Nov. 19, 1940. K. R. TEIS ET AL 2,222,207

TELESCOPING KELLY DRIVE

Filed Jan. 25, 1937

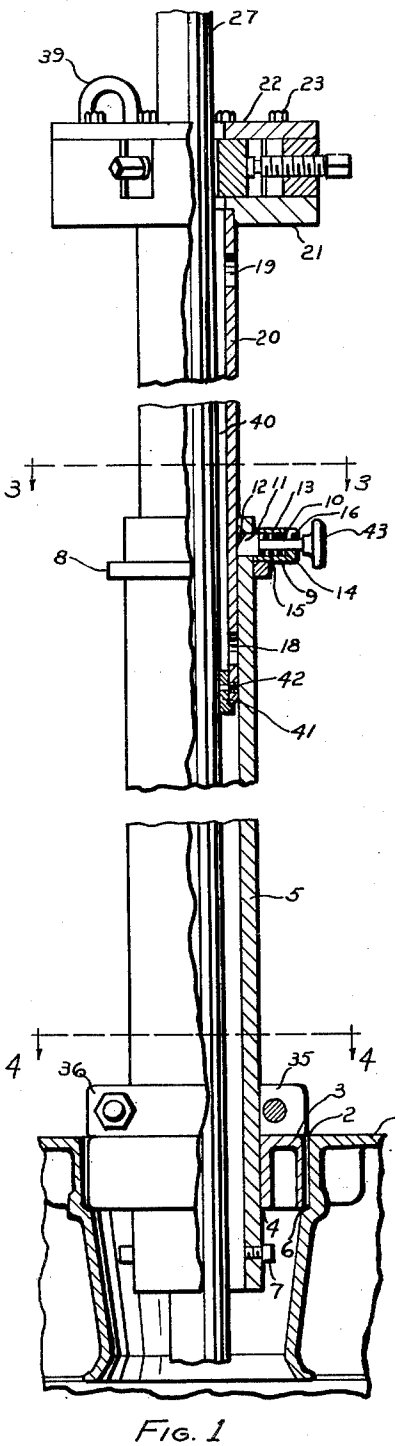


FIG. 1

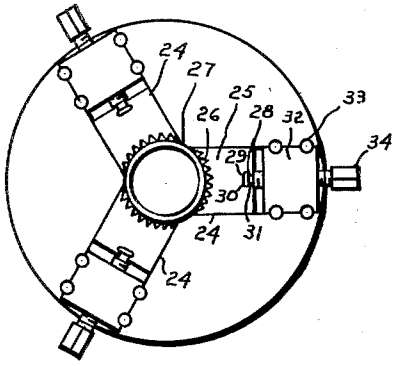


FIG. 2

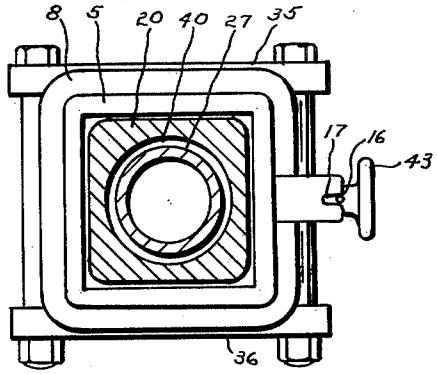


FIG. 3

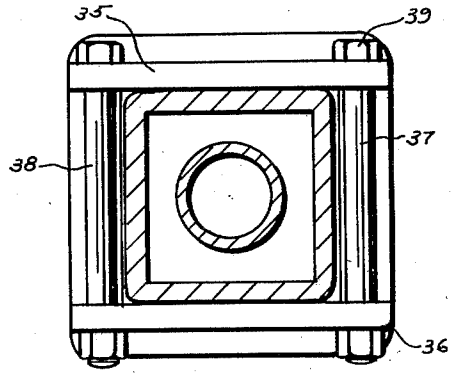


FIG. 4

Kenneth R. Teis
William O. Moore INVENTOR.

BY Hastings W. Baker

ATTORNEY.

Patented Nov. 19, 1940 2,222,207

UNITED STATES PATENT OFFICE

2,222,207

TELESCOPING KELLY DRIVE

Kenneth R. Teis, Tulsa, and William O. Moore, Ada, Okla., assignors to The Guiberson Corporation, Dallas, Tex., a corporation of Delaware

Application January 25, 1937, Serial No. 122,166

3 Claims. (Cl. 255—23)

In rotary drilling of oil wells, it has heretofore been customary to employ various means for imparting rotation to the drill pipe. One means heretofore employed is to provide a rotary table having a square center which receives a square rotary bushing, which in turn receives a driving means which rotates with the rotary table and its bushing and grips the drill pipe. As the well is drilled deeper, the drill pipe descends and the gripping means has frequently cut and scarred the drill pipe, which scarred portion may do considerable damage to oil savers or other parts which may contact the rotary drill pipe.

One of the objects of this invention is to provide means to connect the Kelly drive to the rotary drill pipe which is used as a round kelly without defacing or scarring or otherwise damaging the drill pipe. The outside of the Kelly drive is of a shape to conform to the shape of the hole in the rotary bushing.

The Kelly drive must descend in its bushing with the round kelly which is the upper section of the drill pipe as the well is deepened, the Kelly drive sliding longitudinally through its bushing which is driven by the rotary table. Obviously, the Kelly drive must be detached from the drill pipe and raised so that it can be connected to the drill pipe at a higher point whenever the Kelly drive has moved downwardly to the point where its head contacts the said bushing. It has heretofore been customary to provide a comparatively long Kelly drive so as to avoid the necessity of disconnecting the Kelly drive, raising it and again connecting it with the drill pipe any more frequently than necessary. To provide a long Kelly drive, however, has the disadvantage that the cellar beneath the rotary table must have sufficient depth to accommodate all of the Kelly drive which projects beneath the rotary table. That is, the cellar must be nearly as deep as the length of the Kelly drive. In order to overcome this difficulty, we propose to construct the Kelly drive of telescoping sections so that the cellar need be only one-half as deep as the length of the Kelly drive provided two telescoping sections are used, one-third as deep as the Kelly drive if three sections are used, etc.

Another object of the invention is to provide means to limit the travel of the Kelly drive so that it cannot be unintentionally pulled out of its bushing and also means to connect the various sections of the Kelly drive together when it is desired to remove the Kelly drive from the upper section of the drill pipe or round kelly.

The conventional Christmas tree may be positioned only a short distance beneath the rotary table. Suppose, for instance, the Christmas tree is three feet below the rotary table and the length of either of the telescoping sections of the Kelly drive is six feet. We have provided clamp means which may be attached to the outer section of the telescoping section of the Kelly drive at any point so as to limit the downward movement of the outer section so that it will not engage the Christmas tree. In the above case the clamp could be attached approximately midway of the outer section of the Kelly drive so that when this outer section has fully descended, it would extend substantially three feet beneath the rotary table and three feet above it. If the upper section were also six feet in length, it would travel downwardly until its head contacted the upper part of the outer section of the Kelly drive. The clamp is therefore a means to limit the downward travel of the Kelly drive. If the operator does not desire to limit the downward movement of the Kelly drive, the said clamp may be disengaged, or removed, if desired.

Other objects and advantages of the invention will appear in the detail specification and claims which follow.

Referring to drawing:

Figure 1 is a side elevational view partly in cross section of our telescoping Kelly drive as applied to rotary drill pipe.

Figure 2 is a top plan view of the head with its cover removed.

Figure 3 is a cross sectional view on the line 3—3 of Figure 1, looking downwardly.

Figure 4 is a cross sectional view on the line 4—4 of Figure 1, looking downwardly.

A rotary table 1 is of the conventional type and is rotated by conventional means as is well understood in the art. It is provided with a square hole 2 which receives the rotary bushing 3 which is provided with a square or other non-circular hole 4 which receives the outer section 5 of the Kelly drive. The rotary table 1 is provided with a shoulder or seat 6 to support the rotary bushing 3. Means 7 are provided on the section 5 to prevent the outer section 5 from being pulled upwardly through the rotary bushing, which means may consist of taps or other means which may be removed if desired for assembling or taking the parts apart. The outer section 5 is provided with a shoulder 8 which limits the downward movement thereof. The outer section 5 is provided near its upper end with a housing 9 which receives a stem 10 which stem, at its inner end, carries a stop plug 11

which is beveled on its upper side as shown at 12.

A spring 13 is interposed between the stop plug 11 and the outer end 14 of a chamber 15 in the housing 9, the spring 13 surrounding the stem 10 and tending to push the plug 11 towards the center of the outer section 5. The stem 10 is provided with a pin 16 which lies within a groove 17 of the housing 9, the object of the pin and groove being to prevent the rotation of the stem 10 and the stop plug 11. A handle 43 is provided on the outer end of the stem 10 so that the operator may pull the stem 10 and plug 11 outwardly so as to disengage the plug 11 from the apertures 18 or 19 in the inner square section 20 of the kelly. The inner square section 20 is telescoped within the outer section 5 and the aperture 18 and plug 11 serves as a means to prevent the inner section from being pulled out of the outer section unintentionally, but if it is desired to disassemble the parts, the operator pulls outwardly on the handle 43 so that the plug 11 cannot engage the aperture 18 and the inner section can then be removed from the outer section. If the aperture 19 in the inner section 20 has been moved downwardly sufficiently to receive the plug 11, the entire Kelly drive may be removed in its collapsed condition. If desired, the operator may render the plug 11 inoperative by pulling outwardly on the handle 43 and rotating the same so that the pin 16 will lie on the outer part of the housing 9.

The outer section 20 is rigidly secured by welding or otherwise to a Kelly head 21 which has secured thereto an upper cover plate 22 by means of bolts 23. Secured to the cover plate 22 are one or more lifting eyes 39 to which a cable may be attached to lift the entire kelly. The Kelly head 21 is provided with three radially extending channels 24, each of which is adapted to receive a block 25 and each of these blocks at its inner end is provided with arcuate toothed faces 26 adapted to grip the drill pipe 27 so that the drill pipe will be positively turned with the Kelly drive. The teeth on the block 25 rigidly engage the drill pipe and there is no movement between the blocks and the drill pipe or round kelly so that the drill pipe will not be scarred or defaced. Each of the said blocks 25 is actuated by means of a screw 28 which has an enlarged inner head 29 which is received in an orifice 30 which orifice is provided with shoulders 31 extended behind the head 29 of the screw. The screw 30 passes through stationary blocks 32 secured in the channel 24 by means of bolts or pins 33. The screw 28 is provided with a square head 34 adapted to receive a wrench so that the screw can be turned. If the screw is rotated inwardly, the inner end of the screw will engage its block 25 and move the toothed section into engagement with the drill pipe. If the screw is rotated in the opposite direction, the head 29 of the screw will engage the shoulder 31 which will pull its block 25 away from the drill pipe.

When it is desired to limit the downward movement of the outer section 5 of the Kelly drive so that said section will not move downwardly more than a given distance, a collar may be attached to the outer section 5. This collar consists of two plates 35 and 36 attached together by spacing bolts 37 and 38 which receive nuts 39 on the outer end of the bolts. If, therefore, it is desired that the outer Kelly drive should move downwardly for a shorter distance than it would normally be permitted to travel, the said collar is clamped to the outer section at the point where it is desired to stop its downward movement.

When the Kelly drive has been attached to the drill pipe so that the Kelly drive is fully extended and so that the limiting means 7 is immediately beneath the bushing 3, the plug 11 will be received within the aperture 18. As the rotary table is rotated by power means the drill pipe 27 will descend as the well is drilled deeper. The outer section 5 will travel downwardly through the non-circular hole 4 in the bushing 3 until its downward movement is arrested by either the plates 35 and 36 contacting the upper end of the bushing, or if the collar is not used, by the shoulder contacting the upper end of the bushing. In case the clamping means is not clamped to the outer section 5, but has not been removed, the downward movement of the outer section 5 would be limited by the shoulder 8 engaging the plates 35 and 36. As the pipe descends deeper, the upper end of the aperture 18 would move the plug 11 outwardly by means of the beveled portion 12 of the stop plug so that the inner section 20 would descend with the drill pipe until the Kelly head 21 contacted the upper end of the outer section 5. It would then be necessary to raise the Kelly drive and the hook of a cable would be passed through the lifting eye 39. The heads 34 of the screws 28 would be rotated so as to disengage the blocks 25 from the drill pipe. The Kelly drive would now be elevated to its full length and when so elevated, the limiting means 7 would be immediately beneath the bushing 3 and the plug 11 would rest in the aperture 18. The head 34 would then be rotated so as to move the blocks 25 into engagement with the drill pipe 27. The operator would then be ready to start the rotation of the rotary table 1.

The internal part of the inner square section 20 may be square, round, or any other shape. In Figure 3 we have indicated it as being round, but it is considerably larger than the drill pipe 27, leaving a space 40 between the section 20 and the drill pipe. At the lower end of the inner section we have provided a collar 41 which is secured to the section 20 by any conventional means such as screws 42. The inner diameter of the collar 41 should conform to the size of the drill pipe 27. If it is desired to use smaller drill pipe, a smaller collar would be inserted, or if it is desired to use a large drill pipe, a larger collar would be inserted.

We realize that many changes may be made in the specific form of the invention without departing from the spirit of this invention. We therefore desire to claim the invention as broadly as possible except as we may limit ourselves by the following claims by the prior art.

Having now described our invention, we claim:

1. In combination with round drill pipe and a rotary table, a Kelly drive operatively connecting said table and drill pipe, said Kelly drive being composed of a plurality of telescoping sections, the inner of said telescoping sections being provided with an aperture and means carried by the outer of said sections to engage within said aperture.

2. In combination with round drill pipe and a rotary table, a Kelly drive operatively connecting said table and drill pipe, said Kelly drive being composed of a plurality of telescoping sections, the inner of said telescoping sections being provided with an aperture and means carried by the outer of said sections to engage within said aperture and manual means whereby the last

named means may be disengaged from said aperture.

3. In combination with round drill pipe and a rotary table, a Kelly drive operatively connecting said table and drill pipe, said Kelly drive being composed of a plurality of telescoping sections and a clamp which may be adjustably secured to the outer one of the telescoping sections, said clamp consisting of two plates with means to press the plates against opposite sides of the outer one of the telescoping sections.

KENNETH R. TEIS.
WILLIAM O. MOORE.