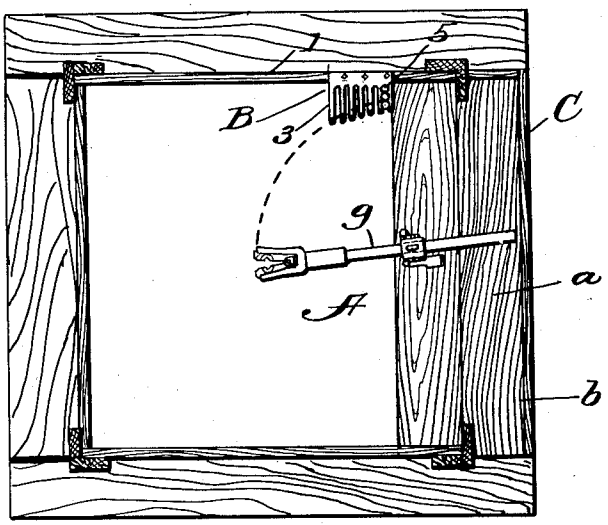
June 2, 1925. 1,540,245

J. BERGSTEN

WELL APPARATUS

Filed Feb. 23, 1923 2 Sheets-Sheet 1

Fig. 1.



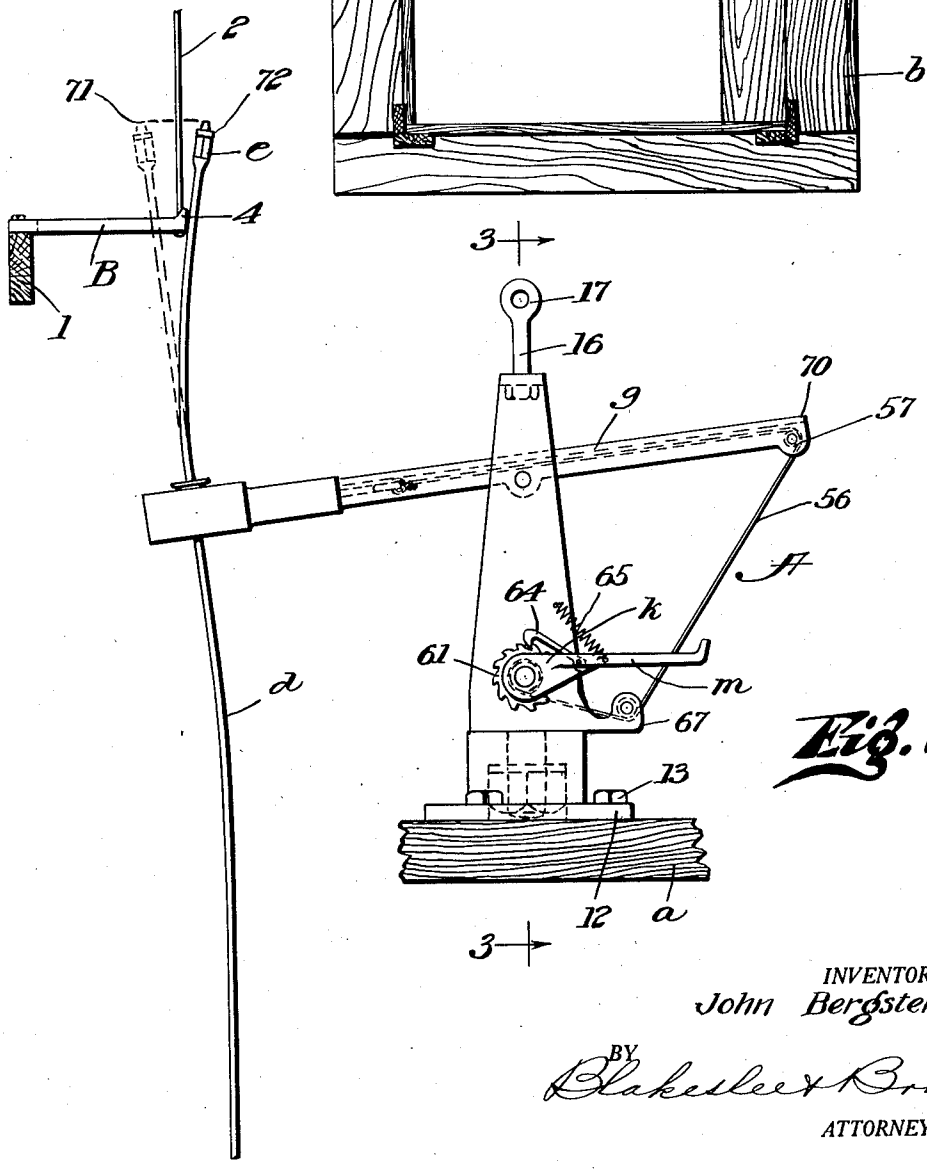


Fig. 2.

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June 2, 1925. 1,540,245

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WELL APPARATUS

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Fig. 3.

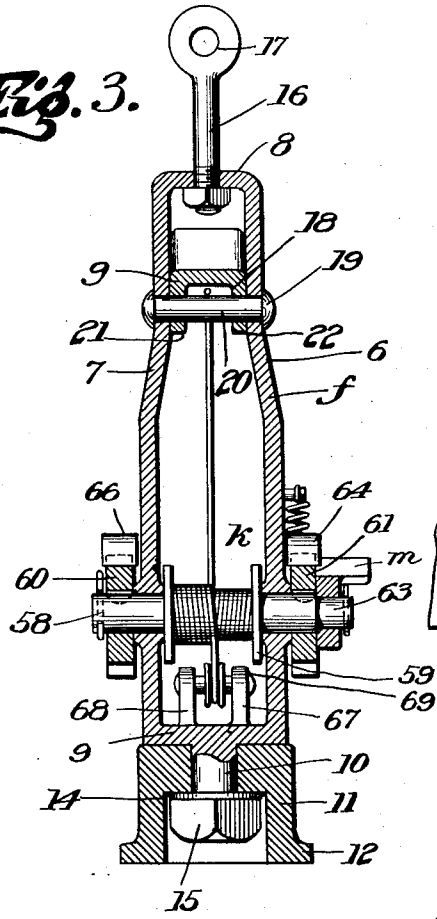
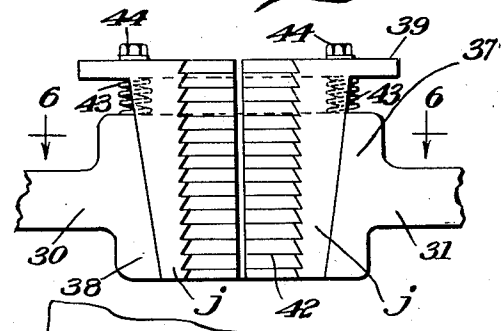


Fig. 5.



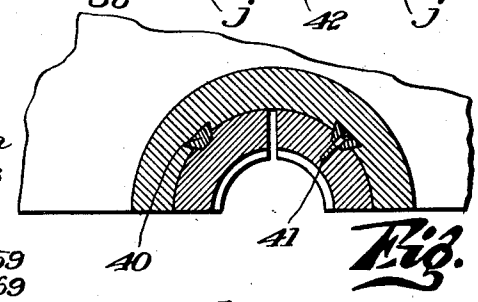


Fig. 6.

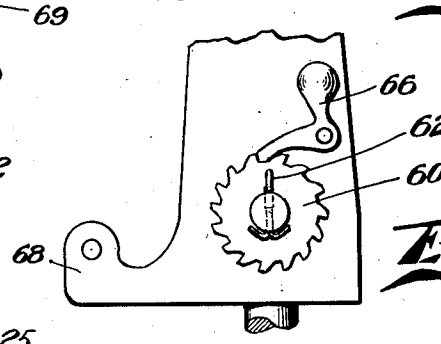


Fig. 7.

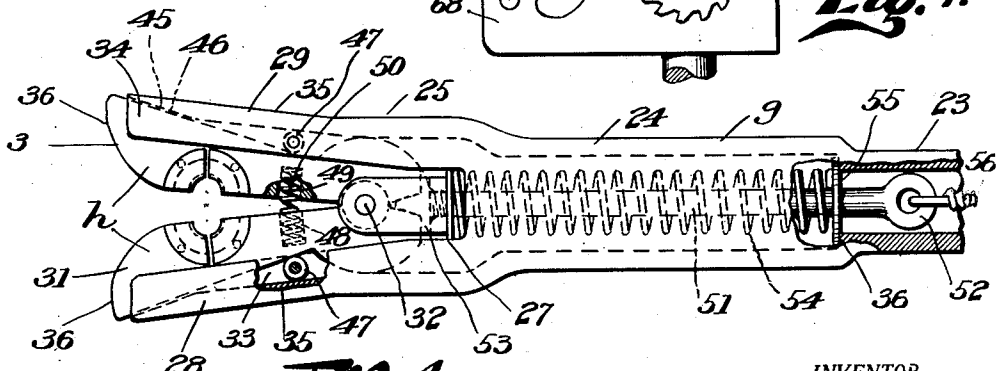


Fig. 4.

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Patented June 2, 1925. 1,540,245

UNITED STATES PATENT OFFICE.

JOHN BERGSTEN, OF TORRANCE, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STANDARD MACHINE COMPANY, A CORPORATION.

WELL APPARATUS.

Application filed February 23, 1923. Serial No. 620,709.

To all whom it may concern:

Be it known that I, JOHN BERGSTEN, a citizen of the United States, residing at Torrance, in the county of Los Angeles and State of California, have invented new and useful Improvements in Well Apparatus, of which the following is a specification.

This invention relates to well apparatus, and particularly to what may be designated as a sucker rod lifter. The invention has for an object the provision of a device of this character which will permit a single operator standing on the tubing board of a derrick to control the releasing and setting of sucker rods or other tubing on a selected position of the derrick. A further object is the provision of a device which will allow a more rapid hanging up of tubing, in that the main elevator for lifting the tubing may be disconnected while the tubing is being hung up, said elevator then being allowed to descend for the raising of other tubing.

In practicing the invention I may provide as one embodiment a swinging arm member mounted upon a post or pedestal which in turn is mounted upon the tubing board of a well derrick. The swinging arm member carries movable jaws, which in turn carry slips, and the jaws and swinging arm member are so related that the jaws may be moved relative to said arm member, means being provided for effecting such movement.

The sucker rod, after being lifted a certain distance by the well elevator, is engaged by the jaw members carried by the swinging arm. The well elevator may then be unlatched from the said sucker rod and may descend for the purpose of raising other sucker rods. The swinging arm may be turned with its load to where the sucker rod may be "hung up" on a rack.

With the above mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction, association and relative arrangement of the various features of the invention, all as shown in one embodiment in the accompanying drawings, described and finally pointed out in the claims.

In the drawings:

Figure 1 is a plan view of an oil well derrick with the improved sucker rod lifter shown as mounted on a tubing board and adapted to cooperate with a rack mounted at one side of the derrick;

Figure 2 is a fragmentary view on an enlarged scale of the improved sucker rod lifter and rack, said view being in elevation;

Figure 3 is a cross sectional view of the sucker rod lifter, taken on the line 3—3 of Figure 2, and looking in the direction of the appended arrows;

Figure 4 is a fragmentary view, certain parts being in section, and on an enlarged scale, of certain elements of the sucker rod lifter;

Figure 5 is a fragmentary view on an enlarged scale of slip members carried by movable jaws used in gripping sucker rods;

Figure 6 is a fragmentary cross sectional view, taken on the line 6—6 of Figure 5 and looking in the direction of the appended arrows; and

Figure 7 is a fragmentary view showing certain means used in practicing the invention.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, the well apparatus which is a sucker rod lifter, is designated as an entirety by A and the rack member for receiving the sucker rods is designated by B. The rack and sucker rod lifter are both mounted, in the embodiment shown, on a derrick C. The sucker rod lifter A considered as an entirety may be mounted upon the tubing board *a*. There is also a small platform *b* near the top of the derrick which surrounds the derrick and upon which an operator may walk. The tubing board and platform *b* are standard in practice.

The rack member is mounted a certain distance above the normal height of the sucker rod lifter A, as illustrated in Figure 2, said rack being attached to a side 1 of the derrick C and likewise attached to the top of the derrick by means of rods 2 extending between said rack and top of the derrick. This rack contains a number of spaced arms 3 with the extremities of said arms bent upwardly or provided with raised portions as shown at 4, it being intended that tubing raised by the sucker rod lifter should be received between a pair of arms and held by said pair of arms, all as illustrated in Figure 1, at 5. The bent or raised portions 4 on the arms prevents the tubing from slipping from said arms, and it is to be noted that the tubing which is designated by *d* carries

the usual coupling or collar *e* and the rod is suspended on the rack B by the coupling or collar *e* engaging the arms. It is thus possible by use of such a rack to locate the tubing in a definite position relative to the well derrick and to hold the tubing suspended. This will ensure that the tubing does not become bent, as it is a known fact that tubing is inclined to bend or become distorted throughout its length where it rests on the floor, the weight causing an internal crushing and bending strain.

The sucker rod lifter A includes a swinging post *f*, said swinging post *f* having two spaced leg members 6 and 7 and top and base portions 8 and 9. The base 9 carries a stud 10 adapted to pass through a standard 11, which standard is flanged as shown at 12 and held to the tubing board *a*, as by means of bolts 13, said bolts passing through the flange 12. The base member or standard 11 is likewise internally recessed as shown at 14 and the stud 10, which may be termed a shaft, is screw-threaded at its extremity for reception of a nut 15 adapted to be received on said screw-threaded portions and within the recess 14 of the base or standard 11. It will thus be seen that it is possible to turn the post *f*, the base 11 at its top portion in conjunction with the base portion 9 of the post, forming bearing members, and the shaft 10 holds the said base 11 and post *f* in working relation. The top portion 8 may carry a swivel member 16 provided with an eye portion 17, so that the swinging post might be supported from the top of the derrick, as well as by the tubing board *a*. In the embodiment of the invention as shown in the drawing the arm member as an entirety is designated by *g*, and said arm member is of channel form as shown at 18 and pivoted between the legs 6 and 7 of the post *f*, as shown at 19, through any suitable means such as a shaft or bearing member 20. The distance between the legs 21 and 22 of the arm *g* varies as shown at 23, 24 and 25, and where the legs vary in distance of separation as between 23 and 24, a shoulder 26 is formed and the part 25 which is an extension of the part 24, is flared or tapered, it being particularly noted that the top portion of the arm *g*, as illustrated at 27, is slotted so as to provide two arms 28 and 29, which arms, as stated, diverge outwardly from each other. The tapered portions of the arm *g* are adapted to receive jaw members *h* which function to grip tubing *d* and hold the same during movement of the post *f* and a raising of the arm *g* so that the tubing may be placed on the rack B. The jaw members *h* include two members 30 and 31 which are pivoted together as at 32. In this connection it is to be noted that the parts 28 and 29 are channeled; that is to say, have top and base members 33 and 34 and side portions 35, said members 30 and 31 being received in the channel portion formed by said members 33, 34 and 35. The members 30 and 31 are each curved as shown at 36 to form an entrance part for admittance of tubing within the jaws, and said members 30 and 31 are formed with enlargements 37 and 38 which are recessed for the reception of slip members *j*, which are provided with flanges 39. The slips are held to the members 37 and 38 by keys 40; said keys carrying screw-threaded bolt members 41 having engagement with screw-threaded openings in the slips, all as illustrated in Figure 6. The keys 40 are wedge shaped and fit within dove-tailed slots in the enlargements of the jaw members *h*. Possibly it is unnecessary to state that the slips may be of standard construction, in that they are segmental in form with their outer walls tapered and fitted in correspondingly tapered portions in the members 37 and 38 so that the same may be lifted from said members or a downward movement of the slips closing the segments into circular formation. This is of course standard practice, and in the embodiment shown the slips are formed on their inner concave surfaces with teeth 42 to enhance grip on any object that they may engage. One difference, however, in the utilization of these slips resides in the interposing of coil springs 43 between the flanges 39 and the enlargements 37 and 38 of the jaw members *h*. The springs 43 are held in position by means of screw-bolts 44. The springs 43 hold the slips in proper position when the same engage the rods *d*, and the slips will be guided in their movement through the medium of the keys 40 sliding in the dove-tail slots. It is to be noted that the members 30 and 31 forming the jaws *h* each have a portion thereof as 45, in engagement with a taper portion 46 forming a part of the sides 35, and likewise there is a roller member 47 adapted to engage sides 35 and each member of the jaws, as illustrated in Figure 4. If the jaws were given an inward pull they would tend to close, for the reason that the members 28 and 29 flare outwardly and the jaws by traveling inwardly reach the restricted zone of this flare and consequently are forced toward each other; in other words, they are cammed toward each other. Each jaw is recessed as shown at 48 and 49, and received in said recesses and extending between said jaws is a coil spring 50, this spring tending to at all times separate the jaws. A bolt 51 carries an eye 52 at one end and a yoke member 53 at the other end, and said bolt is receivable within the channel portion of the arm and particularly the part 24 of said arm, said yoke 53 having the end portions of the jaws *h* received therebetween, and the pivot pin 32 for the jaws is likewise associated with the

yoke 53. Interposed between the yoke 53 and surrounding a part of the bolt 51 is a coil spring 54, there being an annular plate 55 through which the bolt 51 passes, and the end of the spring opposite the yoke member of the bolt is adapted to bear against said annular plate 55, said annular plate being held in position at the step portion 26 between the parts 23 and 24 of the arm *g*. A cable 56 is attached to the eye member 52 of the bolt and extends over a pulley 57 carried at an extremity of the arm *g*, as shown in Figure 2, and then downwardly to where it engages with winding mechanism *k* associated with the post *f*.

The mechanism *k* includes a sleeve shaft 58 journaled between the sides 6 and 7 of the post *f* and upon which shaft 58 between the sides 6 and 7 is a drum 59. Ratchet wheels 60 and 61 are keyed to end portions of the shaft 58, as shown in Figure 3, and the ratchet wheel 60 may be conveniently held in position by passing a cotter pin or other securing device 62 through an end of the shaft 58. A shaft 63 is carried within the sleeve shaft 58 and to said shaft 63 is joined a foot lever *m*. The foot lever *m* carries a pivoted ratchet 64 adapted to contact with the ratchet wheel teeth, as shown in Figure 2. A coil spring 65 is associated with the lever *m* and with the post *f* for the purpose of restoring the lever *m* to a horizontal position, or substantially horizontal, as illustrated in the figures. A ratchet 66 is likewise provided for the ratchet wheel 60. The sides of the post *f* are provided with two extensions 67 and 68 which are spaced from each other, said extensions carrying between them a grooved wheel 69. The cable 56 extends from the grooved wheel 57 over the grooved wheel 69 and thence to the drum 59, as shown in Figures 2 and 3. Movement of the foot lever *m* downwardly will permit a winding of the cable 56 upon the drum 59, and the use of the double ratchet will of course be obvious, in that the ratchet 66 by engaging a tooth in the ratchet wheel 60 will prevent the drum from back rotation, upon the lever arm *m* being released, so that the ratchet 64 may engage a new tooth in the ratchet wheel 61. The ratchet 66 is weighted and bell-crank in form so that it may be swung out of position in order that its end will not engage the ratchet wheel teeth when it is desired to release the drum, it being only necessary to lift the ratchet 64 when the ratchet 66 has been so released.

The operation is as follows:

The sucker rod tubing to be placed on the rack B is first raised in the usual manner by means of the well elevator, whereupon the sucker rod tubing may be brought within the confines of the jaws *h* by moving or swinging the post *f* into position. Movement of the foot lever *m* will perform a two-fold function, in that it will first draw the bolt 51 along the channel arm *g* and tend to close the jaws *h* and confine the tubing *d* within the slip members *j*. Further movement of the lever *m* so as to wind the cable upon the drum, will move the end 70 of the arm *g* downwardly so as to raise the tubing carried at the other end of said arm *g*. It is of course obvious that the tubing *d* will be tightly gripped and prevented from slipping, as the cable 56 is at all times in tension during such raising and holding. The tubing then may be moved as shown in the dotted lines of Figure 1 by swinging the post about its pivot point and the operator by standing on the tubing board or upon the platform *b*, may push an end of the tubing from the dotted position of Figure 2 shown at 71 to the full line position shown at 72, so the tubing may be received between two of the arms of the rack, whereupon the drum may be released and the coupling *e* seated upon the rack arms. It will thus be seen that in this device the raising of the arm from a lower to a higher position not only tends to cause the jaw members *h* to grip any object that may be received between them, but likewise to raise the object. The jaws are of course separated upon releasing the drum to release the cable 56, said separation being provided by the coil spring 54 and the coil spring 50, the spring 54 urging the jaws outwardly and the spring 50 opening said jaws.

The rack B in the showing of Figure 1 is provided with teeth of different length so as to take care of the arc formed upon swinging the post and the arm *g*, as illustrated by the dotted line in Figure 1.

It is obvious that various changes, modifications and variations may be made in practicing the invention, in departure from the particular showing of the drawings, but that all of said changes and modifications may be made within a fair interpretation of the invention as set forth in the appended claims.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. The combination, with a well derrick, of a sucker rod lifter mounted therein, said sucker rod lifter comprising a pivoted arm having a jaw portion and means adapted to simultaneously close said jaw portion and move said arm about its pivot point, whereby any sucker rods engaged by said jaw portion may be lifted.

2. The combination, with a well derrick, of a sucker rod lifter mounted therein, said sucker rod lifter comprising a pivoted arm having a normally open jaw portion and means adapted to simultaneously close said jaw portion and move said arm about its pivot point, whereby any sucker rods en-

gaged by said jaw portion may be lifted; said sucker lifter being turnable about a horizontal plane, and means for anchoring sucker rods carried by said sucker rod lifter at a definite point in said derrick.

3. The combination, with a well derrick, of a sucker rod lifter mounted therein, said sucker rod lifter comprising a pivoted arm having a jaw portion and means adapted to simultaneously tightly close said jaw portion and move said arm about its pivot point, whereby any sucker rods engaged by said jaw portion may be lifted; said sucker rod lifter being turnable about a horizontal plane, means for anchoring sucker rods carried by said sucker rod lifter at a definite point in said derrick, and means for releasing the jaw portion of said sucker rod lifter when the sucker rods are so anchored.

4. Well apparatus, comprising a post, an arm pivoted to said post, jaws carried by said arm, and means associated with said jaws for closing said jaws and for moving said arm about its pivot point; the outer extremities of said arm being furcated and flared, and said jaws being carried at the zone of said flare.

5. Well apparatus, comprising a post, an arm pivoted to said post, jaws carried by said arm, and means associated with said jaws for closing said jaws and for moving said arm about its pivot point; the outer extremities of said arm being furcated and flared, and said jaws being carried at the zone of said flare; there being means for causing relative separation of said jaws.

6. Well apparatus, comprising a post, an arm pivoted to said post, jaws carried by said arm, and means associated with said jaws for closing said jaws and for moving the arm about its pivot point; the outer extremities of said arm being furcated and flared, and said jaws being carried at the zone of said flare; there being means for causing relative separation of said jaws, and means for closing the jaws.

7. Improvements in well apparatus, comprising a swinging post provided with two spaced side members, an arm pivoted between said side members, and jaw members carried by said arm; a drum carried by said post and a cable associated with said jaw members and with said drum, and means for winding said cable upon the drum to close the jaw members.

8. Improvements in well apparatus, comprising a swinging post provided with two spaced side members, an arm pivoted between the side members, and jaw members carried by said arm; a drum carried by the post and a cable associated with the jaw members and with said drum, and means for winding said cable upon said drum to close the jaw members; said drum being journaled between the side members of the post.

9. Improvements in well apparatus, comprising a swinging post provided with two spaced side members, an arm pivoted between the side members, and jaw members carried by the arm; a drum carried by the post and a cable associated with the jaw members and with the drum, and means for winding said cable upon the drum to close the jaw members; said drum being journaled between the side members of the post, and means for turning said drum.

10. Improvements in well apparatus, comprising a swinging post provided with two spaced side members, an arm pivoted between the side members, and jaw members carried by the arm; a drum carried by said post and a cable associated with the jaw members and with the drum, and means for winding the cable upon the drum to close said jaw members; said drum being journaled between the side members of the post, and means for turning said drum, means likewise being provided for preventing slipping of the drum while so turning.

11. The combination, with a well derrick, of means for lifting well tubing, and means for anchoring such well tubing at a definite zone in such derrick, said first named means being mounted adjacent such second named means in the derrick and such first named means including a prehensile member.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BERGSTEN.

Witnesses:
J. S. HUTT,
EDNA TURNER.