

Description

This invention relates to telescoping joints.

Telescoping joints for pipelines have long been known since it is important in the repair of pipelines, particularly subsea pipelines, that the damaged section be removed and that a piece of the correct length be inserted in place of the removed section. In subsea locations, the repair of pipelines is done by divers or remotely operated vehicles. The repair of subsea pipelines generally requires that the operation of the replacement section include a telescoping joint and that it be easy and simple to operate so that divers or remotely operated vehicles may perform such repairs with a maximum of efficiency.

U. S. Patent No. 4,371,198 discloses a telescoping joint with metal bellows for sealing and locking the joint. The metal bellows is positioned in an annular space between the outer members interior surface and the inner members exterior surface. Actuation is pressure responsive, which moves annular pistons into compressive engagement with the bellows causing the bellows to move radially outward and inward into sealing engagement with the above mentioned surfaces.

U. S. Patent No. 4,109,945 discloses another telescoping joint with separate sealing and gripping means. The sealing sleeve is moved by flange bolts to set the annular seal and the gripping sleeve is also similarly moved to set the gripping slips.

U. S. Patent No. 4,131,287 discloses an annular seal for use in an oil and gas well. This seal involves a central metal seal member having inner and outer lips facing in both directions and wedge members positioned between the lips to force them into tight sealing engagement with the inner and outer walls. Each of the legs has a tapered shoulder which is adapted to engage with a mating taper on its wedge, the engagement of these tapers causes the lips to be urged away from the wall against which each lip is in sealing engagement on retraction of the wedge and thus assists in the unsetting of the seal assembly.

A recently filed U.S. patent application, Serial No. 761,692, filed August 2, 1985 by W.M. Taylor and T.R. Schmitz, publication No. 4720124, published 19.08.88, discloses a telescoping joint with lightly serrated cylindrical surfaces having an interference fit on the inner and outer members and movement of the two members is allowed by the introduction of pressure between the members to overcome the interference fit which allows the adjustment in length of the joint. On release of pressure, such surfaces engage each other to lock the joint in position and to provide a metal-to-metal seal. One embodiment of this application allows

pressure to be used to move the members of the joint to an extended position.

Another prior art arrangement is described in EP-A-0053901. This document describes a joint in accordance with the pre-characterising part of claim 1.

An object of the present invention is to provide an improved telescoping joint which can be positioned between the ends of two pipe sections and readily adjusted in length by extension or retraction, locked in the position of the desired length and having a metal-to-metal seal between the two members of the joint which is separate from the means locking the members in position.

According to the present invention there is provided a telescoping joint comprising an inner tubular member, an outer tubular member having an inner diameter sufficiently large to receive the inner tubular member therein, sealing means between the interior of the outer tubular member and the exterior of the inner tubular member at different diameters to establish a joint extending area and a joint retracting area therebetween, means for supplying fluid under pressure to said extending and retracting areas to cause relative extension and retraction movement of said members, engaging means carried by said outer tubular member, a metal-to-metal seal for sealing between said inner and outer tubular members, pressure responsive means coacting with said engaging means to lock said engaging means to said inner tubular member, characterised in that said pressure responsive means also coacts with said engaging means to release said engaging means from said inner tubular member.

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 telescoping joint of the present invention in its retracted position.

Figure 2 is another similar view of the joint shown in Figure 1 but in its extended position.

Figure 3 is a partial detail sectional view of the seal means of the joint shown in released position.

Figure 4 is a similar sectional view of the seal means of the joint shown in Figure 3 but illustrated in its set position.

Figure 5 is a partial detail sectional view of the locking means of the joint shown in its released position.

Figure 6 is a similar sectional view of the locking means of the joint shown in Figure 5 but illustrated in its set position.

Description of the Preferred Embodiment

A telescoping joint J as shown in the drawings includes inner tubular member M1 which is formed at its end for connection (as by welding) to the exposed end of pipeline P1 (shown in broken lines) and outer tubular member M2 which is formed at its end for connection (as by welding) to the exposed end of pipeline P2 (shown in broken lines). Joint J also includes extension means E and retraction means R, locking means L and sealing means S as hereinafter explained.

Inner tubular member M1 is tubular in shape, has a substantially cylindrical interior and includes exterior surface 10 extending from the end 12 which connects to pipeline P1 to rib 14 and exterior surface 16 extending from rib 14 to the end 18 which is to be positioned within member M2. Shoulder 20 is provided by rib 14 at the end of surface 10 and shoulder 22 is also provided by rib 14 at the beginning of surface 16. Groove 24 is provided in the central portion of rib 14 facing outwardly to receive O ring 26 as shown.

Outer tubular member M2 includes end member 28, spool member 30 connected to end member 28 and locking assembly 32 connected to spool member 30. End member 28 includes end 34 suitable for connection to pipeline P2 and with an internal diameter the same as tubular member M1, flange 36 and body 38 having inner surface 40 with a diameter sufficiently large to receive the end 18 of tubular member M1 therein. Shoulder 42 is formed at the end of surface 40. The opposite end of surface 40 from shoulder 42 ends in rib 41 with O ring groove 41a and bearing ring groove 41b to receive O ring 43a and bearing ring 43b as shown. Flange 36 is provided with tapered recess 44 on its interior surface. Spool member 30 includes flanges 46 and 48 at each end and body 50 between flanges 46 and 48. The inner end of flange 46 includes tapered recess 52 which coacts with recess 44 on end member 28 to receive seal ring 54 therein for sealing between the flanges. Studs 56 and nuts 58 provide the means for connecting flanges 46 and 36 together. As best seen in FIGURES 3 and 4, flange 46 includes projection 60 which extends into recess 62 on the face of flange 36 and bevel 64 is provided between recess 62 and the face of flange 36 so that O ring 66 is trapped therein to provide an additional seal between the flanges. Flange 48 includes projection 68 to define recess 70 between the upper surface of projection 68 and the face of flange 48. The interior of spool member 30 includes interior surface 72 extending from projection 68 to shoulder 74. Shoulder 74 is provided by rib 76 which includes O ring groove 78 for O ring 79 and bearing ring groove 80 for bearing ring 80. Rib 76 forms shoulder 82 with inner surface 84. The interior of spool 30 from shoulder 82 includes surface 86, tapered surface 88, surface 90, surface 92 and counterbore surface 94.

Locking assembly 32 includes gripping or engaging element 96 and actuating means 98 as illustrated in FIGURES 5 and 6. Gripping element 96 includes body 100 having flange 102 and fingers 104 extending to the left of body 100 as shown. Ring 106 is sealed in recess 108 on the face of flange 102 and is secured in position by studs 105 which extend through ring 106, flange 102 and flange 48 and nuts 107. Ring 106 has inwardly projecting lip 110 which has its inner surface spaced a short distance radially outward from the exterior of body 100. The shape of ring 106 coacts with body 100 and flange 102 of element 96 to form annular cylinder 112 in which piston 114 is positioned for reciprocation. Piston 114 includes suitable inner and outer seals. Tubular extension 116 extends from piston 114 in sealing relation to the inner edge of lip 110 and the exterior of body 100 into surrounding engagement with the exterior tapered surfaces 118 of fingers 104. The inner surface of the ends of fingers 104 includes teeth 120 which are preferably machined to have an included apex angle of approximately 50 degrees and in a 12 inch joint would have 16 teeth at .250 pitch. The apex of teeth 120 in the released position, as shown in FIGURES 1 and 5, should be closely spaced with respect to the exterior surface 10 of tubular member M1 (e.g. approximately 0.010 inch max. space). Ring 122 is secured by screws 123 to the outer end of extension 116 and is slidable on studs 124 which are threaded into ring 106 with nuts 125 threaded onto the outer end of studs 124 at a position to allow full release or locking of locking assembly 32.

Passage 126 extends through flange 102 into the release end of cylinder 112 and passage 128 extends through ring 106 into the set end of cylinder 112. Additionally passage 130 extends through flange 102 into a position to deliver fluid under pressure on the interior and between flanges 102 and 48. Passage 132 extends through body 50 of spool member 30 to deliver fluid under pressure to a position on the exterior surface of rib 14 to the right of O ring 26. Passage 134 extends through body 50 into a position opening through the left end of surface 84. Passage 136 extends through body 50 to a position opening through surface 92. Passage 138 extends through flange 46 to a position extending through the right portion of second counterbore surface 139 to supply pressure fluid urging piston 140 to the left. Piston 140 is annular in shape and is positioned between the exterior surface 16 of member M1 and interior surface 94 and includes fingers 142 extending into and engaging with inner leg 144 of annular metal channel shaped seal ring 146. The inner surface of the

distal end of fingers 142 include groove 148 into which projection 150 on leg 144 is engaged. When piston 140 is in the position shown in FIGURE 3, the inner leg 144 of seal ring 146 does not touch surface 16 of the inner tubular member M1 and joint J can be extended or retracted without damage to seal leg 144. Projections 152 of fingers 142 has outer surface 154 which is tapered and flat surface 156. Surfaces 154 and 156 are provided to coact with surfaces 90 and 88 to provide an inward force on fingers 142 to cause the inner leg 144 of seal ring 146 to be moved into a sealing contact with surface 16 of the inner tubular member M1 and to be maintained in this mode by residual stress in fingers 142.

When improved joint J of the present invention is to be used to replace a damaged section in a subsea pipeline, the damaged section is first cut free and removed and then replacement joint J is lowered into position between the free ends of the pipeline. If joint J is shorter than the gap between the pipeline ends P1 and P2 as shown, then extension means E is actuated by a diver or remote controlled vehicle by admitting fluid under pressure through passage 132 and venting or relieving the pressure in passage 130. The fluid under pressure delivered through passage 132 acts on an annular area between the seal of O ring 26 on surface 72 and the seal of O ring 79 on surface 16 of inner tubular member M1. The pressure on this area is exerted to move inner tubular member M1 to the left as shown in the drawings and outer tubular member M2 to the right. If the joint J is longer when extended than the gap between the pipeline ends, then retraction means R is actuated by a diver or remote controlled vehicle by admitting fluid under pressure through passage 130 and venting or relieving the pressure in passage 132. The fluid under pressure delivered through passage 130 acts on an annular area between the seal of O ring 79 against surface 10 and the seal of O ring 26 on surface 72. The pressure on this area is exerted to move inner tubular member M1 to the right as shown in the drawings and outer tubular member M2 to the left. When the desired length of joint J is achieved the communications with passages 103 and 132 are closed to lock the joint J in its position of desired length.

The trapping of hydraulic fluid within the areas mentioned above will resist the change in length of joint J. However, it is preferred that joint J be positively locked in position by the energizing of locking means L. This is accomplished by the admission of fluid under pressure through passage 128 while providing a return or vent through passage 126. The fluid delivered through passage 128 enters the left-hand end of annular cylinder 112 and moves piston 114 to the right. This causes

tubular extension 116 and ring 122 also to move to the right. The inner surface 162 of extension 116 is in engagement with the exterior tapered surface 118 on the outer ends of fingers 104. The length of the stroke of piston 114 is sufficient to cause surface 162 to cam teeth 120 into locking engagement with exterior surface 10 of inner tubular member M1 providing the positive lock between members M1 and M2. In this position nuts 125 are tightened on studs 124 to secure locking assembly in its locked position. If it is desired that this positive lock be released it is only necessary to unthread nuts 125 and to supply fluid under pressure through passage 126 and to vent or return fluid from passage 128.

With the locking of locking means L, sealing means S is actuated to provide the desired metal-to-metal seal between the exterior of inner tubular member M1 and the interior of outer tubular member M2 at a position near the inner end of joint J and upstream from locking means L, extension means E and retracting means R. This seal is provided by the supply of fluid under pressure through passage 138 and the venting or return of fluid through passage 136. The fluid under pressure in the annular area between surface 94 and surface 16 urges piston 140 to move to the left. The movement of piston 140 moves metal seal ring 146 into engagement with shoulder 82 in the confined space between surface 16 on inner tubular member M1 and surface 84 on the interior of spool member 30. This movement is transmitted to seal ring 146 through piston fingers 142 to leg 144 of seal ring 146. The spacing between surfaces 16 and 84 is such that the outer leg of seal ring 146 is caused to bend inward by the reduction of the radial dimension of the space in which seal ring 146 is positioned. This causes the outer leg to be stressed so that it maintains a positive metal-to-metal seal against such surfaces as shown in FIGURE 4. At the same time, the inner seal leg 144 is moved into sealing contact with surface 16 of inner tubular member M1 by the camming action of surface 90 and 88 coacting with surface 154 and 156 and thereby depressing fingers 142. Release of locking means L is achieved by reversing the procedure. Fluid under pressure is delivered through passage 136 and passage 138 is vented or returned. This causes piston 140 to move to the right. Figures 142 which are held in engagement with inner leg 144 or seal ring 146 pull seal ring 146 to the right until it is in the position as shown in FIGURE 5. The camming of fingers 142 against leg 144 by the engagement of projection surfaces 154 and 156 against surfaces 90 and 88 ensures that the metal-to-metal seal will be release by the reverse movement of piston 140.

Once seal ring 146 has been moved into set

position, it is often desirable to test to determine whether or not it has created a tight seal. This is done before joint J is fixed to the free ends of the pipeline. Testing is accomplished by supplying fluid under pressure through both passages 136 and 138 and checking for leakage at passage 134. The supply of fluid to both of passages 136 and 138 ensures that piston 140 does not move from set position and also exerts fluid pressure on seal ring 146. If testing established that seal ring 146 is fluid tight then the repair of the pipeline can be completed by securing the ends of joint J to the free ends of the pipeline as by checking the pressure of fluids in passage 164 which extends through flange 36.

Claims

1. A telescoping joint comprising an inner tubular member (M1), an outer tubular member (M2), having an inner diameter sufficiently large to receive the inner tubular member (M1) therein, sealing means (26, 79) between the interior of the outer tubular member (M2) and the exterior of the inner tubular member (M1) at different diameters to establish a joint extending area and a joint retracting area therebetween, means (130, 132) for supplying fluid under pressure to said extending and retracting areas to cause relative extension and retraction movement of said members (M1, M2), engaging means (120) carried by said outer tubular member (M2), a metal-to-metal seal for sealing between said inner (M1) and outer tubular members (M2), pressure responsive means (114) coacting with said engaging means (120) to lock said engaging means (120) to said inner tubular member (M1), characterised in that said pressure responsive means also coacts with said engaging means to release said engaging means from said inner tubular member.
2. A telescoping joint according to claim 1, wherein said pressure responsive means (114) comprise pressure responsive cam means.
3. A telescoping joint according to claim 1 or claim 2, wherein said seal is positioned in an area between said tubular members which has a decreasing dimension in the axial direction.
4. A telescoping joint according to claim 3, including pressure responsive means for setting said seal by movement in the narrowing axial direction to move the seal into sealing engagement with the tubular members and for releasing said seal by movement in the widening axial direction to move the seal from its sealing engagement.
5. A telescoping joint according to claim 1, wherein said metal-to-metal seal includes pressure responsive means (140, 142), for setting and releasing said metal-to-metal seal, and means (136, 138) supplying fluid under pressure to said seal pressure responsive means (140, 142).
6. A telescoping joint according to claim 1, including means (134, 136, 138) for pressure testing said metal-to-metal seal.
7. A telescoping joint according to claim 1, wherein said metal-to-metal seal includes a U-shaped metal seal ring (146) having its legs extending in the direction from which pressure from within the inner tubular members comes, and a plurality of fingers (142) extending from said pressure responsive seal setting and releasing means (140, 142) and engaging said seal ring (146) so that the seal ring (146) moves with the movement of said pressure responsive seal setting and releasing means (140, 142) between release and set positions.
8. A telescoping joint according to claim 7, wherein said seal ring (146) when set is positioned in an annular recess between said tubular members, the inner leg (144) of said seal ring (146) includes a lip (150) at its end, and said fingers (142) engage said leg lip (150).
9. A telescoping joint according to claim 8, including means (90, 98, 154, 156) for camming said fingers into tight engagement with said leg lip.
10. A telescoping joint according to claim 9, including mechanical means (140, 142) for securing said camming means (90, 98, 154, 156) in engagement position.
11. A telescoping joint according to claim 5, wherein said pressure responsive seal setting and releasing means (140, 142), includes an annular seal piston (140) positioned in annular recess between said tubular members (M1, M2) for axial movement therein and said supply means includes ports (136, 138) into each end of said annular seal piston recess.
12. A telescoping joint according to claim 11, including a test port (134) extending through

position, it is often desirable to test to determine whether or not it has created a tight seal. This is done before joint J is fixed to the free ends of the pipeline. Testing is accomplished by supplying fluid under pressure through both passages 136 and 138 and checking for leakage at passage 134. The supply of fluid to both of passages 136 and 138 ensures that piston 140 does not move from set position and also exerts fluid pressure on seal ring 146. If testing established that seal ring 146 is fluid tight then the repair of the pipeline can be completed by securing the ends of joint J to the free ends of the pipeline as by checking the pressure of fluids in passage 164 which extends through flange 36.

Claims

1. A telescoping joint comprising an inner tubular member (M1), an outer tubular member (M2) having an inner diameter sufficiently large to receive the inner tubular member (M1) therein, sealing means (26, 79) between the interior of the outer tubular member (M2) and the exterior of the inner tubular member (M1) at different diameters to establish a joint extending area and a joint retracting area therebetween, means (130, 132) for supplying fluid under pressure to said extending and retracting areas to cause relative extension and retraction movement of said members (M1, M2), engaging means (120) carried by said outer tubular member (M2), a metal-to-metal seal for sealing between said inner (M1) and outer tubular members (M2), pressure responsive means (114) coacting with said engaging means (120) to lock said engaging means (120) to said inner tubular member (M1), characterised in that said pressure responsive means also coacts with said engaging means to release said engaging means from said inner tubular member.
2. A telescoping joint according to claim 1, wherein said pressure responsive means (114) comprise pressure responsive cam means.
3. A telescoping joint according to claim 1 or claim 2, wherein said seal is positioned in an area between said tubular members which has a decreasing dimension in the axial direction.
4. A telescoping joint according to claim 3, including pressure responsive means for setting said seal by movement in the narrowing axial direction to move the seal into sealing engagement with the tubular members and for releasing said seal by movement in the widening axial direction to move the seal from its sealing engagement.
5. A telescoping joint according to claim 1, wherein said metal-to-metal seal includes pressure responsive means (140, 142), for setting and releasing said metal-to-metal seal, and means (136, 138) supplying fluid under pressure to said seal pressure responsive means (140, 142).
6. A telescoping joint according to claim 1, including means (134, 136, 138) for pressure testing said metal-to-metal seal.
7. A telescoping joint according to claim 1, wherein said metal-to-metal seal includes a U-shaped metal seal ring (146) having its legs extending in the direction from which pressure from within the inner tubular members comes, and a plurality of fingers (142) extending from said pressure responsive seal setting and releasing means (140, 142) and engaging said seal ring (146) so that the seal ring (146) moves with the movement of said pressure responsive seal setting and releasing means (140, 142) between release and set positions.
8. A telescoping joint according to claim 7, wherein said seal ring (146) when set is positioned in an annular recess between said tubular members, the inner leg (144) of said seal ring (146) includes a lip (150) at its end, and said fingers (142) engage said leg lip (150).
9. A telescoping joint according to claim 8, including means (90, 98, 154, 156) for camming said fingers into tight engagement with said leg lip.
10. A telescoping joint according to claim 9, including mechanical means (140, 142) for securing said camming means (90, 98, 154, 156) in engagement position.
11. A telescoping joint according to claim 5, wherein said pressure responsive seal setting and releasing means (140, 142), includes an annular seal piston (140) positioned in annular recess between said tubular members (M1, M2) for axial movement therein and said supply means includes ports (136, 138) into each end of said annular seal piston recess.
12. A telescoping joint according to claim 11, including a test port (134) extending through



said outer tubular member (M1) downstream of said seal ring (146) whereby pressure supplied to both ports (136, 138) of said annular seal piston recess locks said seal piston (140) and pressurizes said seal ring (146) and any leakage past said seal ring (146) is detected at said test port (134).

13. A telescoping joint according to claim 2, wherein said joint includes means (126, 128) for supplying fluid under pressure selectively to the pressure responsive means 114 for said engaging means (120) to move said engaging means (120) between its locked and released positions.

14. A telescoping joint according to claim 13, including mechanical means (124, 125) for securing said engaging means (120) and its pressure responsive actuating means (114) in the locked position.

15. A telescoping joint according to claim 13, wherein said outer tubular member (M2) includes a plurality of sections (L, E, S) with means (56, 58, 105, 107) securing the sections together to facilitate assembly of said outer tubular member on said inner tubular member while preserving said effective pressure areas for extension and retraction of the members.

Revendications

1. Raccord télescopique, comportant un élément tubulaire intérieur (M1), un élément tubulaire extérieur (M2) ayant un diamètre intérieur suffisamment grand pour recevoir intérieurement l'élément tubulaire intérieur (M1), des moyens d'étanchéité (26, 79) situés entre l'intérieur de l'élément tubulaire extérieur (M2) et l'extérieur de l'élément tubulaire intérieur (M1) à différents diamètres pour définir entre eux une zone d'extension du raccord et une zone de rétraction du raccord, des moyens (130, 132) pour amener du fluide sous pression dans ces zones d'extension et de rétraction pour provoquer un déplacement relatif d'extension ou de rétraction de ces deux éléments (M1, M2), des moyens faisant prise (120) portés par l'élément tubulaire extérieur (M2), un joint d'étanchéité métal-sur-métal pour réaliser l'étanchéité entre l'élément tubulaire intérieur (M1) et l'élément tubulaire extérieur (M2), des moyens (114) sensibles à la pression coopérant avec les moyens faisant prise (120) pour verrouiller les moyens faisant prise (120) sur l'élément tubulaire intérieur (M1), caractérisé en ce que

les moyens sensibles à la pression coopèrent également avec les moyens faisant prise afin de libérer lesdits moyens faisant prise de l'élément tubulaire intérieur.

2. Raccord télescopique conforme à la revendication 1, dans lequel les moyens (114) sensibles à la pression comprennent des moyens formant came sensibles à la pression.

3. Raccord télescopique conforme à l'une des revendications 1 ou 2, dans lequel ledit joint est placé dans une région située entre les éléments tubulaires présentant une dimension qui diminue dans le sens axial.

4. Raccord télescopique conforme à la revendication 3, comportant des moyens sensibles à la pression pour mettre en action ledit joint par déplacement dans le sens axial de rétrécissement pour déplacer le joint et le mettre en contact étanche avec les éléments tubulaires, et pour libérer le joint par déplacement dans le sens axial d'élargissement pour sortir le joint de son contact étanche.

5. Raccord télescopique conforme à la revendication 1, dans lequel ledit joint métal-sur-métal comporte des moyens (140, 142) sensibles à la pression, pour mettre en action et libérer ledit joint métal-sur-métal, et des moyens (136, 138) amenant du fluide sous pression auxdits moyens (140, 142) sensibles à la pression.

6. Raccord télescopique conforme à la revendication 1, comportant des moyens (134, 136, 138) pour tester sous pression ledit joint métal-sur-métal.

7. Raccord télescopique conforme à la revendication 1, dans lequel ledit joint métal-sur-métal comporte une bague d'étanchéité métallique (146) en forme de U dont les branches s'étendent dans le sens d'où vient la pression provenant de l'intérieur de l'élément tubulaire intérieur, et plusieurs doigts (142) qui s'étendent à partir desdits moyens (140, 142) sensibles à la pression pour mettre en action et libérer le joint et qui viennent en prise avec la bague d'étanchéité (146) de façon telle que la bague (146) se déplace pendant que lesdits moyens (140, 142) sensibles à la pression pour mettre en action et libérer le joint se déplacent entre leurs positions respectives de mise en action et de dégagement.

8. Raccord télescopique conforme à la revendication 7, dans lequel la bague d'étanchéité (146),



quand elle est mise en action, est placée dans un évidement annulaire situé entre les éléments tubulaires, la branche intérieure (144) de la bague d'étanchéité (146) comporte une lèvre (150) à son extrémité, et les doigts (142) viennent en contact avec la lèvre (150) de la branche.

9. Raccord télescopique conforme à la revendication 8, comportant des moyens (90, 98, 154, 156) pour exercer un effet de came sur les doigts pour les amener en contact étanche avec la lèvre de la branche.

10. Raccord télescopique conforme à la revendication 9, comportant des moyens mécaniques (140, 142) pour fixer les moyens (90, 98, 154, 156) exerçant un effet de came en position de contact.

11. Raccord télescopique conforme à la revendication 6, dans lequel les moyens (140, 142) sensibles à la pression pour mettre en action et libérer le joint comportent un piston d'étanchéité annulaire (140) placé dans un évidement annulaire ménagé entre les éléments tubulaires (M1, M2) pour se déplacer axialement à l'intérieur de cet évidement, et les moyens d'amenée comprennent des orifices (136, 138) ménagés à chacune des extrémités de l'évidement du piston d'étanchéité annulaire.

12. Raccord télescopique conforme à la revendication 11, comportant un orifice (134) d'essai traversant l'élément tubulaire extérieur (M1) en aval de la bague d'étanchéité (146), de sorte qu'une pression amenée jusqu'aux deux orifices (136, 138) de l'évidement du piston d'étanchéité annulaire verrouille ledit piston d'étanchéité (140) et met sous pression la bague d'étanchéité (146), et toute fuite au-delà de ladite bague (l'étanchéité (146) est détectée à l'orifice d'essai (134).

13. Raccord télescopique conforme à la revendication 2, dans lequel ledit raccord comporte des moyens (126, 128) pour amener du fluide sous pression sélectivement jusqu'aux moyens (114) sensibles à la pression, pour déplacer les moyens faisant prise (120) entre leurs positions respectivement verrouillée et libérée.

14. Raccord télescopique conforme à la revendication 13, comportant des moyens mécaniques (124, 125) pour fixer les moyens faisant prise (120) et leurs moyens d'actionnement sensibles à la pression (114) dans leur position verrouillée.

15. Raccord télescopique conforme à la revendication 13, dans lequel l'élément tubulaire extérieur (M2) comporte plusieurs tronçons (L, E, S) présentant des moyens (56, 58, 105, 107) pour fixer les tronçons les uns aux autres afin de faciliter l'assemblage dudit élément tubulaire extérieur sur l'élément tubulaire intérieur tout en préservant lesdites régions de pression efficace pour l'extension et la rétraction des éléments.

Ansprüche

1. Teleskop-Verbindung mit einem inneren rohrförmigen Teil (M₁), einem äußeren rohrförmigen Teil (M₂), der einen zur Aufnahme des inneren rohrförmigen Teils (M₁) ausreichend großen Innendurchmesser aufweist, einem Dichtungsmittel (26, 79) zwischen dem Inneren des äußeren rohrförmigen Teils (M₂) und dem Äußeren des inneren rohrförmigen Teils (M₁) an unterschiedlichen Durchmessern zugunsten der Schaffung eines Zusammenschiebbereichs der Verbindung und eines Auseinanderziehbereichs der Verbindung, einem Mittel (130, 132) zum Zuführen von Fluid unter Druck in die Auseinanderzieh- und Zusammenschiebbereiche zur Schaffung einer relativen Auseinanderzieh- und Zusammenschiebbewegung der Teile (M₁, M₂), einem von dem äußeren Rohrteil (M₂) getragenen Eingriffsmittel (120), einer Metall-auf-Metalldichtung zur Abdichtung zwischen den inneren (M₁) und äußeren Rohrteilen (M₂), einem mit dem Eingriffsmittel (120) zugunsten dessen Festsetzung oder Versperrung an dem inneren rohrförmigen Teil zusammenwirkenden, auf Druck ansprechenden Mittel (114),
dadurch **gekennzeichnet**, daß
das auf Druck ansprechende Mittel mit dem Eingriffsmittel auch zur Freigabe des Eingriffsmittels von dem inneren rohrförmigen Teil zusammenwirkt.
2. Teleskop-Verbindung nach Anspruch 1, bei der das auf Druck ansprechende Mittel (114) ein auf Druck ansprechendes Beaufschlagungsmittel umfaßt.
3. Teleskop-Verbindung nach Anspruch 1 oder 2, bei der
die Dichtung in einem Bereich zwischen den rohrförmigen Teilen angeordnet ist, der in axialer Richtung eine abnehmende Abmessung aufweist.
4. Teleskop-Verbindung nach Anspruch 3, mit



* C L M S *

einem auf Druck ansprechenden Mittel zum Festsetzen der Dichtung durch Verstellen in der engerwerdenden axialen Richtung zugunsten einer Überführung der Dichtung in Dichtungseingriff mit den rohrförmigen Teilen und zum Freigeben der Dichtung durch Verstellen in der axialen Erweiterungsrichtung zugunsten einer Freigabe der Dichtung aus dem Dichtungseingriff.

5. Teleskop-Verbindung nach Anspruch 1, bei der die Metall-auf-Metallabdichtung ein auf Druck ansprechendes Mittel (140, 142) umfaßt zum Festsetzen und Freigeben der Metall-auf-Metallabdichtung, und ein Mittel (136, 138), das Fluid unter Druck an das auf Druck ansprechende Dichtungsmittel (140, 142) liefert.

Teleskop-Verbindung nach Anspruch 1, mit einem Mittel (134, 136, 138) zum Drucküberprüfen der Metall-auf-Metallabdichtung.

7. Teleskop-Verbindung nach Anspruch 1, bei der die Metall-auf-Metallabdichtung einen U-förmigen Metallabdichtungsring (146) umfaßt, dessen Schenkel sich in der Richtung erstrecken, aus welcher Druck vom Innern der rohrförmigen Teile kommt, und eine Mehrzahl Finger (142), die sich von dem auf Druck ansprechenden Dichtungsfestsetz- und freigabemittel (140, 142) erstrecken und mit dem Dichtungsring (146) so im Eingriff stehen, daß sich der Dichtungsring (146) mit der Bewegung des auf Druck ansprechenden Dichtungsfestsetz- und Freigabemittels (140, 142) zwischen Freigabe- und Festsetzstellungen bewegt.

Teleskop-Verbindung nach Anspruch 7, bei der der festgesetzte Dichtungsring (146) in einer ringförmigen Ausnehmung zwischen den rohrförmigen Teilen angeordnet ist, wobei der innere Schenkel (144) des Dichtungsring (146) an seinem Ende eine Lippe (150) umfaßt, und die Finger (142) im Eingriff mit der Schenkel-lippe (150) stehen.

9. Teleskop-Verbindung nach Anspruch 8, mit einem Mittel (90, 98, 154, 156) zum Drängen der Finger in engen Eingriff mit der Schenkel-lippe.
10. Teleskop-Verbindung nach Anspruch 9, mit einem mechanischen Mittel (140, 142) zum Sichern bzw. Festlegen des Drängemittels (90, 98, 154, 156) in der Eingriffsstellung.
11. Teleskop-Verbindung nach Anspruch 5, bei der das auf Druck ansprechende

Dichtungsfestsetz- und Freigabe-mittel (140, 142) einen ringförmigen Dichtungskolben (140) umfaßt, der in einer ringförmigen Ausnehmung zwischen den rohrförmigen Teilen (M_1 , M_2) zur axialen Bewegung darin angeordnet ist, und bei der das Zuführmittel Öffnungen (136, 138) in jedes Ende der ringförmigen Dichtungskolbenausnehmungen umfaßt.

12. Teleskop-Verbindung nach Anspruch 11, mit einer durch das äußere rohrförmige Teil (M_1) stromab des Dichtungsring (146) verlaufenden Prüfföffnung (134), wodurch an beide Öffnungen (136, 138) der ringförmigen Dichtungskolbenausnehmung angelegter Druck den Dichtungskolben (140) blockiert bzw. festsetzt und den Dichtungsring mit Druck beaufschlagt sowie jegliche Leckage hinter dem Dichtungsring (146) an der Prüfföffnung (134) erfaßt wird.

13. Teleskop-Verbindung nach Anspruch 2, bei der die Verbindung ein Mittel (126, 128) zum selektiven Zuführen von Fluid unter Druck an das auf Druck ansprechende Mittel (114) für das Eingriffsmittel (120) umfaßt, um das Eingriffsmittel zwischen seinen Festsetz- und Freigabestellungen zu verstellen.

14. Teleskop-Verbindung nach Anspruch 13, mit einem mechanischen Mittel (124, 125) zum Festsetzen des Eingriffsmittels (120) und seines auf Druck ansprechenden Betätigungsmittels (114) in der festgesetzten Stellung.

15. Teleskop-Verbindung nach Anspruch 13, bei der das äußere rohrförmige Teil (M_2) eine Mehrzahl von Abschnitten (L, E, S) mit Mitteln (56, 58, 105, 107) umfaßt, welche die Abschnitte zusammen sichern, um den Zusammenbau des äußeren rohrförmigen Teils mit dem inneren rohrförmigen Teil zu erleichtern, während die effektiven Druckbereiche zum Auseinanderziehen und Zusammenschieben der Teile aufrechterhalten bleiben.

