressure with these surfaces produces forces which thereby influence the internal movable element in opposite directions. The force influence on these two oppositely directed surfaces can therefore be configured so that they substantially cancel each other out or at any rate reduce the influence of the well pressure. This can be achieved by different configurations which will be discussed below. By cancelling forces in this way, frictional forces as a result of the fluid pressure from the well fluid on the movable element will no longer have such a great effect on the rotational movement of the internal movable element. The internal movable element can thereby be more easily rotated, which means that the forces required for rotating the element are less and that these forces in the torsional force transmission device can be employed to a greater extent for

CLAIMS

1. A tool for installation of units in connection with oil wells, comprising a housing ~~(1)~~ with an attachment device ~~(12)~~ for attachment to a well installation, an internal movable element ~~(2)~~ comprising a telescopic device ~~(30, 31, 32)~~ for extension of the tool, a torsional force transmission device ~~(13)~~ for rotation of the internal movable element ~~(2)~~ of the tool, where the internal movable element ~~(2)~~ comprises a pressure face ~~(21)~~, which in an operative condition is exposed to a well pressure and a counter-pressure face ~~(22)~~, with a sealing arrangement ~~(26)~~ between the housing ~~(1)~~ and the internal movable element ~~(2)~~ provided between these pressure faces ~~(21, 22)~~, characterised in that the internal movable element ~~(2)~~ further comprises devices ~~(23, 24, 25)~~ which are arranged in such a manner that a pressure can be applied to the counter-pressure face ~~(22)~~, the internal movable element ~~(2)~~ further comprising a return system for retracting at least one telescoped internally located part ~~(31, 32)~~ of the telescopic device ~~(30, 31, 32)~~ to an initial position arranged approximately inside an outer part ~~(30)~~ of the telescopic device ~~(30, 31, 32)~~ of the movable element ~~(2)~~, the return system comprising a pressure face ~~(34, 33, 36, 35)~~ both on the internally located part ~~(31, 32)~~ and the outer part ~~(30)~~, which pressure faces in pairs are facing in opposite directions and devices ~~(40, 41, 37, 38, 39)~~ for applying a pressure to these pressure faces which exert forces on the at least one telescoped internally located part ~~(31, 32)~~, causing it to be retracted to an initial position.

2. A tool according to claim 1, characterised in that the devices comprise an external pressure source.

3. A tool according to claim 1, characterised in that the devices comprise a pressure transmission from the pressure face ~~(21)~~ to the counter-pressure face ~~(22)~~.

4. A tool according to claim 3, characterised in that the transmission runs through an internal bore ~~(23)~~ in the movable element ~~(2)~~.

5. A tool according to claim 4, characterised in that the bore ~~(23)~~ comprises at least one bend ~~(25)~~ and an internal movable piston ~~(24)~~, where the piston's ~~(24)~~ movement in one direction is restricted by the bend ~~(25)~~.

6. A tool according to claim 3,
characterised in that the transmission runs through an external lead.

7. A tool according to one of the preceding claims,
characterised in that at least a part of the telescopic device ~~(30, 31, 32)~~ can be telescoped relative to the housing ~~(1)~~.

8. A tool according to claim 1,
characterised in that the devices ~~(40, 41, 37, 38, 39)~~ for applying pressure to the pressure faces comprise an elastic element, preferably at least one spring element.

9. A tool according to claim 1,
characterised in that the return system comprises an internally arranged pressure face ~~(33)~~ in the outer part ~~(30)~~, an internally ~~(35)~~ and externally ~~(34)~~ arranged pressure face on the at least one intermediate part ~~(31)~~ and an externally arranged pressure face ~~(36)~~ on the internal part ~~(32)~~, and a bore ~~(37)~~ in the at least one intermediate part ~~(31)~~, with an opening ~~(38)~~ to an externally located pressure chamber ~~(40)~~ in connection with the externally arranged pressure face ~~(34)~~ for the intermediate part ~~(31)~~ and an opening ~~(39)~~ to an internally located pressure chamber ~~(41)~~ in connection with the internally arranged pressure face ~~(35)~~ for the intermediate part, which openings ~~(38, 39)~~ are arranged at each end of the intermediate part.

10. A tool according to claim 9,
characterised in that the opening ~~(39)~~ to the internally located pressure chamber ~~(41)~~ is arranged at an end of the intermediate part ~~(31)~~, which end in a telescoped condition is moved out of externally located parts ~~(30)~~ of the internal movable element ~~(2)~~.