Description

The present invention relates to a retrievable guide post system for the guide posts of a permanent subsea guide base or a subsea template which may be readily removed when damaged or bent and replaced with a new guide post.

Prior to the present invention, guide posts have been remotely installed and retrieved but they were ot suitable for the retrieval of bent or damaged guide posts since they rely for their release on the exertion of a downward force on the upper end of a release sleeve at the upper end of the post to release latches which latch into the guide post receptacle. An example of this type of guide post is shown in the "Remote Guidepost System" of FMC as shown in the Composite Catalog published by Gulf Publishing Company for 1988-1989, page 1502.

U. S Patent No. 4,523,878 discloses a structure f the replacement of damaged guide posts which are attached to a receptacle which is a part of a subsea structure. The guide post includes radially extending spring loaded lock pins which engage within a groove in the guide post receptacle and, when damaged, the guide posts are retrieved by an upward pull of sufficient force to shear the lock pins to thereby obtain the release of the guide post from its receptacle and recovered to the surface and a replacement is installed in the receptacle with the aid of a television camera for ensuring proper orientation.

GB-A-2033463 describes a connection in which an inner tubular member can be connected to an outer tubular member by means of a split latching ring carried by the inner member and engageable in a groove in the outer member.

According to the present invention there is ovided a retrievable guide post comprising a ubular body having external means for engagement and a split latching ring for latching the guide post in a receptacle and characterised by, a sleeve surrounding and axially movable along the lower portion of the tubular body and having an upper end, a lower end having a reduced wedging rim and external means for engagement close to the upper end, said split latching ring being supported on said body and being movable to its latching position by coaction with said sleeve wedging rim, a support ring positioned around said tubular body below said split latching ring, means releasably securing said support ring to said tubular body, and means connecting said support ring to said tubular body such that a limited axial movement can occur between said support ring and said tubular body, the arrangement being such that lifting forces on said tubular body can be transmitted to said split latching ring by said support ring.

A tool for setting and retrieving the retrievable guide post comprises a first ring having an interior adapted to be lowered into surrounding relationship to the tubular body and having means for engaging within the tubular body groove to secure said first ring to said tubular body, a second ring having an interior adapted to be lowered into surrounding relationship with the upper end of the sleeve and having means for engaging within the sleeve exterior groove to secure said second ring to said sleeve, and actuating means interconnecting said first and second rings to cause said rings to move axially apart and to return the rings to the adjacent positions.

One embodiment of the present invention provides an improved retrievable guide post for a subsea template which is secured and released through the action of a hydraulic tool and also can be released through the use of a separate pulling tool to provide a shearing of shear pins to allow the release of the latch into the receptacle. The receptacle includes the usual funnel and a groove in the cylindrical inner surface of the receptacle below the funnel, a guide post body, a tool which can be lowered over the guide post body and set in engagement with the body and which includes a ring with means for engaging in a groove in the sleeve which slides within a split latching ring to wedge it into engagement with the receptacle inner groove and an actuator for moving the ring downwardly with respect to the tool to cause the downward movement of the sleeve and also to raise the ring to slide the sleeve upwardly to allow the retraction of the split latching ring from its engagement with the receptacle inner groove, and further a suitable interengagement of the guide post body and the sleeve including shear pins which shear responsive to an upward load on the body and allow the upward movement of the body to raise the sleeve from within the split latching ring to allow its disengagement from the receptacle inner groove and the retrieval of the guide post.

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

FIGURE 1 is an elevation view of a subsea wellhead having a guide base or template with upwardly extending guide posts of the present invention and showing one of the guide posts in section.

FIGURE 2 is an elevation view taken in section to illustrate the improved guide post with the installation tool secured thereto and the sleeve in latching position.

FIGURE 3 is an elevation view taken in section to illustrate the improved guide post with the pulling tool secured to the upper end of the guide post.

FIGURE 4 is a partial sectional view of the improved guide post installation tool with the sleeve in its unlatched position.

FIGURE 5 is another partial sectional view of the installation tool with the sleeve moved to its latched position.

FIGURE 6 is a partial sectional view through the guide post landed in the subsea receptacle but prior to its latching engagement therewith.

FIGURE 7 is another partial sectional view of the guide post and the receptacle illustrating the latching of the guide post within the receptacle.

FIGURE 8 is a sectional view of the guide post latched within the receptacle and illustrating the shear pin connecting the support ring to the guide post.

FIGURE 9 is another sectional view of the guide post illustrating the shearing of the shear pins and initial upward movement of the guide post.

FIGURE 10 is another sectional view of the guide post illustrating its release from its receptacle through the action of shearing the shear pin.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIGURE 1, improved guide posts 10 of the present invention are installed within the receptacles 12 of the subsea floor structure 14, such as a guide base or a template with wellhead 16 located within the opening through structure 14. Guide frame 18 which has its tubular legs 20 surrounding guide posts 10 is used for the lowering of tools and strings into the wellhead and can be used for retrieving and installing the guide posts 10 by provide location guidance from the guide cables 22 and the other guide posts during the lowering of tools and the replacement guide post. Guide post 10 includes tubular body 24 including cable attachment 26 secured to the upper end of body 24 with cables 22 extending therefrom to the surface (not shown). Sleeve 28 surrounds the lower portion of tubular body 24 and extends into receptacle 12 as shown. Receptacle 12 includes an upwardly and outwardly flaring funnel 30 and a tubular body 32 extending downwardly from the funnel 30 and being secured as a part of subsea structure 14. The upper portion of body 32 is counterbored at 34 and includes latching groove 36 therein to receive split latching ring 38 therein when it has been forced outwardly into engagement with groove 36, as best seen in FIGURES 6 and 7.

The installation and retrieval of guide post 10 is normally accompanied by the positioning of running and retrieval tool 40 in engagement with guide post 10 as hereinafter described. Tool 40 is normally actuated on installation to cause its upper ring to engage body 24 and its lower ring to engage sleeve 28. Sleeve locking ring 43 (as best seen in FIGURES 4 and 5) which lock sleeve 28 in its latched position allows the installation of tool 40 so that on actuation of tool 40 sleeve 28 is moved downward thereby wedging split latching ring 38 within the receptacle groove 36. Once installation is complete, the engagement of upper ring and lower ring of tool are disengaged hydraulically as hereinafter explained and then tool 40 can be removed and retrieved to the surface. Removal of guide post 10 is achieved by essentially reversing the procedure as by raising sleeve 28 to release split latching ring 38 and allow retrieval of guide post 10. FIGURE 3 is a sectional view of guide post 10 secured within its receptacle 12 and having pulling tool 44 secured to the upper end of guide post 10. As shown in FIGURES 4 and 5, sleeve 28 is slidable on the exterior of tubular body 24 below downwardly facing shoulder 46 and, in the absence of running and retrieval tool 40 being secured thereon, is secured in its latched position by the engagement of one of split sleeve locking ring 43 within inner groove 48 on the interior of sleeve 28 and also in groove 51 on the exterior of body 24. A plurality of balls 52 are secured within ports 54 in sleeve 28 and are in a position extending partially beyond the outer surface of sleeve 28 until tool 40 is installed thereon. After tool 40 is installed, lower ring 56 of tool 40 engages balls 52 and wedges them inwardly with ports 54 and following actuation of sleeve 28, balls 52 move split latching ring 43, which is in registry with balls 52, back into its groove 50 or 51 on the exterior of tubular body 24 to latch sleeve 28 in its actuated position.

Running and retrieving tool 40 includes upper ring 58, lower ring 56, means 60 connecting between rings 56 and 58 for moving them axially relative to one another, means 62 for securing upper ring 58 to the exterior of tubular body 24 of guide post 10 and means 64 for securing lower ring 56 to the exterior of sleeve 28 as shown in FIGURE 2 and hereinafter described in detail with reference to FIGURES 4 and 5. Tool 40 includes lifting eyes 66 (preferably three) secured to the upper surface of upper ring 58 for lowering and retrieving tool 40, guided on cable 22 into position around tubular body 24 and sleeve 28 as shown in FIGURES 2, 4 and 5 and to retrieve it therefrom.

Upper ring 58 includes upper inner surface 68 which is larger than the diameter of external surface 70 of tubular body 24. The exterior of tubular body 24 at the lower end of surface 70 tapers downwardly and outwardly to external surface 72. Surface 72 includes groove 74 approximately mid way to downwardly facing shoulder 46 which is the end of external surface 72 and the beginning of external surface 76 on which sleeve 28 is slidably

mounted. Upper ring 58 tapers outwardly and downwardly at the lower end of inner surface 68 to inner surface 78 which is slightly larger than external surface 72 so that it will slide thereon to the position illustrated in FIGURES 4 and 5 with the internal taper of upper ring 58 seated on the external taper of tubular body 24. Inner surface 80 on lower ring 56 is sufficiently large to pass readily over surface 72 of tubular post body 24 and over ...e exterior of sleeve 28. As seen in FIGURE 4, upper ring 58 includes a plurality of spring loaded plungers 82 which extend radially inward and have their inner ends 84 suitably sized to engage within groove 74 on the exterior of body 24 to secure upper ring in its operating position of guide post 10. Each of plungers 82 is positioned within radial bore 86 as shown in FIGURES 4 and 5 and includes sealing collar 88 secured to plunger shaft 90 with spring 92 surrounding the outer end of ...haft 90 between collar 88 and the inner surface of ...ap 94. Collar 88 includes seal 96 which seals against the interior of bore 86 so that pressure delivered through passage 98 to the inner surface of collar 88 will result in the force of spring 92 being overcome and plunger 82 moving radially outward out of engagement with groove 74. Thus, plungers 82 provide means 62 for securing upper ring 58 to the exterior of tubular post body 24. Plungers 100 which is of a similar structure to plungers 82 provide means 64 for securing lower ring 56 to sleeve 28. Each of plungers 100 includes shaft 102 with collar 104 mounted thereon and sealed by seal 106 against the interior of bore 108 with spring 110 urging plunger 100 radially inward from its position surrounding the outer portion of shaft 102 and its engagement between collar 104 and cap 112. Pressure delivered through passage 114 extending through the interior of body 116 of ...tuator 118 is exerted on the interior surface of ...aling collar 104 to cause plunger 100 to move radially outward and thus out of engagement with groove 120 on the upper exterior of sleeve 28.

Actuator 118 includes collar 122 which seals against the interior of vertical bore 124 in which it is mounted and actuator body 116 extends downwardly into threaded engagement into the upper portion of lower ring 56. Pressure delivered through passage 126 to the annular chamber above collar 122 causes body 116 to move downwardly to the position illustrated in FIGURE 5 from the position illustrated in FIGURE 4. Actuator 118 is retracted by delivering pressure through passage 128 to the annular chamber below collar 122 and venting the pressure in passage 126. This movement by actuator causes the axial movement of lower ring 56 which when it is secured to sleeve 28 will slide sleeve 28 along the exterior of the lower portion of tubular post body 24. Since each of plungers 82 and 100 can be controlled to retract from their grooves 74 and 120, there is no problem in securing and releasing tool 40 to and from the exterior of tubular post body 24 and to and from the exterior of sleeve 28. Proper operation of actuator 118 will create the desired movement of sleeve 28 and the consequent setting and release of split latching ring 38. Guide pin 130 is secured to the exterior of tubular body 24 and extend outward therefrom and is positioned within upper slot 132 in sleeve 28.

The operation of the lower end of sleeve 28 and its coaction with split latching ring 38 is illustrated in FIGURE 6 and 7. Guide pins 134 which are secured to the exterior of the lower end of tubular body 24 extend outward therefrom and are positioned within lower slots 136. Studs 133 are secured to the exterior of the lower end of tubular body 24 below guide pins 134 and extend outward therefrom and are positioned within slots 135 on the lower end of sleeve 28. Studs 133 engage the upper end of locking ring 38 to maintain it in alignment with receptacle groove 36. Sleeve 28 is tapered on its lower end to provide a reduced rim 138 having a lower tapered wedging surface 139 which engages within the upper tapered surface of split latching ring 38. Support ring 140 is positioned within the lower end of counterbore 34 and, as shown in FIGURES 8, 9 and 10, includes guide pin 142 (preferably more than one) secured in the exterior of tubular body 24 extending outward into vertical slot 144 in ring 140. Additionally, shear pins 146 (preferably more than one) are secured into the exterior of tubular body 24 and in support ring 140. In this position ring 140 positions split latching ring 38 so that it is in registry with groove 36 on the interior of receptacle 12. Thus when sleeve 28 moves downward from the position shown in FIGURE 6, its lower rim 138 wedges split latching ring 38 from its inward position to its latching position within groove 36 as shown in FIGURE 7. Retrieval of guide post 10 is simply the reverse operation by which sleeve 28 is raised and split latching ring 38 is allowed to retract so that guide post 10 is released from receptacle 12 and can be retrieved to the surface.

The alternate retrieval system is illustrated in FIGURES 3, 8, 9 and 10 is utilized to retrieve guide post 10 when the normal retrieval fails, usually because of damage. With pulling tool 44 secured to the upper end of guide post 10 by the engagement of plungers 148 within external groove 150 around the upper exterior of tubular body 24 and having suitable lifting bales 152 secured thereto and having direct connection to the surface for the exertion of substantial lifting forces on guide post 10 when it is stuck in its receptacle 12. With the exertion of sufficient force, shear pins 146 are sheared and tubular body and sleeve 28 move

upwardly as shown by the difference in positions between FIGURES 8 and 9. This allows support ring 140 and split latching ring 38 to remain in their latched positions. As guide pin 142 reaches the upper end of slot 144, support ring 140 engages the lower surface of split latching ring 38 and because of the engagement of tapered surface on the upper end of groove 36 with tapered surface 137 on latching ring 38, the upward force exerted on latching ring 38 causes it to be cammed inwardly to its released position and allow further upward movement of the complete assembly of components as shown in FIGURE 10.

Claims

1. A retrievable guide post comprising a tubular body (24) having external means (22,26) for engagement and a split latching ring (38) for latching the guide post in a receptacle (36) and characterised by, a sleeve (28) surrounding and axially movable along the lower portion of the tubular body and having an upper end, a lower end having a reduced wedging rim (138) and external means for engagement close to the upper end, said split latching ring (38) being supported on said body (24) and being movable to its latching position by coaction with said sleeve wedging rim (138), a support ring (140) positioned around said tubular body below said split latching ring, means (146) releasably securing said support ring to said tubular body, and means (142) connecting said support ring to said tubular body such that a limited axial movement can occur between said support ring (140) and said tubular body (24), the arrangement being such that lifting forces on said tubular body can be transmitted to said split latching ring by said support ring.

2. A retrievable guide post according to claim 1, including means (43, 52) for releasably securing said sleeve (28) to said tubular body (24) in its set position and its latching position.

3. A retrievable guide post according to claim 2, wherein said releasable sleeve securing means includes an upper external groove (57) in the exterior of said tubular body, a lower external groove (51) in the exterior of said tubular body and spaced a preselected distance below said upper external groove, a split locking ring (43) positioned in said upper groove, a split locking ring (43) positioned in said lower groove, a groove (54) on the interior of said sleeve, and means (52) contained within said sleeve and exposed to said interior sleeve groove for coacting with said split locking rings so that the one of said rings within the interior sleeve groove is forced radially inward responsive to a ring engaging the exterior of said sleeve in the area of said sleeve interior groove.

4. A retrievable guide post according to claim 3, wherein said coacting means includes a plurality of balls (52) positioned in recesses (54) in said sleeve and engaging the split locking ring (43) positioned within said interior sleeve groove so that a portion of said balls extend beyond the exterior surface of said sleeve a sufficient distance so that depressing said balls totally into their recesses moves the split locking ring inward out of engagement within the interior sleeve groove.

5. A retrievable guide post according to any preceding claim, including means (26) for securing a guide cable (22) the upper end of said tubular body.

6. A retrievable guide post according to any preceding claim, wherein said releasable securing means includes a plurality of shear pins (146) securing said support ring (140) to said tubular body (24), and said connecting means includes a plurality of vertical slots (144) in said support ring, and a plurality of guide pins (142) secured to said tubular body (24) and positioned in said slots (142).

7. A retrievable guide post according to any preceding claim including a subsea receptacle (12) for receiving said guide post having a central bore and an upper counterbore (34) with an internal latching groove (36) within said counterbore, said latching groove being positioned to receive said split latching ring (38) for latching ring (38) for latching said tubular body (24) into said receptacle (12).

8. A retrievable guide post according to claim 7 including an upper funnel (30), and a lower tubular body (32) extending downward from said funnel.

9. A retrievable guide post according to claim 8 including a subsea structure (14) secured to a plurality of said receptacles (12) for receiving a guide post in each receptacle.

10. A retrievable guide post according to claim 9, wherein said subsea structure surrounds a subsea wellhead (16).

11. A retrievable guide post according to claim 9, wherein said subsea structure is a template.

* C L M S *

upwardly as shown by the difference in positions between FIGURES 8 and 9. This allows support ring 140 and split latching ring 38 to remain in their latched positions. As guide pin 142 reaches the upper end of slot 144, support ring 140 engages the lower surface of split latching ring 38 and because of the engagement of tapered surface on the upper end of groove 36 with tapered surface 137 on latching ring 38, the upward force exerted on latching ring 38 causes it to be cammed inwardly to its released position and allow further upward movement of the complete assembly of components as shown in FIGURE 10.

Claims

1. A retrievable guide post comprising a tubular body (24) having external means (22,26) for engagement and a split latching ring (38) for latching the guide post in a receptacle (36) and characterised by, a sleeve (28) surrounding and axially movable along the lower portion of the tubular body and having an upper end, a lower end having a reduced wedging rim (138) and external means for engagement close to the upper end, said split latching ring (38) being supported on said body (24) and being movable to its latching position by coaction with said sleeve wedging rim (138), a support ring (140) positioned around said tubular body below said split latching ring, means (146) releasably securing said support ring to said tubular body, and means (142) connecting said support ring to said tubular body such that a limited axial movement can occur between said support ring (140) and said tubular body (24), the arrangement being such that lifting forces on said tubular body can be transmitted to said split latching ring by said support ring.

2. A retrievable guide post according to claim 1, including means (43, 52) for releasably securing said sleeve (28) to said tubular body (24) in its set position and its latching position.

3. A retrievable guide post according to claim 2, wherein said releasable sleeve securing means includes an upper external groove (57) in the exterior of said tubular body, a lower external groove (51) in the exterior of said tubular body and spaced a preselected distance below said upper external groove, a split locking ring (43) positioned in said upper groove, a split locking ring (43) positioned in said lower groove, a groove (54) on the interior of said sleeve, and means (52) contained within said sleeve and exposed to said interior sleeve groove for coacting with said split locking rings so that the one of said rings within the interior sleeve groove is forced radially inward responsive to a ring engaging the exterior of said sleeve in the area of said sleeve interior groove.

4. A retrievable guide post according to claim 3, wherein said coacting means includes a plurality of balls (52) positioned in recesses (54) in said sleeve and engaging the split locking ring (43) positioned within said interior sleeve groove so that a portion of said balls extend beyond the exterior surface of said sleeve a sufficient distance so that depressing said balls totally into their recesses moves the split locking ring inward out of engagement within the interior sleeve groove.

5. A retrievable guide post according to any preceding claim, including means (26) for securing a guide cable (22) the upper end of said tubular body.

6. A retrievable guide post according to any preceding claim, wherein said releasable securing means includes a plurality of shear pins (146) securing said support ring (140) to said tubular body (24), and said connecting means includes a plurality of vertical slots (144) in said support ring, and a plurality of guide pins (142) secured to said tubular body (24) and positioned in said slots (142).

7. A retrievable guide post according to any preceding claim including a subsea receptacle (12) for receiving said guide post having a central bore and an upper counterbore (34) with an internal latching groove (36) within said counterbore, said latching groove being positioned to receive said split latching ring (38) for latching ring (38) for latching said tubular body (24) into said receptacle (12).

8. A retrievable guide post according to claim 7 including an upper funnel (30), and a lower tubular body (32) extending downward from said funnel.

9. A retrievable guide post according to claim 8 including a subsea structure (14) secured to a plurality of said receptacles (12) for receiving a guide post in each receptacle.

10. A retrievable guide post according to claim 9, wherein said subsea structure surrounds a subsea wellhead (16).

11. A retrievable guide post according to claim 9, wherein said subsea structure is a template.

* C L M S *

12. A retrievable guide post according to claim 9, wherein said subsea structure is a permanent guide base.

13. A combination of a retrievable guide post according to any preceding claim and a tool for setting and retrieving the guide post, the tool comprising a first ring (58) having an interior adapted to be lowered into surrounding relationship to the tubular body and having means (84) for engaging within the tubular body groove to secure said first ring (58) to said tubular body, a second ring (56) having an interior adapted to be lowered into surrounding relationship with the upper end of the sleeve (28) and having means (64) for engaging within the sleeve exterior groove to secure said second ring to said sleeve, and actuating means (118) interconnecting said first and second rings to cause said rings to move axially apart and to return the rings to the adjacent positions.

14. A combination according to claim 13, wherein said engaging means includes a plurality of plungers (82) extending radially through each of said first and second rings (56, 58) and when extended inward engages within a groove in one of said tubular body and said sleeve.

15. A combination according to claim 14 including means (92) biasing said plungers radially inward.

16. A combination according to claim 15, wherein said plungers (82) are responsive to fluid pressure for retracting radially outward.

atentansprüche

1. Wiedergewinnbare Führungssäule umfassend einen Röhrenkörper (24) mit äußeren Eingriffsmitteln (22, 26) und einem Spalt-Klemmring (38) zum Verklemmen der Führungssäule in einer Aufnahme (36), **gekennzeichnet durch** eine Hülse (28), die den unteren Bereich des Röhrenkörpers umgibt und entlang diesem axial beweglich ist sowie ein oberes Ende, ein unteres Ende mit einem reduzierten Keilrand (138) und äußere Eingriffsmittel nahe dem oberen Ende besitzt, wobei
der Spalt-Klemmring (38) auf dem Körper (24) gehalten wird und durch Zusammenwirkung mit dem Hülsen-Keilrand (138) in seine Klemmposition beweglich ist,
ein Tragering (140), der unterhalb des Spalt-Klemmringes um den Röhrenkörper angeordnet ist,
Mittel (146), die den Tragering lösbar an dem Röhrenkörper befestigen, und
Mittel (142), die den Tragering mit dem Röhrenkörper derart verbinden, daß eine begrenzte axiale Bewegung zwischen dem Tragering (140) und dem Röhrenkörper (24) auftreten kann, wobei die Anordnung derart gebildet ist, daß auf den Röhrenkörper wirkende Hebekräfte auf den Spalt-Klemmring durch den Tragering übertragen werden können.

2. Wiedergewinnbare Führungssäule nach Anspruch 1, die Mittel (43, 52) zur lösbaren Befestigung der Hülse (28) an dem Röhrenkörper (24) in seiner Einsetzposition und in seiner Klemmposition umfaßt.

3. Wiedergewinnbare Führungssäule nach Anspruch 2, bei der das lösbare Hülsen-Befestigungsmittel eine obere äußere Rille (57) auf der Außenseite des Röhrenkörpers, eine untere äußere Rille (51) auf der Außenseite des Röhrenkörpers und einen vorbestimmten Abstand unterhalb der oberen äußeren Rille, einen Spalt-Klemmring (43), der in der oberen Rille angeordnet ist, einen Spalt-Klemmring (43), der in der unteren Rille angeordnet ist, eine Rille (54) auf der Innenseite der Hülse und Mittel (52) umfaßt, die in der Hülse enthalten sind und gegenüber der inneren Hülsenrille zur Zusammenwirkung mit den Spalt-Klemmringen freiliegen, so daß einer der Ringe in der inneren Hülsenrille in Reaktion auf einen Ring, der in Eingriff mit dem Äußeren der Hülse im Bereich der inneren Hülsenrille in Eingriff steht, radial einwärtsgetrieben wird.

4. Wiedergewinnbare Führungssäule nach Anspruch 3, bei der die Zusammenwirkungsmittel eine Vielzahl von Kugeln (52) umfassen, die in Ausnehmungen (54) in der Hülse angeordnet sind und mit dem Spalt-Klemmring (43) in Eingriff stehen, der in der inneren Hülsenrille angeordnet ist, so daß ein Teil der Kugeln sich über die äußere Oberfläche der Hülse um einen genügenden Abstand erstreckt, so daß ein vollständiges Drücken der Kugeln in ihre Ausnehmungen den Spalt-Klemmringeinsatz außer Eingriff mit der inneren Hülsenrille bewegt.

5. Wiedergewinnbare Führungssäule nach einem der vorhergehenden Ansprüche, die Mittel (26) zur Befestigung eines Führungskabels (22) an dem oberen Ende des Röhrenkörpers umfaßt.

6. Wiedergewinnbare Führungssäule nach einem der vorhergehenden Ansprüche, bei der die

* C L M S *

lösbaren Befestigungsmittel eine Vielzahl von Scherstiften (146) umfassen, die den Tragering (140) an dem Röhrenkörper (24) befestigen, wobei die Verbindungsmittel eine Vielzahl von vertikalen Schlitzen (144) in dem Tragering umfassen, wobei eine Vielzahl von Führungsstiften (142) an dem Röhrenkörper (24) befestigt und in den Schlitzen (144) angeordnet sind.

7. Wiedergewinnbare Führungssäule nach einem der vorhergehenden Ansprüche, die eine Untersee-Aufnahme (12) zur Aufnahme der Führungssäule umfaßt, die eine Mittelbohrung und eine obere Absenkung (34) mit einer inneren Klemmhülle (36) in dieser Absenkung besitzt, wobei die Klemmrille angeordnet ist, um den Spalt-Klemmring (38) zum Verklemmen des Ringes (38) zu empfangen, um den Röhrenkörper (24) in der Aufnahme (12) einzuklinken.

8. Wiedergewinnbare Führungssäule nach Anspruch 7, die einen oberen Trichter (30) und einen unteren Röhrenkörper (32) umfaßt, der sich von dem Trichter abwärts erstreckt.

9. Wiedergewinnbare Führungssäule nach Anspruch 1, die einen Untersee-Aufbau (14) umfaßt, der an einer Vielzahl der Aufnahmen (12) zum Empfang einer Führungssäule in jeder Aufnahme befestigt ist.

10. Wiedergewinnbare Führungssäule nach Anspruch 9, bei der der Untersee-Aufbau einen Untersee-Bohrkopf (16) umgibt.

11. Wiedergewinnbare Führungssäule nach Anspruch 9, bei der der Untersee-Aufbau eine Leitform ist.

12. Wiedergewinnbare Führungssäule nach Anspruch 9, bei der der Untersee-Aufbau eine dauerhafte Führungsbasis ist.

13. Kombination einer wiedergewinnbaren Führungssäule gemäß einem der vorhergehenden Ansprüche und ein Werkzeug zum Einsetzen und Wiedergewinnen der Führungssäule, wobei das Werkzeug enthält
einen ersten Ring (58) mit einer Innenseite, die dazu vorgesehen ist, in umgebender Beziehung auf den Röhrenkörper abgesenkt zu werden, und mit einem Mittel (84) zum Eingriff mit der Röhrenkörperrille besitzt, um den ersten Ring (58) an dem Röhrenkörper zu befestigen,
einen zweiten Ring (56) mit einer Innenseite, der dazu vorgesehen ist, in umgebender Beziehung mit dem oberen Ende der Hülse (28) abgesenkt zu werden, und der Mittel (64) zum Eingriff mit der äußeren Hülsenrille besitzt, um den zweiten Ring an der Hülse zu befestigen, und
Betätigungsmittel (118), die die ersten und zweiten Ringe miteinander verbinden, um die Ringe zu veranlassen, sich voneinander axial auseinanderzubewegen, und um die Ringe in die aneinandergrenzenden Position zurückzubewegen.

14. Eine Kombination nach Anspruch 13, bei der die Eingriffsmittel eine Vielzahl von Stempeln (82) umfassen, die sich radial durch jeden der ersten und zweiten Ringe (56, 58) erstrecken, und die, wenn sie einwärts erstreckt wird, in Eingriff mit einer Rille in dem Röhrenkörper oder der Hülse steht.

15. Eine Kombination nach Anspruch 14, die Mittel (92) umfaßt, die die Stempel radial einwärts vorspannen.

16. Eine Kombination nach Anspruch 15, bei der die Stempel (82) gegenüber einem Flüssigkeitsdruck zum radial auswärtsgerichteten Zurückziehen empfindlich sind.

Revendications

1. Colonne de guidage récupérable comportant un corps tubulaire (24) ayant des moyens extérieurs (22, 26) de prise et un anneau fendu (38) de verrouillage destiné à verrouiller la colonne de guidage dans un réceptacle (36) et caractérisée en ce qu'elle comporte un manchon (28) entourant la partie inférieure du corps tubulaire et mobile axialement le long de cette partie et ayant une extrémité supérieure, une extrémité inférieure ayant une bordure (138) formant coin de dimension réduite et des moyens extérieurs de prise situés à proximité de l'extrémité supérieure, ledit anneau fendu (38) de verrouillage étant supporté sur ledit corps (24) et étant mobile vers sa position de verrouillage par coopération avec ladite bordure (138) formant coin du manchon, un anneau (140) de support positionné autour dudit corps tubulaire en dessous dudit anneau fendu de verrouillage, des moyens (146) de fixation relâchable dudit anneau de support sur ledit corps tubulaire, et des moyens (142) de liaison dudit anneau de support audit corps tubulaire de telle sorte qu'un mouvement axial limité peut apparaître entre ledit anneau (140) de support et ledit corps (24) tubulaire, l'agencement étant tel que des forces de levage appliquées sur

ledit corps tubulaire peuvent être transmises par ledit anneau de support audit anneau fendu de verrouillage

2. Colonne de guidage récupérable selon la revendication 1, comportant des moyens (43, 52) destinés à fixer de manière relâchable ledit manchon (28) sur ledit corps tubulaire (24) dans sa position de mise en place et sa position verrouillante.

3. Colonne de guidage récupérable selon la revendication 2, dans laquelle lesdits moyens de fixation relâchable du manchon comportent une gorge (57) supérieure extérieure agencée dans la partie extérieure dudit corps tubulaire, une gorge (51) inférieure extérieure agencée dans la partie extérieure dudit corps tubulaire et écartée d'une distance présélectionnée en dessous de ladite gorge supérieure extérieure, un anneau fendu (43) de verrouillage positionné dans ladite gorge supérieure, un anneau fendu (43) de verrouillage positionné dans ladite gorge inférieure, une gorge (54) située sur la partie intérieure dudit manchon, et des moyens (52) contenus à l'intérieur dudit manchon et exposés à ladite gorge intérieure de manchon pour coopérer avec lesdits anneaux fendus de verrouillage de telle sorte que l'un desdits anneaux situé à l'intérieur de la gorge intérieure de manchon est forcé radialement vers l'intérieur en réponse à un anneau venant en contact avec la partie extérieure dudit manchon dans la zone de ladite gorge intérieure de manchon.

4. Colonne de guidage récupérable selon la revendication 3, dans laquelle lesdits moyens de coopération comportent plusieurs billes (52) situées dans des cavités (54) dudit manchon et venant en contact avec l'anneau fendu (43) de verrouillage situé à l'intérieur de ladite gorge intérieure de manchon de telle sorte qu'une partie desdites billes s'étend au-delà de la surface extérieure dudit manchon sur une distance suffisante de telle sorte qu'en enfonçant lesdites billes entièrement à l'intérieur de leurs cavités on déplace l'anneau fendu de verrouillage vers l'intérieur hors de prise avec l'intérieur de la gorge intérieure de manchon.

5. Colonne de guidage récupérable selon l'une quelconque des revendications précédentes, comportant des moyens (26) pour fixer un câble de guidage (22) à l'extrémité supérieure dudit corps tubulaire.

6. Colonne de guidage récupérable selon l'une quelconque des revendications précédentes, dans laquelle lesdits moyens de fixation relâchable comportent plusieurs goupilles de cisaillement (146) fixant ledit anneau de support (140) sur ledit corps tubulaire (24), et lesdits moyens de liaison comportent plusieurs lentes verticales (144) agencées dans ledit anneau de support, et plusieurs doigts de guidage (142) fixés sur ledit corps tubulaire (24) et positionnés dans lesdites fentes (142).

7. Colonne de guidage récupérable selon l'une quelconque des revendications précédentes, comportant un réceptacle (12) sous-marin destiné à recevoir ladite colonne de guidage, ayant un alésage central et un contre-alésage (34) supérieur, une gorge (36) intérieure de verrouillage étant située dans ledit contre-alésage, ladite gorge de verrouillage étant positionnée de manière à recevoir ledit anneau fendu (38) de verrouillage pour verrouiller l'anneau de verrouillage (38) pour verrouiller ledit corps tubulaire (24) dans ledit réceptacle (12).

8. Colonne de guidage récupérable selon la revendication 7, comportant un entonnoir supérieur (30) et un corps (32) tubulaire inférieur s'étendant vers le bas à partir dudit entonnoir.

9. Colonne de guidage récupérable selon la revendication 8, comportant une structure (14) sous-marine fixée à plusieurs desdits réceptacles (12) pour recevoir une colonne de guidage dans chaque réceptacle.

10. Colonne de guidage récupérable selon la revendication 9, dans laquelle ladite structure sous-marine entoure une tête (16) de puits sous-marin.

11. Colonne de guidage récupérable selon la revendication 9, dans laquelle ladite structure sous-marine est un gabarit.

12. Colonne de guidage récupérable selon la revendication 9, dans laquelle ladite structure sous-marine est une base de guidage permanente.

13. Combinaison d'une colonne de guidage récupérable selon l'une quelconque des revendications précédentes et d'un outil destiné à la mise en place et à l'enlèvement de la colonne de guidage, l'outil comportant un premier anneau (58) ayant une face intérieure adaptée pour qu'il puisse être abaissé de manière à entourer le corps tubulaire et ayant des

* C L M S *

moyens (84) pour venir en prise à l'intérieur de la gorge du corps tubulaire pour fixer ledit premier anneau (58) audit corps tubulaire, un second anneau (56) ayant une face intérieure adaptée pour qu'il puisse être abaissé en entourant l'extrémité supérieure du manchon (28) et ayant des moyens (64) pour venir en prise à l'intérieur de la gorge extérieure du manchon pour fixer ledit second anneau sur ledit manchon, et des moyens (118) d'actionnement reliant lesdits premier et second anneaux pour entraîner lesdits anneaux à se déplacer axialement en s'éloignant l'un par rapport à l'autre et à revenir dans des positions adjacentes.

14. Combinaison selon la revendication 13, dans laquelle lesdits moyens de prise comportent plusieurs pistons (82) s'étendant radialement à travers chacun desdits premier et second anneaux (56, 58) et qui, lors-qu'ils sont étendus vers l'intérieur, viennent en prise à l'intérieur d'une gorge de l'un dudit corps tubulaire et dudit manchon.

15. Combinaison selon la revendication 14, comportant des moyens (92) de sollicitation desdits pistons radialement vers l'intérieur.

16. Combinaison selon la revendication 15, dans laquelle lesdits pistons (82) répondent à une pression de fluide pour se rétracter radialement vers l'intérieur.