W. D. DOOLEY.

ELECTRICALLY CONTROLLED PULLER FOR OIL WELL CASINGS.

APPLICATION FILED APR. 26, 1920.

1,374,833. Patented Apr. 12, 1921.

Fig. 1.

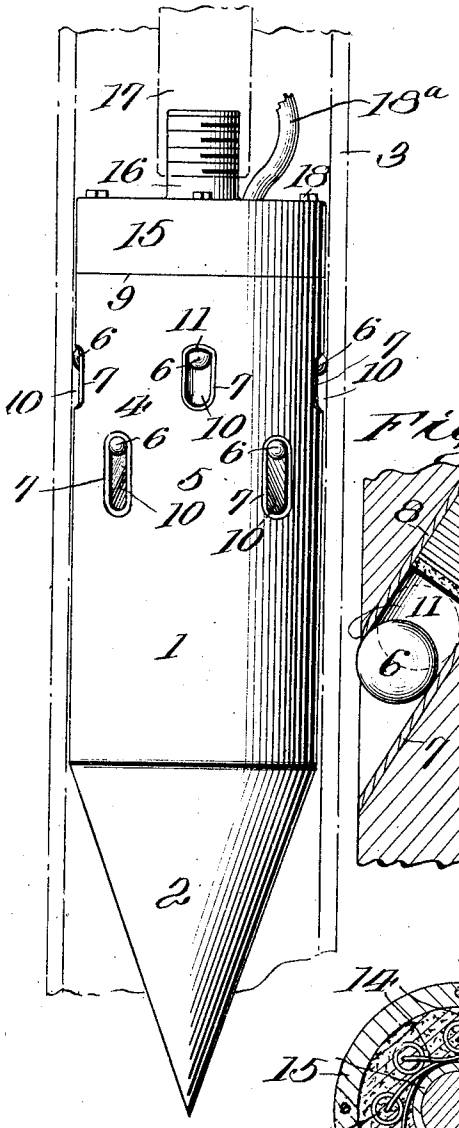


Fig. 2.

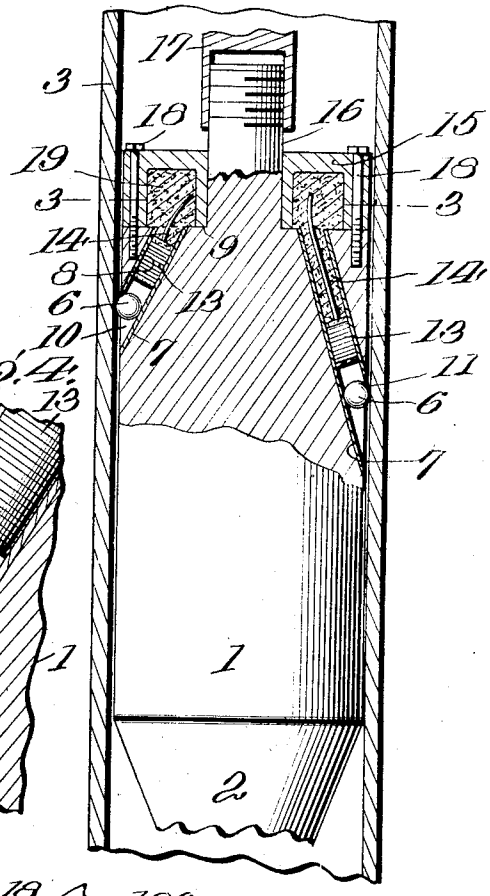


Fig. 4.

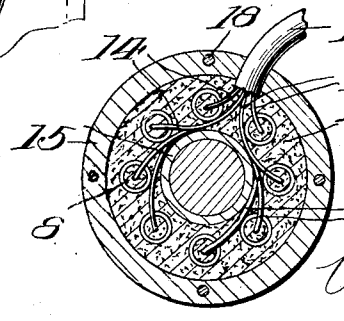


Fig. 3.

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ELECTRICALLY-CONTROLLED PULLER FOR OIL-WELL CASINGS.

1,374,833. Specification of Letters Patent. **Patented Apr. 12, 1921.**

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To all whom it may concern:

Be it known that I, WILLIAM D. DOOLEY, a citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Electrically-Controlled Pullers for Oil-Well Casings, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in electrically controlled pullers for oil well casings, which is adapted to be lowered into the well within the casing to be pulled and locked with its inner wall for pulling the casing out of the well.

The primary object of this invention is to provide an oil well casing puller which has electrically controlled members adapted to lock against the inner wall of the casing and pull it out of the well.

Another object of my invention is to provide a casing puller which is provided with members that automatically lock against the inner wall of the casing and electromagnets for holding the members in their unlocked positions for releasing it from the casing, whereby the pulley may be moved up and down in the casing at will and caused to either lock with the casing of the well at any desired point, or to be released from its locking action at any desired point in the casing.

Another object of my present improvement is to provide a casing puller which carries a plurality of ball wedges, which automatically lock with the inner wall of the casing, and an electromagnet for each ball to hold it out of its locking position.

Further objects of my present improvements will appear from the drawings and specifications.

In the accompanying drawings:—

Figure 1 is a side elevation of a casing puller which embodies my improvement.

Fig. 2 is a view partly in central section and partly in side elevation, showing my present improvement.

Fig. 3 is a cross-sectional view on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged sectional view longitudinally through one of the ball passages.

Referring now to the drawings, 1 is the body of my puller, which has a pointed lower end 2. This body is provided with a plurality of electrically controlled members which are adapted to be moved into locking and unlocking positions in respect to the well casing 3.

These locking members are arranged in horizontal series around the body 1, comprising an upper series 4 and a lower series 5. The upper series of locking members, here shown, comprise balls 6, which are located in inclined sleeves 7. These sleeves 7 are within inclined passage-ways 8, that are formed in the body 1. These passage-ways 8 are formed by boring through the body 1 from its upper end 9 at an inclination which brings their ends 10 through the side of the body 1, as clearly shown in the drawing. The sleeves 7 are composed of brass or other non-magnetic material, and the balls 6 are of a size to freely move within the sleeve, so that they normally fall to the lower ends of the sleeves, as shown. The lower ends 11 of the upper sides of the sleeves 7 are slightly turned inward, as shown, and engage the balls 6 just below their center, so that normally their peripheries project beyond the outer side of the body 1, so that they will normally engage the inner face of the well-casing 3. These pullers are made of a size slightly smaller than the interior diameter of the casing that is to be pulled. The inturned lower edges of the sleeves 7 prevent the balls 6 from falling out of the sleeves, but permits them to project sufficiently far to engage the wall of the tube. The body 1 of the puller will be made of such diameter, relative to the interior diameter of the casing 3, that when it is within the casing the balls will be slightly lifted above the upper inturned edges of the sleeves 7 so that they will be permitted a slight farther down movement for causing them to wedge against the inner wall of the casing 3 and have a cam-locking action. There may be as many of these locking balls as desired to meet the requirements. The inclination of the lower series 5 of the openings 8 is greater than the inclination of the series above, as will be readily understood, and by reason of their inclination the lower ends of the openings are elongated as clearly shown in Fig. 1.

Located in each of the sleeves 7, and above the locking ball 6, is an electro-magnet 13. These electro-magnets have their wire leads

14 extending upward into a housing ring 15, which is placed around the screw-threaded stud 16 to receive the lower end of the pulling rod 17. The electro-magnet leads 14 pass into a suitable covering 18 and extend to the top of the well, where they will be connected with any desired electrical source and controlled by any suitable switch (not shown). This housing ring 15 is attached to the upper end of the body 1 by means of suitable bolts 18, and the leads 14 are embedded in suitable waterproof cement 19, which fills the housing ring 15.

In operation, the lifting tool is lowered into the well casing to the desired point and the locking balls may be drawn upward in the sleeves 7, by the electro-magnets, as shown in Fig. 4, to prevent them from engaging the casing, so that the puller can be freely moved up and down in the casing until the desired location therein is obtained. At this time, the balls are released by making the electric circuit and they fall to the positions shown in Figs. 2 and 4, whereby they will engage the inner wall of the casing 3, so that an upward pull on the tool will cause the balls to roll downward and form locking wedges between the casing and body 1. The casing may then be pulled or lifted as desired. The puller can be released at any time from the casing by simply permitting it to drop slightly and then closing the circuit for magnetizing the magnets 13 to lift the balls within their sleeves, permitting the tool to be moved up and down freely within the casing.

From the foregoing it will be observed that the locking members 6 are normally in their locking positions, but are held in their unlocked positions by energizing the electro-magnets 13.

I do not limit myself to the exact construction here shown, for that may be varied by those skilled in the art without departing from the spirit and scope of my invention, as defined in the following claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A casing puller, comprising a body having a plurality of normally projecting locking members and a plurality of electro-magnets for holding the locking members in their unlocked positions.

2. A casing puller comprising a body having a plurality of inclined passages opening through the side of the body, a locking ball in each passage, and an electro-magnet in each passage for holding the balls in their unlocked positions.

3. A casing puller comprising a body portion, having a plurality of outwardly inclined passages with their upper ends opening at the top of the body and their lower ends passing out of the side of the body, a plurality of locking balls in the passages, the lower end wall of the passage constructed to hold the balls therein with their peripheries projecting beyond the body, and an electro-magnet in each passage having leads extending to the top of the well, whereby the locking balls are held in their unlocked positions when the magnets are electrically energized.

4. A casing puller comprising a body having upper and lower series of outwardly inclined passage-ways with their lower ends passing out through the body at different elevations, a locking ball in each passage adapted to project beyond the outer surface of the body, an electro-magnet in each passage, the magnets having leads extending upward through the well for the purpose of energizing the magnets and holding the locking balls in their unlocked positions.

5. A casing puller comprising a body having an inclined passage with its lower end opening through the outside of the body, a locking ball adapted to have its periphery project beyond the outer face of the body and an electro-magnet adapted to lift and hold the ball in its unlocked position.

6. A casing puller comprising a body having an outwardly inclined passageway, a brass tube within the passage, a ball within the passage, an electro-magnet within the passage and above the ball, whereby the ball may be lifted to its unlocked position by electrically energizing the magnet.

In testimony whereof I hereunto affix my signature.

WILLIAM D. DOOLEY