Description

This invention relates to running tools.

Running tools have been used in the past for lowering well structures into oil and gas wells or for performing certain functions, such as the manipulation of well structures within the well. Running tools of the prior art have been used to lower equipment such as a well casing hanger into a well housing and to be manipulated to set the hanger in the correct position and to actuate portions thereof so that the hanger is locked or latched into the housing.

U. S. Patent No. 4,719,971 discloses an annular seal and latching mechanism to be lowered, landed and latched into position within a well housing with a wedging ring 42 which is independently moved by weight or pressure after the casing hanger has been landed. There is no showing in this patent of the running tool nor of any connection by which the running tool could be used in setting the seal and latch after the landing of the hanger and further locking the seal and latch assembly in their set positions.

U. S. Patent Nos. 3,350,130, 3,357,486 and 3,897,823 all disclose types of running tools used in the lowering and landing of hangers and hanger seals into a well housing and setting the seal and latching the seal in set position. Normally, these types of running tools allow for the circulation of fluids subsequent to the landing of the hanger and prior to the setting of the seal to allow for the cementing of the casing within the well.

U. S. Patent No. 3,871,449 discloses a running tool for running a casing hanger and a packing assembly in the well together with the tool releasably connected to the hanger when it is landed and still retain the packing assembly above its desired sealed position. A spring shifts a torque sleeve and sets the packing assembly after the hanger body is released from the running tool.

U.S. Patent No. 4,691,780 discloses a subsea wellhead structure including a running tool which carries a casing hanger and its sealing assembly which is set by rotation and downward movement of the running tool after the hanger has landed.

US-A-3115933 describes a running tool having a body with latching dogs which can be urged outwards to engage for example a casing hanger.

According to the present invention there is provided a running tool for lowering and manipulating structures within a well comprising a tool body, means for connecting said tool body to a running string at its upper end, said tool body having radially extending windows, latch dogs carried in the tool body windows and means operable to wedge the latch dogs outwardly to a latching position, characterised in that said tool body comprises a mandrel and an outer tool body surrounding said mandrel, releasable means interconnecting the mandrel and outer tool body, and in its operative position being operable to limit movement of the mandrel downwardly with respect to the outer tool body, said wedging means comprises an actuator ring positioned between the mandrel and the outer tool body, the actuator ring being interconnected to said mandrel and said outer tool body, such that by rotation of said tool body the actuator ring can be moved from a position in which it wedges said latch dogs to their latching position, to a position in which said dogs can be released, and means for effecting release of said releasable means such that the mandrel can move downwardly with respect to the outer body and to be manipulated to position said structures in the well.

The present running tool is capable of performing additional functions within the well after the landing and disengagement of the running tool from the well structure.

Also the tool can provide direct support for the well structure without imposing the load path of the well structure through the threaded connection of the actuator to the mandrel.

The invention will be described now by way of example only, with particular reference to the accompanying drawings. In the drawings:

FIGURE 1 is a sectional view of the improved running tool of the present invention having a casing hanger landed and latching in position within the well housing and with the seal assembly in set position.

FIGURE 2 is a partial sectional view of the improved running tool of the present invention with the casing hanger connected thereto and landed within the well housing.

FIGURE 3 is a partial sectional view of the improved running tool of the present invention with the casing hanger landed and illustrating the disengaging action which releases the running tool from the actuator ring in preparation to the setting of the seal.

FIGURE 4 is a partial sectional view of the improved running tool of the present invention with the running tool disengaged from the actuator ring and lowered to set the seal assembly in the annulus between the casing hanger and the well housing.

FIGURE 5 is another partial sectional view of the running tool to illustrate the setting of the means retaining the seal assembly in its set position.

FIGURE 6 is a sectional view of a modified form of the improved running tool of the present invention with the casing hanger supported thereon and illustrating the lowering of the casing hanger and seal assembly on the running tool within the well.

FIGURE 6A is partial detail sectional view to illustrate the relationships of the mandrel, the actuator ring and the body of the running tool shown in FIGURE 6.

Improved running tool 10 of the present invention is shown in FIGURE 1 connected to casing hanger 12 which has been landed on landing seat 14 of well housing 16 with seal assembly 18 set and latched in set position within annulus 20 between the exterior of casing hanger 12 and the interior of well housing 16. Running tool 10 includes tubular mandrel 22 having running string 24 threaded into its upper end as shown, tubular body 26 supported from mandrel 22 with actuator ring 28 positioned between the lower exterior of mandrel 22 and the interior of body 26 to coact with latch elements or dogs 30 which are carried within windows 32 extending through the lower portion of body 26. Retainer ring 34 is positioned in internal groove 36 in the lower interior of body 26 below windows 32 and is a split ring which is biased outwardly into engagement with groove 36. Retainer ring 34 functions to prevent downward movement of actuator ring 28 after it has moved sufficiently to engage latch elements 30 and wedge them outwardly into engagement within internal groove 37 on casing hanger 12 which secures casing hanger 12 to running tool 10. Seal setting and latching tool 38 is supported on the upper exterior of mandrel 22 between upper and lower snap rings 40 and 42 which are retained within their grooves 44 and 46 as shown.

The lower exterior of mandrel 22 includes vertical grooves or splines 48 which are engaged by the internal grooves or splines 50 on actuator ring 28. Left hand threads 52 on the exterior of actuator ring 28 engage within internal left hand threads 54 on the interior of body 26. Body 26 includes external downwardly facing shoulder 56 which engages upwardly facing shoulder 58 on casing hanger 12 when landed. Body 26 also includes inwardly projecting flange 60 which closely surrounds the exterior of mandrel 22 below ring 42 as shown. The lower portion of flange 60 is tapered upwardly and outwardly as surface 62 to receive releasable latching ring 64, which during running engages within groove 66 on the exterior of mandrel but which can be released responsive to rotation of mandrel 22 and actuator ring 28 to thread actuator ring upwardly causing latching ring 64 to be cammed outwardly on surface 62 into the position shown in FIGURE 1 wherein it is completely out of engagement with groove 66 on the exterior of mandrel 22. This allows mandrel 22 to be free of actuator ring 28 to allow setting movement of mandrel as hereinafter explained.

Seal setting and latching tool 38 includes upper plate 68 which fits closely around mandrel 22 and within the upper interior of housing 16, inner body 70, annular piston 72, outer latching sleeve 74 and a plurality of tubes 76 which extend through plate 68 and radial portion 78 of body 70 into communication with passages 80 through body 26. Body 70 includes upper tubular portion 82 surrounding the exterior of mandrel 22 and is supported on lower ring 42, radial portion 78 and outer depending seal assembly engaging rim 84. The lower portion of rim 84 is connected to seal assembly 18 as by a J slot connection.

Seal assembly 18 includes seal ring 86 with sealing element thereon as set forth in the copending application US-Serial No. 07/159,946, filed February 24, 1988. Lower wedge ring 88 of seal assembly 18 coacts with locking ring 90 when the seal assembly 18 is set to secure casing hanger 12 in position within housing 16. Outer latching sleeve 74 engages the upper edge of latching rim 92 of seal assembly 18 to rotate it after the setting of the seal elements. It should be noted that latching rim 92 is designed so that it interengages with the latching sleeve in the sealing assembly as set forth in the above identified application and functions to latch the seal assembly in its set position after it has been set. Outer latching sleeve 74 is rotated by the downward movement of piston 72 in the space between the interior of sleeve 74 and the exterior of upper portion 82 of body 78. Pin 94 secured to the exterior piston 72 engages within helical slot 96 on the interior of sleeve 74 so that when pressure is supplied into the annular space above piston 72, piston 72 travels downwardly and this downward movement of pin 94 in slot 96 rotates sleeve 74 to move latching rim 92 into position securing the set position of seal assembly 18. Suitable seal and fluid passages are provided to produce the proper operation of piston 72 in a well known manner. It should be noted that tubes 76 which extend through plate 68, piston 72 and radial portion 78 of body 70 ensure that only outer sleeve rotates responsive to the movement of piston 72.

FIGURE 2 illustrates the position of the components with respect to running tool 10 as casing hanger 12 is landed on landing seat 14 of well housing 16. In this position actuator ring 28 is in its lower position wedging latch element 30 into their outer position and in engagement within internal hanger groove 37. Seal assembly 18 is positioned above the passages 80 through body 26 so that circulation can be established for cementing or other operations prior to the setting of seal assembly 18. Seal assembly 18 is supported in this position by the engagement of the lower end of outer rim 84 with the upper portion of seal assembly 18. Also, it should be noted that latching ring 64 which has its upper surface in engagement with

tapered surface on flange 60 of body 26 is also in engagement with groove 66 on the exterior of mandrel 22. This position is maintained during the lowering and landing of casing hanger 12 within and onto landing shoulder 14 of well housing 16.

FIGURE 3 illustrates the next step in the operations in that seal assembly 18 is still positioned above the opening of passages 80 but mandrel 22 has been rotated to cause actuator ring 28 to be rotated to its upper position. In this position latching ring 64 has been forced against tapered surface 62 on body flange 60 so that it is wedged outwardly out of engagement with groove 66 on mandrel 22. This disengagement frees mandrel 22 for the setting of seal assembly 18.

As can be seen in FIGURE 4 mandrel 22 and seal assembly 18 have been lowered with respect to casing hanger 12 so that seal assembly 18 has moved downwardly in the annulus between the exterior of casing hanger 12 and the interior of well housing 16. In this position lower wedge ring 88 has moved locking ring 90 into its locked position and seal elements are set but not latched in set position.

The latching of seal elements into their set position is illustrated in FIGURE 5 wherein piston 72 has been actuated by fluid pressure to its lower position. This movement by virtue of the engagement of piston pin 94 within helical groove 96 on the interior of outer sleeve 74 and the engagement of the lower portion of outer sleeve 74 with the upper end of latching rim 92, latching rim 92 is rotated so that its internal threads engage the external threads of the upper portion of seal assembly 18 to retain it in sealed position as is more fully described in the aforementioned application. With the seal set and latched in set position, running tool may be recovered by merely lifting running string 24. The tapers on latch elements 30 and groove 37 causes latch elements to be cammed inwardly out of groove 37. Further outer rim 84 is disengaged from the upper end of seal assembly 18. As mandrel 22 is raised, shoulder 98 on the exterior of mandrel 22 above groove 66 engages the lower portion of flange 60 to cause the lifting of body 26 and the threaded engagement of body 26 with actuator ring 28 carries actuator ring 28 with the retrieval of running tool 10.

A modified form of running tool 110 is illustrated in FIGURE 6 in which the structural change with respect to running tool 10 is in the relationship between the lower end of mandrel 122, actuator ring 128 and body 126. In FIGURE 6 all components not changed are given the same numerical designation while the changed components are given the same numerical designation with a "1" prefix. Latching ring 164 is a split ring which is biased radially outward whereas latching ring 64 is a split ring which is biases radially inward. The interior of body 126 below flange 60 includes a short straight surface 126a extending downwardly, tapered surface 126b extending downwardly and outwardly, straight surface 126c extending downwardly and tapered surface 126d extending downwardly and outwardly. Latching ring 164 is positioned with its upper outer tapered surface 164a in engagement with tapered surface 126b on the interior of body 126 during running and actuator ring 128 is in engagement with latching elements or dogs 30 to retain them in engagement with internal groove 37 on the interior of casing hanger 12. Mandrel 122 is released from this position by rotation which causes actuator ring 128 to move downwardly with respect to body 126 so that recess 128a on the exterior of actuator ring 128 is opposite latching elements 30 as shown in FIGURE 6A. In this position latching ring 164 moves into engagement with tapered surface 126d on the interior of body 126.

Claims

1. A running tool for lowering and manipulating structures within a well comprising a tool body, means for connecting said tool body (22, 26) to a running string (24) at its upper end, said tool body having radially extending windows (32), latch dogs (30) carried in the tool body windows (32) and means (28) operable to wedge the latch dogs outwardly to a latching position, characterised in that said tool body (22, 26) comprises a mandrel (22) and an outer tool body (26) surrounding said mandrel (22), releasable means (64) interconnecting the mandrel (22) and outer tool body (26), and in its operative position being operable to limit movement of the mandrel (22) downwardly with respect to the outer tool body (26), said wedging means comprises an actuator ring (28) positioned between the mandrel (22) and the outer tool body (26), the actuator ring (28) being interconnected to said mandrel (22) and said outer tool body (26), such that by rotation of said tool body (22, 26) the actuator ring (28) can be moved from a position in which it wedges said latch dogs (30) to their latching position, to a position in which said dogs (30) can be released, and means (28) for effecting release of said releasable means (64) such that the mandrel (22) can move downwardly with respect to the outer body (26) and be manipulated to position said structures in the well.

2. A running tool according to claim 1, wherein the means for effecting release of the releasable means is said actuator ring (28).

tapered surface on flange 60 of body 26 is also in engagement with groove 66 on the exterior of mandrel 22. This position is maintained during the lowering and landing of casing hanger 12 within and onto landing shoulder 14 of well housing 16.

FIGURE 3 illustrates the next step in the operations in that seal assembly 18 is still positioned above the opening of passages 80 but mandrel 22 has been rotated to cause actuator ring 28 to be rotated to its upper position. In this position latching ring 64 has been forced against tapered surface 62 on body flange 60 so that it is wedged outwardly out of engagement with groove 66 on mandrel 22. This disengagement frees mandrel 22 for the setting of seal assembly 18.

As can be seen in FIGURE 4 mandrel 22 and seal assembly 18 have been lowered with respect to casing hanger 12 so that seal assembly 18 has moved downwardly in the annulus between the exterior of casing hanger 12 and the interior of well housing 16. In this position lower wedge ring 88 has moved locking ring 90 into its locked position and seal elements are set but not latched in set position.

The latching of seal elements into their set position is illustrated in FIGURE 5 wherein piston 72 has been actuated by fluid pressure to its lower position. This movement by virtue of the engagement of piston pin 94 within helical groove 96 on the interior of outer sleeve 74 and the engagement of the lower portion of outer sleeve 74 with the upper end of latching rim 92, latching rim 92 is rotated so that its internal threads engage the external threads of the upper portion of seal assembly 18 to retain it in sealed position as is more fully described in the aforementioned application. With the seal set and latched in set position, running tool may be recovered by merely lifting running string 24. The tapers on latch elements 30 and groove 37 causes latch elements to be cammed inwardly out of groove 37. Further outer rim 84 is disengaged from the upper end of seal assembly 18. As mandrel 22 is raised, shoulder 98 on the exterior of mandrel 22 above groove 66 engages the lower portion of flange 60 to cause the lifting of body 26 and the threaded engagement of body 26 with actuator ring 28 carries actuator ring 28 with the retrieval of running tool 10.

A modified form of running tool 110 is illustrated in FIGURE 6 in which the structural change with respect to running tool 10 is in the relationship between the lower end of mandrel 122, actuator ring 128 and body 126. In FIGURE 6 all components not changed are given the same numerical designation while the changed components are given the same numerical designation with a "1" prefix. Latching ring 164 is a split ring which is biased radially outward whereas latching ring 64 is a split ring which is biases radially inward. The interior of body 126 below flange 60 includes a short straight surface 126a extending downwardly, tapered surface 126b extending downwardly and outwardly, straight surface 126c extending downwardly and tapered surface 126d extending downwardly and outwardly. Latching ring 164 is positioned with its upper outer tapered surface 164a in engagement with tapered surface 126b on the interior of body 126 during running and actuator ring 128 is in engagement with latching elements or dogs 30 to retain them in engagement with internal groove 37 on the interior of casing hanger 12. Mandrel 122 is released from this position by rotation which causes actuator ring 128 to move downwardly with respect to body 126 so that recess 128a on the exterior of actuator ring 128 is opposite latching elements 30 as shown in FIGURE 6A. In this position latching ring 164 moves into engagement with tapered surface 126d on the interior of body 126.

Claims

1. A running tool for lowering and manipulating structures within a well comprising a tool body, means for connecting said tool body (22, 26) to a running string (24) at its upper end, said tool body having radially extending windows (32), latch dogs (30) carried in the tool body windows (32) and means (28) operable to wedge the latch dogs outwardly to a latching position, characterised in that said tool body (22, 26) comprises a mandrel (22) and an outer tool body (26) surrounding said mandrel (22), releasable means (64) interconnecting the mandrel (22) and outer tool body (26), and in its operative position being operable to limit movement of the mandrel (22) downwardly with respect to the outer tool body (26), said wedging means comprises an actuator ring (28) positioned between the mandrel (22) and the outer tool body (26), the actuator ring (28) being interconnected to said mandrel (22) and said outer tool body (26), such that by rotation of said tool body (22, 26) the actuator ring (28) can be moved from a position in which it wedges said latch dogs (30) to their latching position, to a position in which said dogs (30) can be released, and means (28) for effecting release of said releasable means (64) such that the mandrel (22) can move downwardly with respect to the outer body (26) and be manipulated to position said structures in the well.

2. A running tool according to claim 1, wherein the means for effecting release of the releasable means is said actuator ring (28).

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3. A running tool according to claim 1 or claim 2, including means (34) for limiting the downward movement of said actuator ring (28) with respect to said tool body (10).

4. A running tool (10) according to any preceding claim, wherein said structures (18, 12) include a hanger (12) and an annular seal (18) for sealing between the hanger (12) and an interior surface of a well housing (16) within which said well structure (12) is to be landed and including means (38, 40, 42) on said tool for supporting said annular seal separately on said tool from said hanger.

5. A running tool (10) according to claim 4, including a passage (80) through said tool body communicating with the annulus below the annular seal to a position above said tool body.

6. A running tool (10) according to claim 5, including at least one tube (76) extending through said seal supporting means (38) and connecting with said passage (80) through said tool body (10).

7. A running tool (10) according to claim 5, wherein said seal supporting means (38) includes a pressure responsive member (72) movable axially of said mandrel (21), a sleeve (74) surrounding said pressure responsive member (72) and engaging a latching rim (92) of said annular seal (18), and means (94, 96) for converting the axial movement of said pressure responsive member (72) into a rotary movement of the sleeve (74).

Patentansprüche

1. Einfahrwerkzeug zum Absenken und Betätigen von Baueinheiten innerhalb eines Bohrloches, mit einem Werkzeugkörper, einer Einrichtung zur Verbindung des Werkzeugkörpers (22, 26) mit einer einfahrenden Futterrohrkolonne (24) an ihrem oberen Ende, wobei der Werkzeugkörper sich radial erstreckende Öffnungen (32), Riegelklauen (30), die in den Werkzeugkörperöffnungen (32) gehalten werden, und eine Einrichtung aufweist, die dazu dient, die Klauen nach außen in eine Verriegelungsstellung zu verkeilen, **dadurch gekennzeichnet**, daß der Werkzeugkörper (22, 26) umfaßt: einen Dorn (22) und einen äußeren Werkzeugkörper (26), der den Dorn (22) umschließt, eine Löseeinrichtung (64), die den Dorn (22) mit dem äußeren Werkzeugkörper (26) verbindet, und in ihrer Arbeitsstellung dazu dient, die Bewegung des Dorns (22) nach unten relativ zum äußeren Werkzeugkörper (26) zu begrenzen, wobei die Verkeilunseinrichtung einen Betätigungsring (28) enthält, der zwischen dem Dorn (22) und dem äußeren Werkzeugkörper (26) angeordnet ist, wobei der Betätigungsring (28) mit dem Dorn (22) und dem äußeren Werkzeugkörper (26) so verbunden ist, daß durch Drehung des Werkzeugkörpers (22, 26) der Betätigungsring (28) aus einer Position, in welcher er die Verriegelungsklauen (30) in Eingriffsstellung drückt, in eine Position bewegbar ist, in welcher die Klauen (30) gelöst werden können, und eine Einrichtung (28) zum Bewirken des Lösens der Löseeinrichtung (64), damit der Dorn (22) sich relativ zum äußeren Werkzeugkörper (26) nach unten bewegen kann und betätigt wird, um die Baueinheiten im Bohrloch anzuordnen.

2. Werkzeug nach Anspruch 1, **dadurch gekennzeichnet,** daß die Einrichtung zur Auslösung der Löseeinrichtung durch den Betätigungsring (28) gebildet ist.

3. Werkzeug nach Anspruch 1 oder 2, **dadurch gekennzeichnet,** daß es eine Einrichtung (34) zur Begrenzung der Abwärtsbewegung des Betätigungsringes (28) relativ zum Werkzeugkörper (10) enthält.

4. Werkzeug (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet,** daß die Baueinheiten (18, 12) umfassen: eine Aufhängung (12) und eine ringförmige Dichtung (18) zur Abdichtung zwischen der Aufhängung (12) und einer inneren Fläche eines Bohrlochkopfgehäuses (16), innerhalb dessen die Baueinheit (12) aufzusetzen ist, und Einrichtungen (38, 40, 42) am Werkzeug zur separaten Abstützung der ringförmigen Dichtung am Werkzeug gegenüber der Aufhängung.

5. Werkzeug (10) nach Anspruch 4, **dadurch gekennzeichnet,** daß es eine Durchführung (80) durch den Werkzeugkörper enthält, die mit dem Ringraum unterhalb der ringförmigen Dichtung zu einem Ort oberhalb des Werkzeugkörpers in Verbindung steht.

6. Werkzeug (10) nach Anspruch 5, **dadurch gekennzeichnet,** daß es mindestens ein Rohr (76) enthält, das sich durch die die Dichtung abstützende Einrichtung (38) erstreckt und eine Verbindung mit der Durchführung (80) durch den Werkzeugkörper (10) herstellt.

7. Werkzeug (10) nach Anspruch 5, **dadurch gekennzeichnet,** daß die die Dichtung abstüt-

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zende Einrichtung (38) einen auf Druck ansprechenden Teil (72), das axialbezüglich des Dorns (21) bewegbar ist, ein das auf Druck ansprechendes Teil (72) umgebendes und mi einem Verriegelungsrand (92) der ringförmigen Dichtung (18) zusammenwirkenden Mantelteil (74), und eine Einrichtung (94, 96) zur Umwandlung der axialen Bewegung des auf Druck ansprechenden Teils (72) in eine Drehbewegung des Mantelteiles (74) aufweist.

Revendications

1. Outil de descente destiné à abaisser et manipuler des structures situées a l'intérieur d'un puits, comportant un corps d'outil, des moyens pour relier ledit corps d'outil (22, 26) à une ligne de descente (24) au niveau de son extrémité supérieure, ledit corps d'outil ayant des fenêtres (32) s'étendant radialement, des griffes (30) de verrouillage supportées dans les fenêtres (32) du corps d'outil et des moyens (28) pouvant être actionnés pour déplacer par effet de coin les griffes du verrou vers l'extérieur vers une position de verrouillage, caractérisé en ce que ledit corps d'outil (22, 26) comporte un mandrin (22) et un corps extérieur (26) d'outil entourant ledit mandrin (22), des moyens (64) pouvant être libérés reliant le mandrin (22) et le corps extérieur (26) d'outil, et, dans leur position active, pouvant être actionnés pour limiter le déplacement du mandrin (22) vers le bas par rapport au corps extérieur (26) d'outil, lesdits moyens agissant par effet de coin comportent un anneau actionneur (28) situé entre le mandrin (22) et le corps extérieur (26) d'outil, l'anneau actionneur (28) étant relié audit mandrin (22) et audit corps extérieur (26) d'outil, de telle sorte que par rotation dudit corps d'outil (22, 26) l'anneau actionneur (28) peut être déplacé d'une position dans laquelle il déplace par effet de coin lesdites griffes (30) de verrou vers leur position de verrouillage, vers une position dans laquelle lesdites griffes (30) peuvent être libérées, et des moyens (28) pour effectuer la libération desdits moyens (64) pouvant être libérés de telle sorte que le mandrin (22) peut être déplacé vers le bas par rapport au corps extérieur (26) et être manipulé pour positionner lesdites structures dans le puits.

2. Outil de descente selon la revendication 1, dans lequel les moyens pour effectuer la libération des moyens pouvant être libérés sont constitués par l'anneau actionneur (28).

3. Outil de descente selon la revendication 1 ou 2, comportant des moyens (34) pour limiter le déplacement vers le bas dudit anneau actionneur (28) par rapport audit corps (10) d'outil.

4. Outil de descente (10) selon l'une quelconque des revendications précédentes, dans lequel lesdites structures (18, 12) comportent un dispositif de suspension (12) et un joint annulaire (18) pour assurer l'étanchéité entre le dispositif de suspension (12) et une surface intérieure d'un boîtier (16) de puits a l'intérieur duquel ladite structure (12) de puits doit être appuyée et comportant des moyens (38, 40,42) situés sur ledit outil pour supporter ledit joint annulaire sur ledit outil de manière séparée dudit dispositif de suspension.

5. Outil de descente (10) selon la revendication 4, comportant un passage (80) traversant ledit corps d'outil mettant en communication l'espace annulaire situé en-dessous du joint annulaire avec une position au-dessus dudit corps d'outil.

6. Outil de descente (10) selon la revendication 5, comportant au moins un tube (76) s'étendant à travers lesdits moyens (38) de support de joint et relié audit passage (80) à travers ledit corps (10) d'outil.

7. Outil de descente (10) selon la revendication 5, dans lequel lesdits moyens (38) de support de joint comportent un élément (72) sensible à la pression pouvant être déplacé axialement dudit mandrin (21), un manchon (74) entourant ledit élément (72) sensible à la pression et venant on prise avec un rebord de verrouillage (92) dudit joint annulaire (18), et des moyens (94, 96) pour convertir le déplacement axial dudit élément (72) sensible à la pression en un mouvement rotatif du manchon (74).