

Aug. 1, 1944.

L. L. RECTOR ET AL

2,354,929

MEANS FOR LANDING AND SUPPORTING WELL TUBINGS

Filed May 13, 1940

3 Sheets-Sheet 1

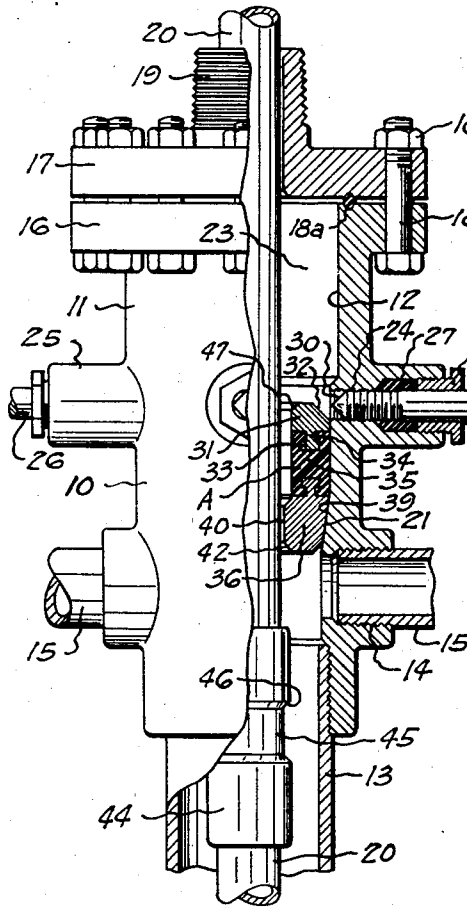


Fig. 1.

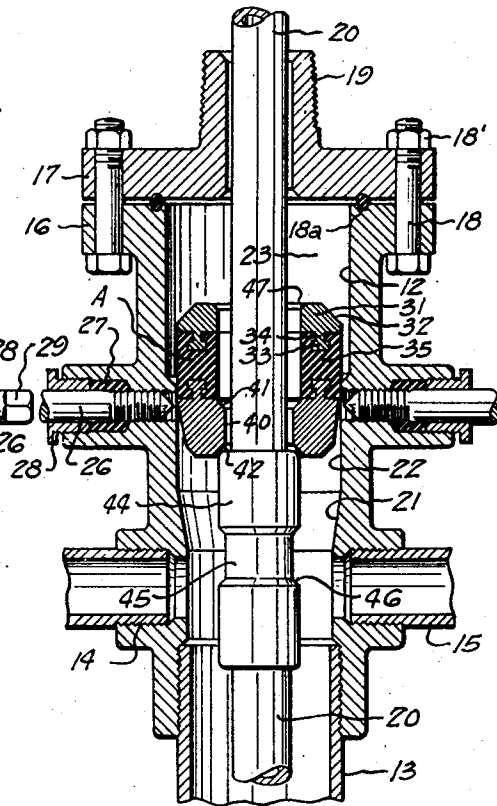


Fig. 2.

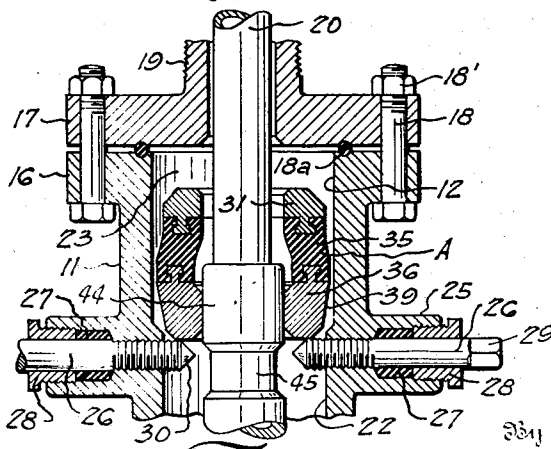


Fig. 9

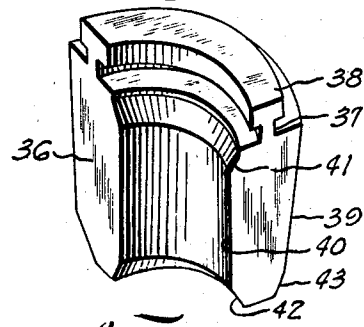


Fig. 8.

Inventors:
Laurence L. Rector
Lewis D. Hilton

Jack A. Ahlby
Attorney

Aug. 1, 1944.

L. L. RECTOR ET AL

2,354,929

MEANS FOR LANDING AND SUPPORTING WELL TUBINGS

Filed May 13, 1940

3 Sheets-Sheet 2

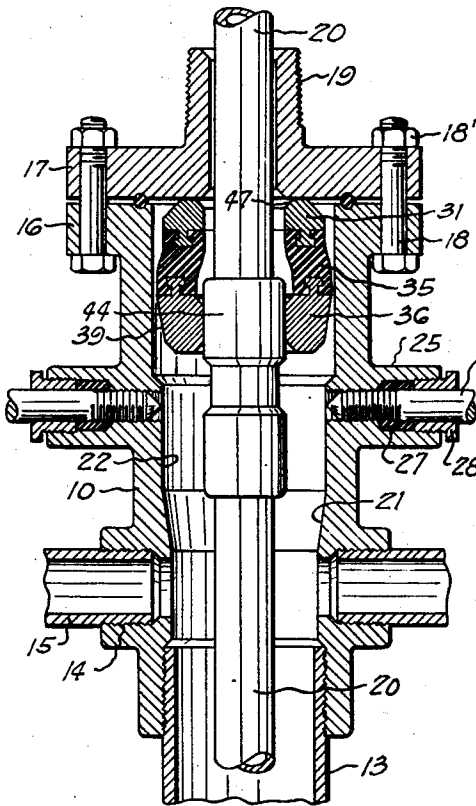


Fig. 3.

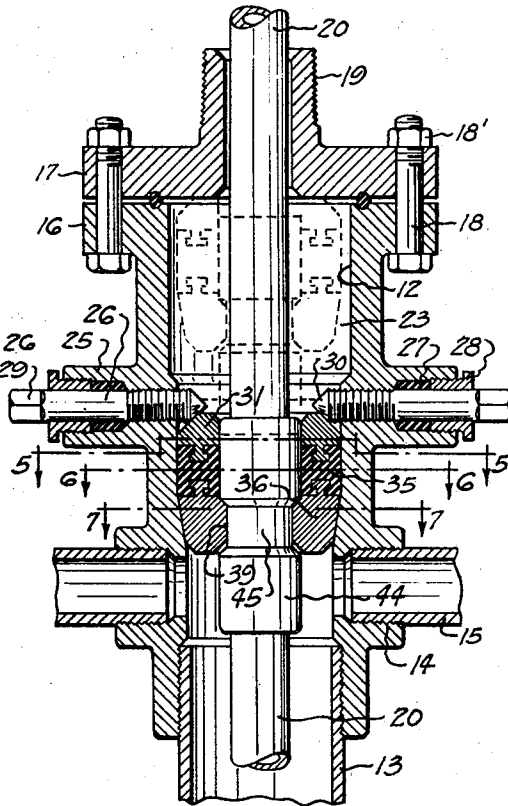


Fig. 4.

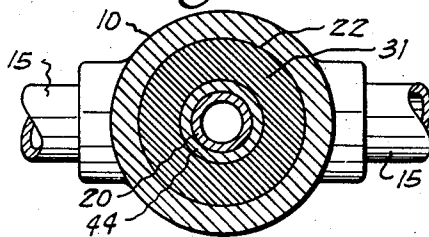


Fig. 5.

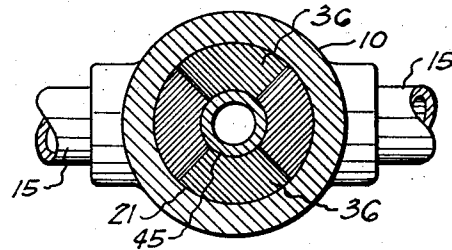


Fig. 7.

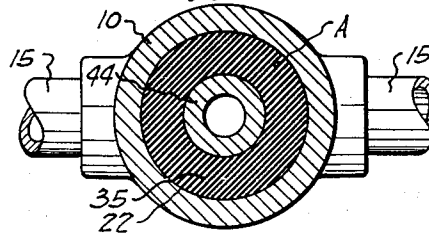


Fig. 6.

Inventors
Laurence L. Rector
Lewis D. Hilton

By

Jack Ashley
Attorney

Aug. 1, 1944.

L. L. RECTOR ET AL

2,354,929

MEANS FOR LANDING AND SUPPORTING WELL TUBINGS

Filed May 13, 1940

3 Sheets-Sheet 3

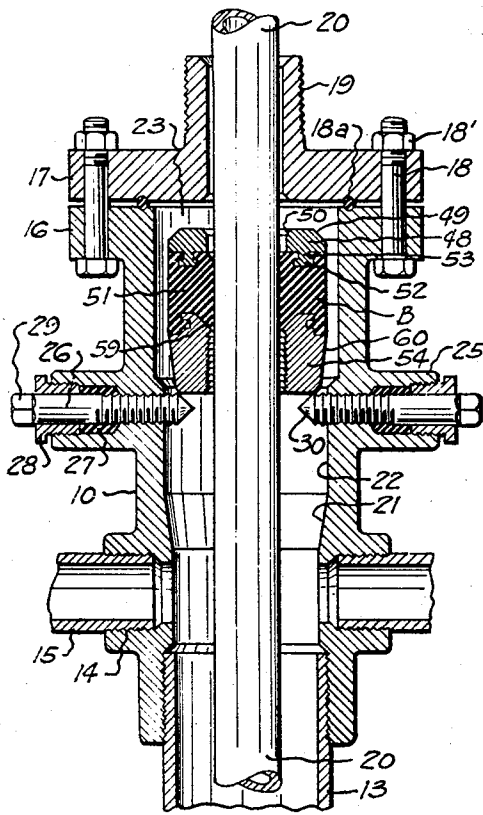


Fig. 10.

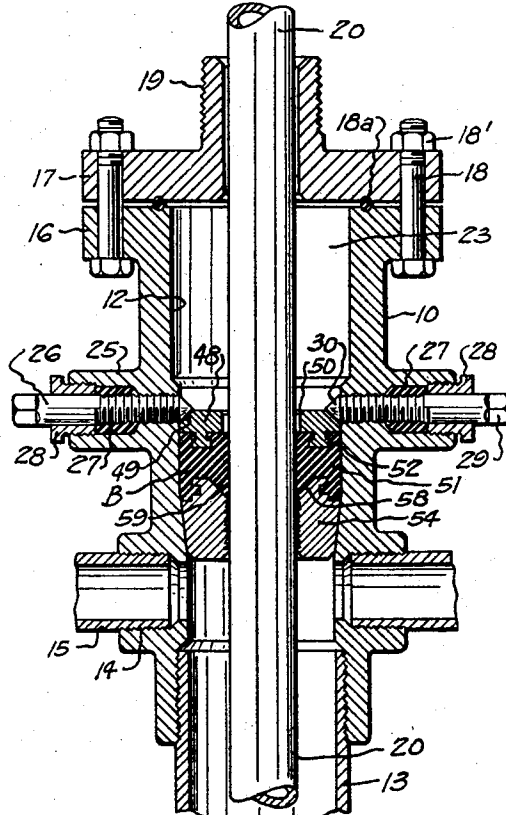


Fig. 11.

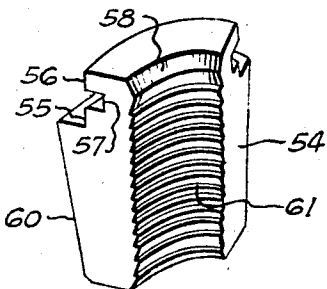


Fig. 12.

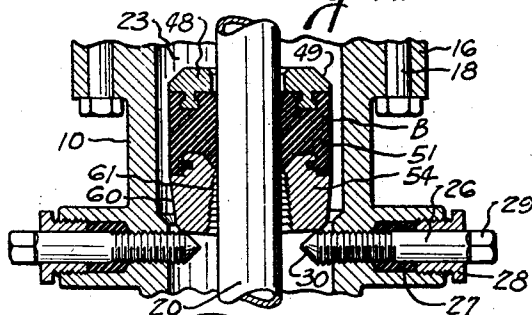


Fig. 13.

Inventors
Laurence L. Rector
Lewis D. Hilton

By

Jack A. Kelly
Attorney

UNITED STATES PATENT OFFICE

2,354,929

MEANS FOR LANDING AND SUPPORTING
WELL TUBINGSLaurence L. Rector and Lewis D. Hilton,
Fort Worth, Tex.

Application May 13, 1940, Serial No. 334,750

4 Claims. (Cl. 166—15)

This invention relates to new and useful improvements in means for landing and supporting well tubings.

One object of the invention is to provide improved means for landing a well tubing and supporting the same within a well head, whereby vertical displacement of said tubing is prevented.

Another object of the invention is to provide improved means for suspending a string of tubing from a well head, said means being so arranged that it may be mounted within the head during certain well operations and may be readily connected to the tubing immediately after the completion of such operations without removing the same from the bore of the head.

A particular object of the invention is to provide, in combination with a well tubing having a recessed coupling connected therein, an improved well head wherein a supporting member is disposed around the tubing within the well head in a non-sealing position so that certain well operations may be performed through said tubing, the recessed coupling of the tubing being positioned below the member and being arranged to be raised upwardly to spread said member and engage therein; subsequent lowering of the tubing moving the element to a sealing position within the head, whereby said element may be locked in position by suitable latching means and whereby vertical displacement of the tubing is prevented.

A further object of the invention is to provide an improved member which is adapted to be mounted within a well head for supporting a tubing string, the tubing having means associated therewith arranged to be automatically coupled with the member to positively connect said tubing to said member, whereby when the member is seated within the head the tubing may be suspended therefrom.

An important object of the invention is to provide an improved support for a tubing having a supporting element mounted thereon, the element being disposed below the support during completion of the well and being arranged to be coupled to said support by upward movement of the tubing, whereby said element and support coact to suspend said tubing within the well when the support is moved to its seated position upon subsequent lowering of the tubing; said support also being adapted to coact with latching means which maintains said support in its seated position and prevents upward movement of the tubing.

Still another object of the invention is to provide an improved supporting member for suspending a tubing string from a well head without

unduly restricting the bore thereof and including a flexible portion which permits the member to be distorted outwardly, whereby the couplings of the tubing string may be passed vertically through said member while the same is mounted within the bore of the head and also whereby a connection between the member and tubing may be effected.

A still further object of the invention is to provide a combined latching and supporting member, of the character described, which includes a plurality of pipe-engaging members flexibly connected to the remaining portion of the member by a resilient packing element, there being means provided within the well head arranged to coact with said member to lock the same in its seated position, whereby vertical displacement of the member and the pipe connected thereto is prevented; the locking of said member in its seated position also acting to distort the packing element into sealing engagement with the bore of the head, whereby said member serves to pack off the space between the pipe and said bore as well as to support said pipe.

Yet another object of the invention is to provide, in combination with a combined latching and supporting member, of the character described, an improved well head having its bore enlarged above the locking means mounted therein, whereby the member may be supported within the enlarged bore by said locking means to permit expansion or spreading of said member when it is desired to move the tubing relative thereto.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings in which an example of the invention is shown, and wherein:

Figure 1 is a view, partly in elevation and partly in section, of a well head having a combined latching and supporting member constructed in accordance with the invention, seated therein,

Figure 2 is a transverse, vertical, sectional view of the head, showing the member engaged by the upper end of the recessed coupling of a tubing and raised from its seat,

Figure 3 is a similar view of the head, with the member in its upper position and the recessed coupling engaging within the lower portion of said member,

Figure 4 is a similar view, showing the member connected to the coupling and seated within the

head with the retaining screws engaging the upper end of said member and locking the same in its seated position,

Figure 5 is a horizontal, cross-sectional view, taken on the line 5—5 of Figure 4,

Figure 6 is a horizontal, cross-sectional view, taken on the line 6—6 of Figure 4,

Figure 7 is a horizontal, cross-sectional view, taken on the line 7—7 of Figure 4,

Figure 8 is an enlarged, isometric view of one of the recess-engaging quadrants of the member,

Figure 9 is a transverse, vertical, sectional view of the upper portion of the head, showing the member supported by the retaining screws during the disconnection of the coupling and member,

Figure 10 is a transverse, vertical, sectional view of the head with another form of supporting member mounted therein and supported by the screws,

Figure 11 is a similar view, showing the modified form seated and locked in position by the screws,

Figure 12 is an enlarged, isometric view of one of the slip quadrants of this form, and

Figure 13 is a transverse, vertical, sectional view of the upper portion of the head, showing the position of the slip quadrants when the tubing is being moved downwardly with relation to the supporting member.

In the drawings, the numeral 10 designates a well head which is preferably constructed in the form of a cylindrical body 11 having an axial bore 12 extending therethrough. The lower end of the bore is screw-threaded to permit the body to be mounted on the upper end of a well casing 13, or other support. Diametrically-opposed, radial outlet ports 14 for receiving the conventional flow pipes 15 are provided in the wall of the body adjacent its lower end and communicate with the bore thereof. An annular, outwardly extending flange 16 is made integral with the upper end of the body and is arranged to be engaged by a flanged cap or closure 17 which is secured thereto by suitable bolts 18 and nuts 18'. A packing rim 18a may be interposed between the flange 16 and the flange of the cap 17. For connecting the body to a valve or other well device (not shown), an externally screw-threaded nipple 19 extends axially upwardly from the cap and is preferably made integral therewith. A well tubing, pipe or other conductor 20 may extend through the nipple and body and into the casing in the conventional manner.

The lower portion of the bore 12, immediately above the radial ports 14 is flared outwardly and upwardly to form an annular, inclined seat 21 within the body and said bore is enlarged thereabove as shown at 22. Between the flange 16 and the intermediate bore portion 22, the diameter of the bore is again increased to provide an enlarged counterbore or chamber 23. It is preferable that the walls of these bores 22 and 23 be substantially vertical. A plurality of radially-disposed openings 24 are provided in the wall of the intermediate bore portion 22 and each opening is surrounded by an external annular collar or boss 25 which is made integral with the exterior of the body. The openings communicate with the bore of the body and are screw-threaded so as to receive elongate threaded retaining pins or set screws 26, the purpose of which will be hereinafter explained. For packing off around the screws, the bore of each collar 25 is enlarged to provide a packing chamber and is adapted to receive an annular elastic packing member 27 of

rubber, or other suitable material. A packing gland nut 28 engages within the screw-threaded outer end of each collar and is arranged to be tightened to distort the packing member into sealing position. The outer extremity of each screw may be provided with a plurality of flat wrench faces 29, while the inner end thereof is tapered or conical as shown at 30.

A combination tubing support and latching member A, having an external diameter substantially equal to the diameter of the intermediate bore portion 22, is adapted to be inserted within said bore and has a snug fit therein as shown in Figure 1. The member A includes a continuous metallic ring 31 which has its upper outer periphery beveled to provide an inclined shoulder or surface 32. The inner conical ends 30 of the retaining pins or screws 26 are arranged to engage the shoulder 32 (Fig. 4), whereby the member A is held against upward displacement within the bore of the body, as will be hereinafter more fully explained. An annular anchoring member 33, of reduced diameter, depends axially from the ring 31 and is connected to the undersurface thereof by an integral annular web or flange 34. The anchoring member 33 is, preferably, molded or otherwise secured within the upper end of a flexible, resilient packing collar 35 or rubber, or other suitable material, whereby the collar is fastened to and suspended from the ring 31. The collar is of substantially the same diameter as said ring and is adapted to engage the vertical wall 22 of the bore of the body.

A plurality of arcuate metallic sections or quadrants 36 are connected to the lower end of the packing collar with the end portions of each quadrant in close proximity to the end portions of its adjacent quadrants. An upwardly-directed arcuate web 37 and anchoring member 38, similar to the annular web and anchoring member of the ring 31, are made integral with the upper end of each quadrant as shown in Figure 8, each anchoring member 38 being co-extensive with its quadrant and being molded within the underside of the collar 35. Thus, the packing collar serves to flexibly connect the quadrants to the ring 31 and permits said quadrants to move relative to said ring and each other, whereby the end portions of the latter may be brought into engagement when said collar is suitably distorted or flexed. The external surface of each quadrant is tapered inwardly and downwardly to provide an inclined shoulder 39 which is complementary to and is adapted to engage the inclined seat 21 formed within the bore 12 so as to support the member A therein. The inner arcuate surface of each quadrant extends inwardly beyond the bore of the member as shown at 40, whereby the bore of the combined quadrants is of less diameter than the bore of the ring 31 or collar 35. Thus, the inner surfaces of the quadrants are in relatively close proximity to the tubing 20 when the member A is inserted within the bore 12 and supported by the shoulders 39 engaging the seat 21. The upper and lower edges of the inner surface 40 of each quadrant are beveled, as shown at 41 and 42, while the lower outer peripheral edge portion of the quadrant may be beveled as shown at 43 (Figure 8).

When the member A is in the position shown in Figure 1 with the quadrants engaging the annular seat 21, the external surface of the remaining portion of said member will be adjacent and abutting the wall of the intermediate bore 22 below the radial openings 24. The length of the

member is such that the inclined shoulder 32 of the ring 31 will be in substantial alinement with the openings 24, whereby when the retaining pins or screws 26 are threaded inwardly, the conical ends 30 of the same will bear against said shoulder. Due to the fact that downward movement of the member is prevented by the engagement between the quadrants and the seat 21, continued inward movement of the screws 26 will force the ring 31 downwardly within the bore 22 and thereby distort the packing collar 35 into sealing engagement with the wall of said bore as shown in Figure 4. When the member is in this position, the distorted packing collar will pack off the annular space between the bore of the body and the tubing 20 to prevent the passage of well fluids therethrough. It is manifest that the screws not only move the packing collar into sealing position but also latch the member A against upward displacement within the bore of the body.

An elongated coupling collar or tool joint 44, having a greater external diameter than the tubing 20, is connected in the tubing string preferably between the uppermost section of tubing and its adjacent section. An annular groove or recess 45 is formed in the external surface of the coupling collar intermediate its ends and said recess has its sidewalls inclined or flared outwardly as shown at 46. The recess 45 is arranged to receive the inner surfaces 40 of the quadrants 35, while the inclined surfaces 46 are engaged by the complementary beveled surfaces 41 and 42 of said quadrants when the member A and coupling collar are in the positions shown in Figure 4. It is pointed out that the provision of these beveled or inclined surfaces permits the coupling collar to be readily connected to and disconnected from the member A whenever necessary. To facilitate the passage of the coupling collar through the member and to prevent "catching" or "hanging" of the same, the upper and lower ends or shoulders of said collar may be slightly tapered or rounded. Also the upper, inner peripheral edge portion of the ring 31 is beveled as shown at 47 to eliminate the possibility of such "catching" or "hanging."

In carrying out the improved method of landing the tubing, the combined tubing support and latching member A is inserted within the bore 12 of the body 11 and moves or is forced downwardly therein until the inclined shoulders 39 of the quadrants 36 engage the annular seat 21, whereby said member will be supported within said bore. At this time, the external surfaces of the packing collar 35 and metallic ring 31 will abut the wall of the intermediate bore portion 22 as shown in Figure 1. Of course, the recessed coupling collar 44 connected in the tubing 20 will be spaced below the member A, having been lowered by downward movement of said tubing to such position previous to insertion of said member.

When the elements are in this position, various well operations may be performed through the tubing. Of course, in accordance with the general practice during the drilling operation, the well casing is filled with a heavy drilling fluid or mud which is pumped downwardly through the tubing and upwardly through said casing. The weight of this fluid seals the well bore and shuts the well in so as to prevent the flow of oil from the formation. After the drilling operation has been completed, the drill bit (not shown) is removed from the lower end of the tubing and the

fluid column washed out of the well bore and casing by circulating water down through said tubing and then up through said casing. It frequently happens that as soon as this fluid is removed, the well comes in, that is, the oil immediately flows from the formation and surges upwardly. To prevent the tubing from being moved upwardly within the casing and blown from the well by the sudden "coming in" or flowing of the well, the tubing may be immediately landed and latched within the well head in accordance with the method to be hereinafter described. It is pointed out that the above well operation has been set forth merely to show the utility of the herein described method and apparatus and that said method and apparatus may be employed in conjunction with numerous other well operations.

In order to land or suspend the well tubing within the well head, said tubing is lifted upwardly until the upper end of the coupling collar strikes the inner bevelled shoulders 42 of the quadrants. A continued upward movement of the tubing will lift the member A from its seat 21 and the bore 22 as shown in Figure 2, the retaining pins or screws 26 being retracted at this time from the bore 12 of the body. This upward movement will then raise the member A into the enlarged chamber or counterbore 23 of the body bore.

After the member enters the chamber 23 and engages the underside of the cap or closure member 17, further upward movement of said member is prevented. Since the member is confined between the cap 17 and the upper end of the coupling collar which bears against the shoulder 42 of the quadrants, continued lifting of the tubing will cause said collar to spread or expand the quadrants so as to permit the collar to enter the bore formed by the quadrants and engage the inner surfaces 40 thereof (Fig. 3). The flexibility or resiliency of the packing collar 35 readily permits such spreading or expansion of the quadrants. As shown in dotted lines in Figure 4, the upper portion of the coupling collar next enters the bore of the packing collar and ring 31. As soon as the recess 45 of the coupling collar is in alinement with the inner surfaces 40 of the quadrants, the inherent elasticity of the packing collar will force said quadrants inwardly to move the same into said recess. With the quadrants seated within the recess 45, the bevelled shoulders 41 and 42 of said quadrants will engage the complementary inclined sidewalls 46 of said recess and, thus, the coupling collar as well as the tubing will be connected to the latching member.

The tubing 20 is then lowered so as to move the latching member A downwardly out of the enlarged chamber 23 into the bore 22 of the body. This downward movement is continued until the inclined shoulders 39 of the quadrants again engage their annular seat 21, whereby the tubing is supported by the co-action of said seat and shoulders and further downward movement of said tubing is prevented. The weight of the tubing tends to urge the quadrants downwardly with relation to their seat, thereby urging said quadrants into snug engagement with the recess of the coupling collar. With the tubing suspended from the member A, the ring 31 and packing collar 35 of said member are in the same position as shown in Figure 1 and have their exteriors contacting the wall of the bore 22. When the elements of the member A are in this position, the beveled shoulder 32 of the ring is disposed opposite the radial openings 24 formed in the wall of the bore 22 as has been hereinbefore explained.

For preventing upward displacement or movement of the tubing due to sudden flowing or "coming in" of the well and for distorting the packing into a more positive sealing position, the elongate retaining pins or set screws 26 are rotated within their screw-threaded openings 24 by a suitable tool (not shown) so as to move the same inwardly into the bore 22. This inward movement of the screws will cause the conical ends 30 thereof to bear against the beveled shoulder 32 of the ring 31. Obviously, continued tightening of the screws forces the ring downwardly within the bore 22, thereby distorting the packing collar 35 into sealing engagement with the wall of said bore so as to pack off the same as shown in Figure 4. It is pointed out that this distortion of the packing collar into sealing position tends to urge the quadrants 36 downwardly and into more snug engagement with the seat 21 and recess 45 so as to more positively connect the member A to the coupling collar. Thus, the member not only coacts with the retaining pins or screws 26 to prevent upward movement of the tubing, but also supports said tubing, whereby vertical displacement of the same is prevented.

If it is desired to disconnect the tubing from the member A, it is necessary to retract the screws 26 which permits the packing collar 35 to return to its undistorted position and then raise the tubing so as to move said member into the chamber 23 of the body. Of course, the screws 26 will then be below the lower end of the member and movement of said screws to their inward position will form a support for said member. The tubing and coupling collar 44 can then be moved downwardly, while the member is held stationary or supported by the screws, so as to spread or expand the quadrants 36 and thereby move the inner surfaces 40 thereof out of engagement with the recess 45 as shown in Figure 9. The upper portion of the collar may then be passed through the opening formed by the internal surfaces of the quadrants, to complete the disconnection of the tubing from the member. It is pointed out that the inclined surfaces 46 of the recess 45 and the bevelled shoulders 41 and 42 of the coupling collar aid in the ease of such disconnection. It is also pointed out that the disconnection is permitted by the radial distortion or flexing of the packing collar 35 which controls the spreading or expansion of the quadrants. Thus, the packing collar facilitates the connection and disconnection of the member to the coupling collar as well as providing a pack-off for the bore of the body 11.

In Figures 10 to 12, another form of tubing support and latching member B, which is of the same general shape and has substantially the same external diameter as the member A, is shown mounted within the bore 12 of the well head body 11. This form of supporting member includes a continuous metallic ring 48, having an external inclined shoulder 49 and an internal bevelled seat 50 at its upper end, which is identical to the ring 31 of the member A. A flexible, resilient packing collar 51 of rubber, neoprene, or other suitable material, is suspended from the ring 48 by having its upper end molded around or otherwise secured to the depending, annular anchoring member 52 which is connected to the undersurface of said ring by an annular web or flange 53. This packing collar is similar to the collar 35 and is of substantially the same external diameter as said collar 35 and the ring 48, whereby the exterior thereof will engage the vertical wall 22 of the bore 12. The bore or inside diam-

eter of the collar 51 is, preferably, materially less than the internal diameter of the ring 48 so as to snugly engage the tubing 20 as shown in Figure 10. In this form, the recessed coupling collar 44 is unnecessary and the tubing may be equipped with conventional or flush coupling collars. It is pointed out that movement of the member B relative to the tubing is prevented by the snug engagement of the collar 51 therewith.

A plurality of arcuate, metallic slip segments or sectors 54, similar to the quadrants 36, are connected to the lower end of the packing collar 51 with the end portions of each slip sector disposed in close proximity to the end portions of its adjacent sectors. The upper end of each sector is reduced in thickness, as shown at 55, to form an upwardly-directed, arcuate anchoring member 56 adjacent the inner surface thereof and this member is provided with a transverse, arcuate groove or recess 57 as shown in Figure 12. Each anchoring member is co-extensive with its sector and is, preferably, molded within the underside of the collar 51, whereby said collar serves to flexibly connect the sectors to the ring 48. Thus, the slip sectors 54 may move independently of each other and the ring with the result that the end portions of the same may be brought into engagement when the packing collar is flexed or distorted. The inner arcuate edge portion of the anchoring member 56 of each sector is bevelled as shown at 58 and is arranged to be engaged by the complementary surface of a depending annular lip 59 formed on the lower end of the collar 51 at its inner peripheral edge. Since the lip 59 overlies each bevelled surface 58 and, due to the inherent flexibility or resiliency of the packing collar, the tendency of said lip is to constantly urge the sectors radially outwardly, as will be hereinafter more fully explained. An inclined or tapered shoulder 60, identical to the shoulders 39 of the quadrants 36, is provided on the exterior of each sector for engaging the complementary seat 21 of the bore 12 and thereby support the member B therein. The inner arcuate surface of each slip sector is provided with a plurality of transverse, upwardly inclined serrations or teeth 61 (Figure 12) for gripping the tubing 20 so as to connect the member thereto. It is pointed out that the bore of the combined sectors is less than the internal diameter of the ring 48 and greater than that of the collar 51, whereby the serrated inner surfaces of said sectors are spaced from the tubing when the packing collar is in its undistorted position as shown in Figure 10.

In landing a tubing with the member B, the section of tubing upon which said member is to be mounted is disconnected temporarily from the tubing string so that the member can be "stripped" or positioned thereon. The removed tubing section is then replaced and lowered with the tubing string through the bore 12 of the body 11 until the tapered shoulders 60 of the slip sectors 54 engage the inclined seat 21, whereby the member B will be supported within said bore. With the member B supported within the body 11 and the sectors wedged between the tubing and the seat 21, said tubing will be suspended from said member, due to the upwardly-directed teeth 61 which will bite into and prevent downward movement of the tubing. At this time, the external surfaces of the packing collar 51 and metallic ring 48 will abut the vertical wall 22 of the bore. It is pointed out that the removal and

replacement of the tubing section is necessary because the bore or opening formed by the combined sectors 54 is of insufficient size to by-pass the coupling collars (not shown). When the elements are in this position, the tubing may be manipulated to set a packer (not shown) or various well operations may be performed through said tubing. Obviously, due to the upward inclination of the arcuate teeth 61 of the slip sectors, the tubing section may be raised relative to the member B if the latter is positioned too low thereupon. To accomplish this upward movement of the tubing, it is only necessary to raise said tubing to bring the ring 48 of the member B into engagement with the cap 17 of the body, whereby continued upward movement of the tubing will "strip" the same upwardly through the packing collar of said member.

As has been hereinbefore set forth, the arcuate teeth 61 of the slip sectors prevent downward movement of the tubing relative to the supporting member B, with the result that said tubing cannot be readily lowered beyond a predetermined point. In order to lower the tubing beyond this point, said tubing is raised so as to lift the member B from its seat 21 and the bore 22 and position the same above the retaining pins or set screws 26 within the enlarged chamber or counterbore 23 of the body. The set screws 26 are then rotated so as to move the same inwardly into the bore 22 and provide a support for the member B. The tubing may then be moved downwardly through the packing collar 51, while the member is held stationary by the set screws as shown in Figure 10. This downward movement of the tubing tends to force or urge the stationary packing collar downwardly, thereby causing the same to flow with the result that the annular lip 53 of said collar thrusts the slip sectors 54 outwardly away from said tubing to permit "sheathing" of the arcuate teeth 61 of said sectors. It is pointed out that the enlarged area of the chamber 23 facilitates this "sheathing" of the slip teeth, since spreading or expansion of the sectors is permitted therein.

After the tubing has been lowered to the desired position relative to the member B, the set screws 26 are retracted from the bore of the body to permit downward movement of said member. This downward movement is continued until the tapered shoulders 60 again engage the seat 21, whereby the tubing is suspended from the member and further downward movement of said tubing is prevented. The weight of the tubing tends to urge the sectors downwardly with relation to their seat, thereby urging the teeth of said sectors into gripping engagement with the exterior of said collars. The set screws are then moved to their inward position to cause the conical ends 30 thereof to bear against the bevelled shoulder 49 of the ring 48. It is manifest that continued tightening of the screws forces the ring downwardly in the bore 22, whereby the packing collar 51 is distorted into sealing engagement with the wall of said bore to pack off the same as shown in Figure 11. Of course, this distortion of the packing collar into sealing position tends to force the slip sectors 54 downwardly and into more snug engagement with the seat 21, whereby the arcuate teeth 61 of said slip sectors will more

firmly engage the tubing. Thus, the member B coacts with the retaining pins or set screws 26 to prevent upward movement of the tubing as well as supports said tubing, thereby preventing vertical displacement of the same.

It is pointed out that the members A and B are readily interchangeable, since both are of substantially the same general external dimensions and may be employed in the same well head. In changing from one member to the other, it is only necessary to disconnect one section of tubing, remove or insert the recessed coupling 44, then remove one member and substitute the other. In this manner, a quick change from one type of support to the other may be easily made without removing the well head.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What we claim and desire to secure by Letters Patent is:

1. The combination with a well head having a bore for the passage of a well tube therethrough, said bore being formed with an enlarged upper portion and a reduced lower portion, said reduced portion of the bore having a downwardly tapered seating surface, and a retaining means disposed between the reduced and enlarged portions of the bore and spaced from said tapered seating surface, said retaining means being supported for movement into and out of the bore of the well head, of a well tube supporting device of a length less than either of said reduced or enlarged portions of the bore, including a ring adapted to be disposed about the well tube and having a beveled surface, an expansible and contractable resilient packing member connected to said ring, and a plurality of cooperating tube engaging elements connected to and depending from the packing member, each of said tube engaging elements having a portion of its external surface formed to engage and cooperate with said tapered seating surface so as to be moved into gripping engagement with the well tube, whereupon the beveled surface of the ring is engageable by the retaining means and forced downwardly to expand the packing member to seal off between the tube and the wall defining the bore of the well head.

2. A well tube supporting device in accordance with claim 1, in which the tube engaging elements together have an internal diameter less than the internal diameter of the packing member and ring when the same are in their unexpanded position.

3. A well tube supporting device in accordance with claim 1, in which the tube engaging elements are each provided with a pair of internal oppositely tapered spaced seating surfaces.

4. A well tube supporting device in accordance with claim 1, in which each of the ring and the tube engaging elements are provided at their extremities with internal and external tapered surfaces.

LAURENCE L. RECTOR.
LEWIS D. HILTON.