June 3, 1930. A. H. NEILSON 1,761,840

SUCKER ROD SOCKET

Filed Nov. 24, 1928

Fig. 1.

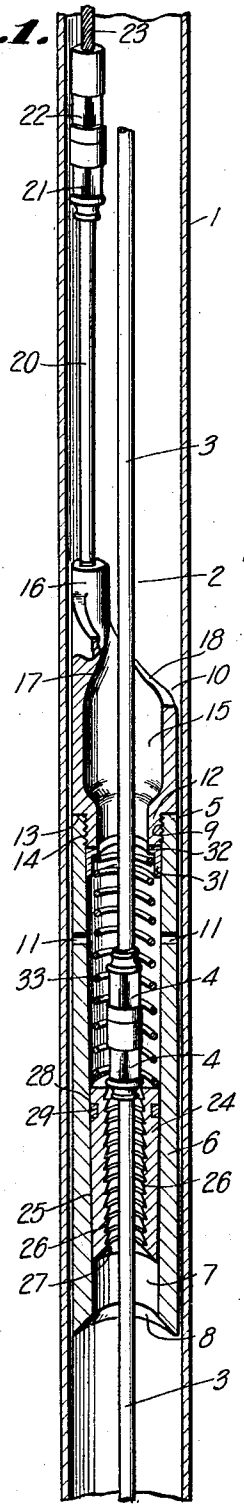


Fig. 3.

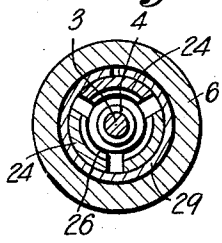
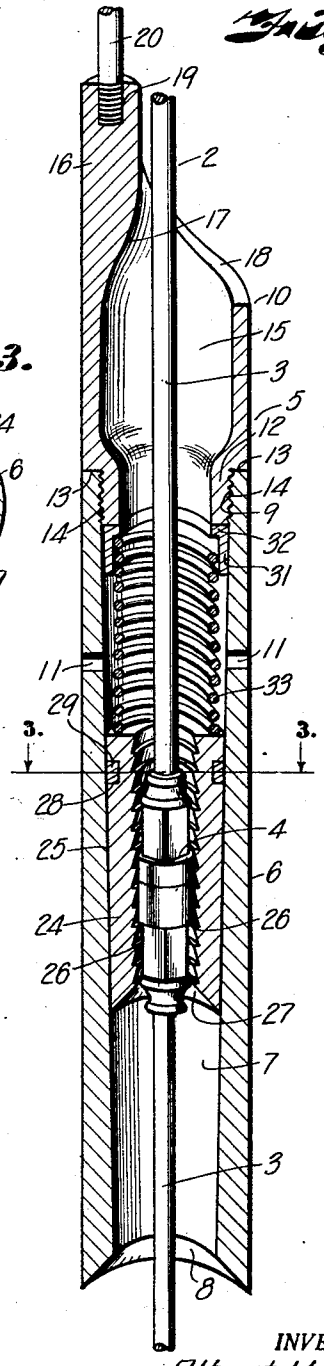


Fig. 2.



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Patented June 3, 1930 1,761,840

UNITED STATES PATENT OFFICE

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SUCKER-ROD SOCKET

Application filed November 24, 1928. Serial No. 321,579.

My invention relates to sucker rod sockets and more particularly to a device of that character for recovering disconnected or broken sucker rods from a well; the principal object of the invention being to permit recovery of the lost portion of a string of rods irrespective of the location of the break in the rods, or variation in the sizes of the rod couplings with which the socket is engageable.

In accomplishing the objects of my invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a central longitudinal section through well tubing and through my improved socket, showing the socket suspended in the tubing and engaging a coupling on a broken sucker rod.

Fig. 2 is an enlarged central longitudinal section of the socket showing its engagement with the body of a coupling on a broken sucker rod.

Fig. 3 is a section on the line 3—3, Fig. 2.

Referring in detail to the drawings:

1 designates well tubing which in oil well pumping practice is fitted at its lower end with a pump (not shown), operable by a string of sucker rods 2 extending through the tubing and connecting with actuating apparatus at the top of the well.

The string of sucker rods 2 is composed of sections 3 of uniform length and provided at their ends with threaded couplings 4 for connection with adjacent sections.

In operating the pump the sucker rods are quite often broken or disconnected at the couplings by vibration, and in order that the lost portion of the string of rods may be recovered from the well, I provide my improved socket 5 presently described.

The socket 5 includes a cylindrical barrel 6 of an outside diameter to permit its free sliding movement in the tubing, and is provided with a tapered bore 7 restricted toward the lower end of the barrel, and terminating in an outwardly flared mouth 8 for guiding the free end of a broken or disconnected rod into the socket.

The upper end of the barrel is internally threaded at 9 for the attachment of a coupling head 10, and ports 11 are provided in the upper portion of the barrel for relieving sand or other foreign substance as may tend to accumulate therein.

The coupling head 10 is equal in diameter to the barrel and provided at its lower end with a reduced neck 12 forming a shoulder 13 for abutment with the end of the barrel, the neck being externally threaded at 14 for engaging the internal threads 9 of the barrel.

Provided in the coupling 10 is a central opening 15 substantially equal in diameter to the upper end of the bore 7 in the barrel, and formed on the upper end of the head and at one side of the opening is a shank 16, the lower end of the shank being tapered back to form a guide surface 17 for guiding sucker rod stems or couplings through the opening.

The shank is reinforced on the head by wall portions 18 which connect with opposite sides of the shank, the walls being tapered downwardly away from the shank to provide a larger outlet from the opening 15 for the passage of sucker rods therethrough.

Provided in the upper end of the shank 16 is a threaded opening 19, and mounted in the opening is a connecting rod 20 fitted at its upper end with a coupling 21, which is engaged by a coupling 22 on the end of a cable 23, whereby the socket is lowered into and lifted from the well.

Located in the tapered bore 7 of the barrel is a set of slips 24 having outer tapered surfaces 25 fitting the tapered bore and adapted for diametrical expansion or contraction, dependent upon their respective upward or downward shifting movement in the barrel.

Each of the slips is provided on its inner surface with upwardly directed teeth 26 and is tapered outwardly at its lower end to form a flared mouth 27 for guiding a sucker rod or rod coupling into the slips.

Formed in the outer surface and adjacent the upper end of each slip is an arcuate groove 28 and fitted in the aligned groove is an expansible connector ring 29 for retaining the slips in assembled relation.

Located in the bore 7 and in abutment with the lower end of the coupling neck 12 is a spacer ring 31 having an inturned annular flange 32 engaged by the upper end of a compression coil spring 33, the spring extending downwardly and resting on the upper end of the set of slips 24 for normally urging the slip members into closed relation.

In using the socket, assuming that a sucker rod is broken as shown in Fig. 1, the socket is lowered into the well tubing by the cable 23. On arriving at the broken end of the sucker rod the flared mouth 8 of the barrel 6 engages and guides the rod into the bore 7, and as the descent of the socket continues, the rod engages the flared mouth 27 of the slips, whereupon the slips 24, spring 31 and coupling head 10 pass over the rod until the slips arrive in engagement with, or pass over a rod coupling 4.

On engaging a coupling of relatively small diameter, the slips are lifted upward in the barrel against the spring 31 until sufficiently expanded to permit the coupling to pass therethrough. When the coupling has passed through the slips, the slips are shifted downwardly in the bore 7 by the spring 31, thus restricting the diameter formed by the slips to less than the diameter of the coupling.

With the coupling positioned above the restricted opening through the slips, lifting of the socket causes the top of the slips to engage the lower end of the coupling, and the lost portion of the string of rods may thereby be lifted from the well.

In the event of a disconnection at a coupling between rod sections, the operation of the device is identical to that heretofore described.

Should the rod coupling between the rod sections be too large in diameter to pass through the slips, the teeth of the slips then become effective in gripping the body of the coupling, so that the depending portion of a string of rods may be lifted from the well.

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

1. A fishing tool including a coupling head having its upper end provided with an opening formed by upwardly curvel walls merging into an extended shank at one side of said opening, the lower end of said head provided with shoulders forming a reduced neck, a barrel having a tapered bore secured to the lower end of the head, slips in the barrel, and means confined in the barrel for normally urging said slips downwardly.

2. A fishing tool including a coupling head having its upper end provided with an opening formed by upwardly curved walls merging into an extended shank at one side of said opening, the lower end of said head provided with shoulders forming a reduced neck, a barrel having a tapered bore detachably secured to the lower end of the head in abutting relation with a shoulder of said head, slips in the barrel, a flanged spacer ring in the barrel engaging another shoulder of the coupling, and a spring seated against said ring and the slips.

In testimony whereof I affix my signature.

ALBERT H. NEILSON.