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1,626,162

TUBING ANCHOR

Original Filed May 9, 1924 2 Sheets-Sheet 1

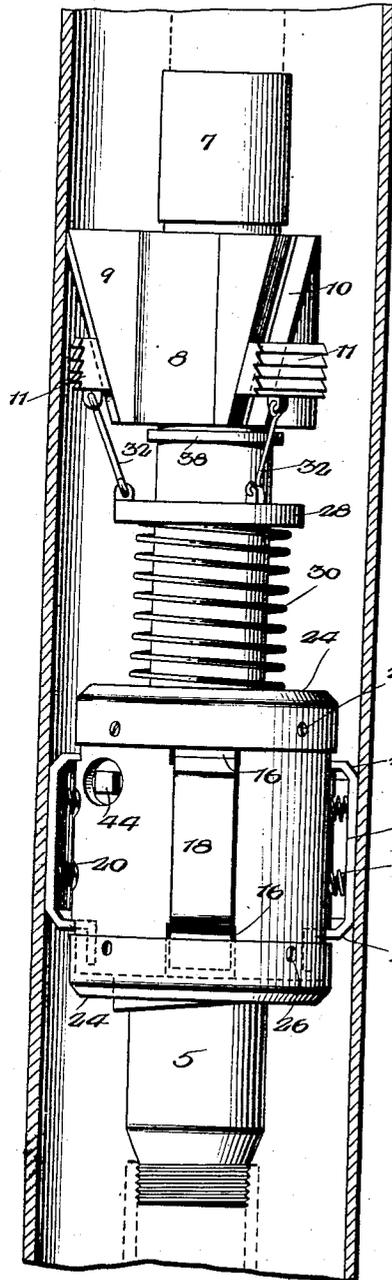


FIG. 1.

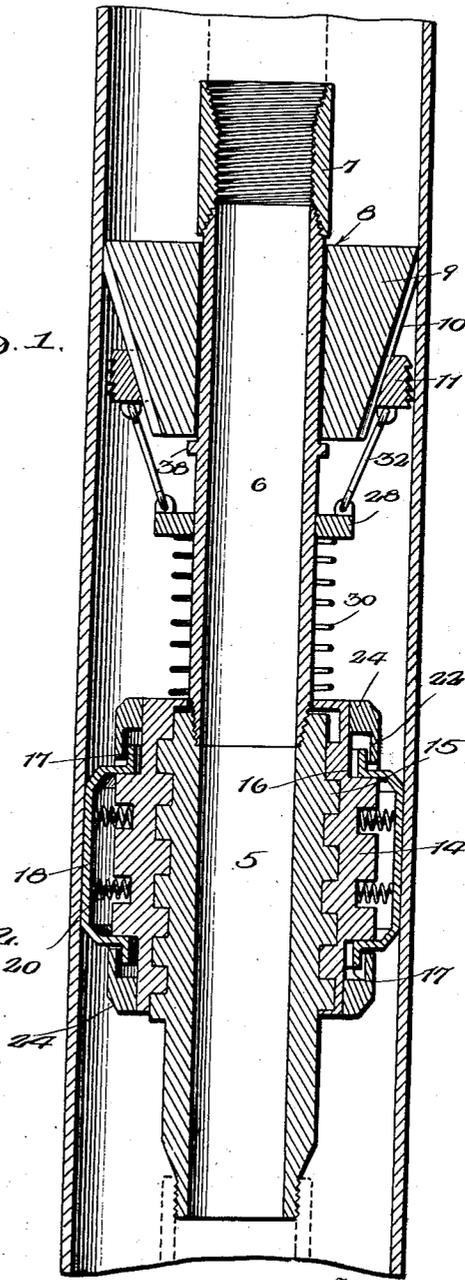


FIG. 2.

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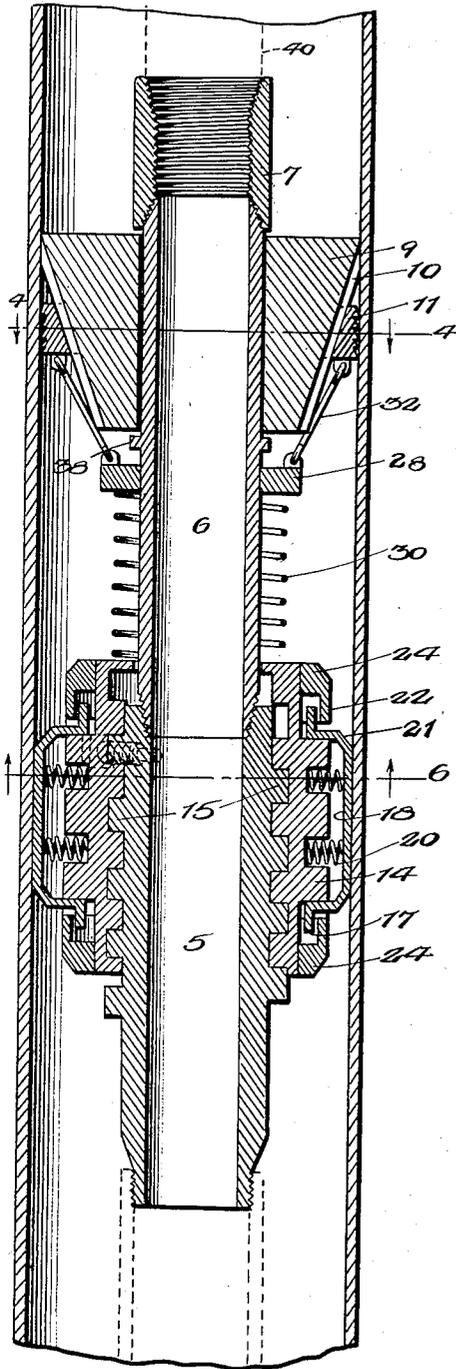


Fig. 3.

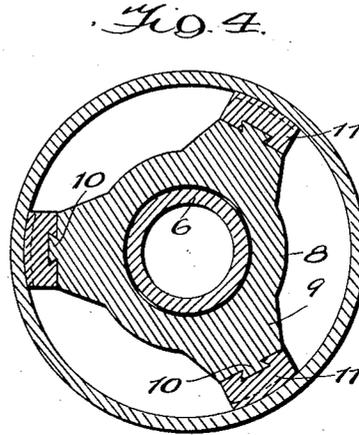


Fig. 4.

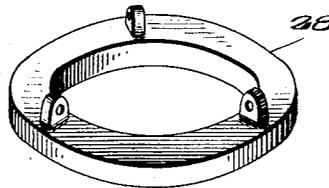


Fig. 5.

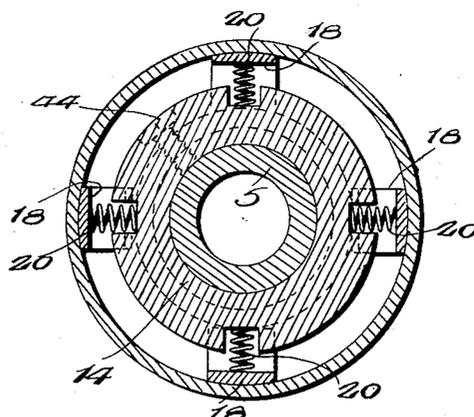


Fig. 6.

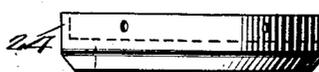


Fig. 7.

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TUBING ANCHOR.

Application filed May 9, 1924, Serial No. 712,083. Renewed September 15, 1926.

This invention relates to tubing anchors especially adapted for use in wells.

An important object of this invention is to provide a tubing anchor having simple means whereby the same may be attached to the casing for overcoming vibration and stretching of the tubing when bearing the weight of a column of fluid.

A further and equally important object of the invention is to provide a tubing anchor wherein reliable means are provided for preventing jamming or sticking of the parts when it is desired to release the anchor and bring the tubing to the surface.

Also, the invention is provided with means whereby the casing engaging slips and the supporting head therefor are freely mounted for rotation on the anchor so that the turning of the tubing for operating the anchor will not result in the separation of any of the sections or joints of the tubing.

A further object is to provide a tubing anchor which is reliable in use, of highly simplified construction, and cheap to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawing forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of the improved tubing anchor positioned within the casing;

Fig. 2 is a vertical sectional view through the improved tubing anchor in its non-gripping or anchoring position;

Fig. 3 is a vertical sectional view through the tubing anchor in its operative or casing engaging position;

Fig. 4 is a horizontal sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a perspective of a slip ring employed in the invention, and

Fig. 6 is a horizontal sectional view taken on line 6—6 of Fig. 3.

Fig. 7 is a side elevation of a retaining ring embodied in the invention.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 5 designates a male member having a tubular attaching portion 6 provided at its upper end with a coupling 7.

With particular reference to Figs. 2 and

4 it will be seen that a slip head 8 is freely mounted on the attaching member 6 and is provided with a plurality of ribs 9, the outer faces of which are inclined and are formed with tongues 10 for engagement with slips 11. When the slips 11 are positioned adjacent the lower ends of the tongues they are, of course, out of engagement with the casing and when the slips 11 are moved to the position illustrated in Fig. 3 they are in operative engagement with the casing and further descent of the anchor is prevented. However, the engagement of the slips with the casing permits the anchor to creep upwardly when the column of oil is supported by the traveling valve.

It is well known that on the upward movement of the traveling valve the column of oil is supported by the traveling valve and on the downward movement of the traveling valve the weight of the column of oil is supported by the tubing which results in considerable vibration and stretching of the tubing. This has the effect of decreasing or minimizing the effective stroke of the traveling valve and to overcome this well known operating disadvantage we provide the improved anchor to securely attach the lower portion of the tubing to the casing in such a manner that the weight of a column of oil on the tubing is transmitted to the casing. This prevents stretching and vibration of the tubing and consequently increases the effectiveness with which the traveling valve operates.

As illustrated in Fig. 2 a female member or sleeve 14 is mounted on the male member 5 and these two parts are provided with coarse interfitting threads 15 by means of which the male member may be moved longitudinally with respect to the female member.

With particular reference to Figs. 1 and 2 it will be seen that the end portions of the female member or sleeve 14 are provided with spaced recesses or sockets 16 for the reception of the offset end portions 17 of a plurality of longitudinally extending locking strips 18. The offset end portions 17 are movably held in the recesses 16 by flanges 22 of retaining rings 24, the said retaining rings being held on the ends of the sleeve 14 by means of small screw bolts 26 or other suitable fastening devices. The locking strips 18 have their major portions spaced from the periphery of the sleeve 14

and are pressed into engagement with the casing by pairs of helical springs 20. The engagement of the locking strips 18 with the casing prevents the free turning of the sleeve 14, but, of course, allows the tubing anchor to be raised or lowered by the operator at the surface. The locking strips 18 are provided adjacent their ends with inwardly extending bends 21 by means of which the strips will freely pass the joints in the casing during the raising and lowering of the anchor.

When the parts are being lowered into a well they occupy the position illustrated in Fig. 1 and when it is desired to anchor the tubing to the casing it is merely necessary to turn the same in the proper direction and the male member 5 is turned in the sleeve 14 and it simultaneously moves downwardly to the position illustrated in Fig. 3. When the male member 5 is moved down to the position illustrated in Fig. 3 the space between the female member 14 and a slip ring 28 is decreased so that a coil spring 30 confined between the sleeve 14 and the ring is compressed for forcing the slip ring and the slips upwardly. The slips, of course, move upwardly because they are connected to the slip ring by means of links 32.

The teeth on the slips are extended downwardly and consequently limit the downward movement of the head 8. However, the downward inclination of the teeth on the slips does not prevent upward slipping of the anchor and the tubing. This allows of stretching and vibration of the tubing to be taken up when the weight of the column of oil is relieved.

Attention is especially directed to the fact that the attaching portion 6 of the male member 5 is freely rotatable through the head 8 so that when the tubing is turned it cannot stick to the head and possibly separate one or more of the sections of the tubing at the joints. The head 8 is limited in its downward movement on the attaching portion 6 by an annular shoulder 38 and in its upward movement by the coupling 7.

In operation the improved anchor is attached to the tubing 40 by means of the coupling 7 and when it is properly positioned in the casing the tubing is turned for moving the slips 11 into biting engagement with the casing. As previously stated, the tubing is now securely anchored in the well and stretching of the same is prevented.

When it is desired to remove the tubing it is merely necessary to rotate the tubing to cause the male and female parts 5 and 14, respectively, to resume the position illustrated in Fig. 2 whereupon the slips 11 are released from biting engagement with the casing and the tubing and anchor attached thereto may be drawn to the surface in the usual manner. The downward inclination

of the teeth on the slips 11 does not in any way resist the withdrawal or upward movement of the tubing and normally the slips 11 are spaced inwardly a substantial distance from the casing so that the descent of the tubing to its proper position in the well is not in any way interfered with.

Jamming of the male member 5 in the sleeve 14 is prevented by a stop member in the form of a screw bolt 44 threaded through the sleeve 14 and having its terminal portion arranged in the path of travel of the square end of the external thread on the male member 5 whereby the upward turning movement of the male member 5 is limited. This prevents binding of the parts and positions them so that the anchor may readily move to its operative position as illustrated in Fig. 3.

It is to be understood that the form of the invention herewith shown and described is to be taken merely as a preferred example of the same and that such minor changes in arrangement and construction of the parts may be made as will remain within the spirit of the invention and the scope of what is claimed.

Having thus described the invention, what is claimed is:

1. A tubing anchor comprising male and female members having interfitting threads, the female member having spaced recesses, locking strips having offset terminal portions freely received in said recesses, and springs urging said locking strips outwardly into engagement with a casing.
2. A tubing anchor comprising male and female members having interfitting threads, the female member having spaced recesses, locking strips having offset terminal portions freely received in said recesses, springs urging said locking strips outwardly into engagement with a casing, and a stop member carried by one of said members and arranged in the path of travel of the screw threads of the other member whereby to limit the movement of one member with relation to the other member.
3. A tubing anchor comprising male and female members having interfitting threads, the female member having spaced recesses, locking strips having offset terminal portions freely received in said recesses, springs urging said locking strips outwardly into engagement with a casing, a stop member carried by one of said members and arranged in the path of travel of the screw threads of the other member whereby to limit the movement of one member with relation to the other member, a slip head having a plurality of ribs, slips carried by said ribs, links connected to said slips, a slip ring connected to said links, and a spring confined between said ring and said members.
4. A tubing anchor comprising a male

member having a tubular attaching portion provided with means whereby the same may be connected to a tubing, a head freely receiving the attaching portion, said attaching portion being provided with means cooperating with said first-named means to limit longitudinal movement of the head on the attaching portion, slips carried by said head and having teeth to engage a casing, a slip ring having connection with said slips, a sleeve mounted on said male member, said sleeve and said male member being provided with interfitting screw threads, a coil spring confined between said slip ring and said sleeve and adapted for moving the slips into engagement with the casing, said sleeve being provided with recesses, locking strips having offset terminal portions received in said recesses, and springs urging the locking strips outwardly into engagement with the casing to hold the sleeve against rotation.

5. A tubing anchor comprising a male member having a tubular attaching portion provided with means whereby the same may be connected to a tubing, a head freely receiving the attaching portion, said attaching portion being provided with means cooperating with said first-named means to limit longitudinal movement of the head on the attaching portion, slips carried by said head and having teeth to engage a casing, a slip ring having connection with said slips, a sleeve mounted on said male member, said sleeve and said male member being provided with interfitting screw threads, a coil spring confined between said slip ring and said sleeve and adapted for moving the slips into engagement with the casing, said sleeve being provided with recesses, locking strips having offset terminal portions received in said recesses, and springs urging the locking strips outwardly into engagement with the casing to hold the sleeve against rotation,

the locking strips being provided adjacent the ends thereof with inwardly directed shoulders whereby the locking strips may freely pass joints in the casing.

6. A tubing anchor comprising a male member having a tubular attaching portion provided with means whereby the same may be connected to a tubing, a head freely receiving the attaching portion, said attaching portion being provided with means cooperating with said first-named means to limit longitudinal movement of the head on the attaching portion, slips carried by said head and having teeth to engage a casing, a slip ring having connection with said slips, a sleeve mounted on said male member, said sleeve and said male member being provided with interfitting screw threads, a coil spring confined between said slip ring and said sleeve and adapted for moving the slips into engagement with the casing, said sleeve being provided with recesses, locking strips having offset terminal portions received in said recesses, springs urging the locking strips outwardly into engagement with the casing to hold the sleeve against rotation, the locking strips being provided adjacent the ends thereof with inwardly directed shoulders whereby the locking strips may freely pass joints in the casing, and a stop member carried by said sleeve and arranged in the path of travel of the screw threads on said male member whereby to limit the turning of the male member in one direction through the sleeve.

7. The construction set forth in claim 5, and retaining rings secured on the end of said sleeve and having flanges extending over and confining the offset terminal portions of said locking strips in said recesses.

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