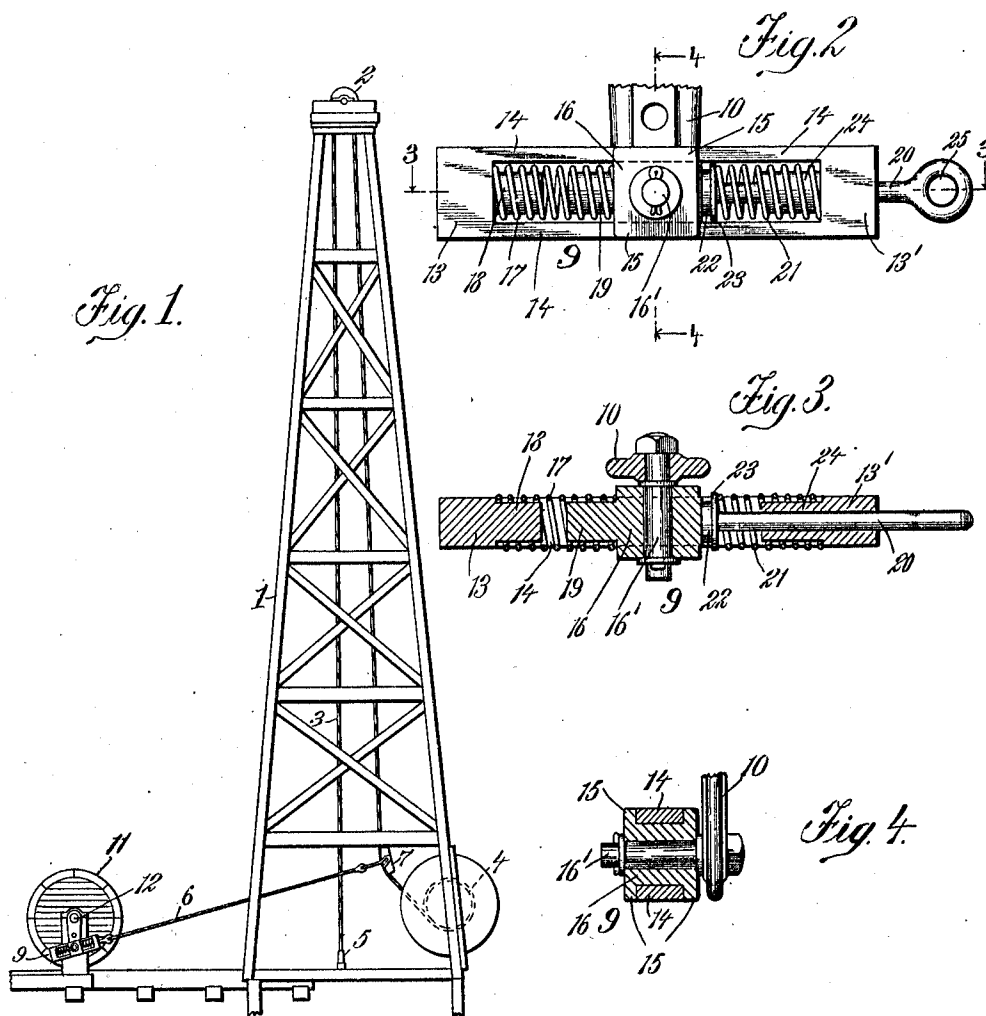


S. S. O'CONNOR.
WELL DRILLING APPARATUS.
APPLICATION FILED MAY 26, 1910.

989,184.

Patented Apr. 11, 1911.



Witnesses

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SAMUEL S. O'CONNOR, OF SANTA MONICA, CALIFORNIA.

WELL-DRILLING APPARATUS.

989,184.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, SAMUEL S. O'CONNOR, a citizen of the United States of America, residing at Santa Monica, in the county of Los Angeles, State of California, have invented a certain new and useful Well-Drilling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to well drilling apparatus of the class in which the drilling is done by means of a weighted tool which is alternately raised and dropped; a "jerk line" connected by means of a spudding shoe with the drill line to which the tool is secured, being used to raise the tool.

The invention relates particularly to the jerk line and to means employed to effect a resilient connection therebetween and the device whereby it is operated.

Objects of the invention are to attain an increase of the speed with which the drilling progresses and to minimize the risk of injury to the drill line, either through the sudden jerk caused by the tool failing to reach the bottom when dropped, or through buckling of the drill line at the point where it is attached to the tools.

Other objects of the invention are to provide the jerk line with a resilient member so constructed and arranged that increase of vibration or oscillation of the jerk line from the weight of the member may be prevented, and to provide a simple and efficient device whereby the resilient member may be mounted on, and its weight carried by, the part which operates the jerk line.

With the above and other objects and advantages in view, which will be apparent to those skilled in the art from a consideration of the following description and accompanying drawings, in which one form of construction in which the invention may be embodied is described and illustrated, the invention may be said to consist in the construction, arrangement, and combination of parts hereinafter described and particularly pointed out in the claims.

Referring now to the drawings: Figure 1 is a side elevation of a well drilling apparatus having the invention applied thereto. Fig. 2 is a side elevation of the resilient member provided on the jerk line, showing it attached to the crank arm by which the jerk

line is operated. Fig. 3 is a horizontal section taken on line 3—3 Fig. 2, and Fig. 4 is a transverse section taken on line 4—4 Fig. 2.

The derrick, indicated at 1, may be of usual or approved construction, having the crown pulley 2, over which the drill line 3 passes, mounted on its upper end; the drill line 3 leading from the bull shaft 4 and being connected at its free end to a drilling tool or tools of any approved construction, the upper end whereof is indicated at 5. The jerk line by means of which the tool is raised is shown at 6, the spudding shoe which connects it with the drill line being indicated at 7.

In order that the drill line, particularly if a wire cable is used, may be given sufficient slack to allow of the tool digging deeply into the earth when dropped without any danger of injury by buckling at the point where it is attached to the tool; and to prevent the sudden strain on the drill line caused by the tools failing to reach bottom, the jerk line 6 is provided with a resilient member or part 9 which will yield when the weight of the falling tools pull the jerk line taut. The resilient member may be connected to one end of the jerk line so that it will not fly back and forth when the jerk line is pulled taut, it being preferably, as shown, arranged to form the connection between the jerk line and the crank arm 10 which operates the jerk line. A drive pulley or band wheel 11 is mounted on the shaft 12 on which the crank arm is secured and is adapted to be driven by any suitable means, not shown.

To prevent the weight of the member 9 from increasing the vibration or oscillation of the jerk line when pulled taut the member may be suitably constructed and arranged to have its weight free of the jerk line, it being preferably mounted on the crank arm 10 in such a manner that its weight will be entirely supported by the latter. As shown particularly in Figs. 2, 3 and 4 member 9 comprises a rectangular frame having ends 13 and 13' connected by top and bottom pieces 14. These top and bottom pieces slide in guides 15 formed on a block 16 pivoted on a wrist pin 16' secured to the crank arm 10. A coiled spring 17 bears between one of the ends 13 and the block, the bosses 18 and 19 on end 13 and block 16 respectively, serving to hold the

spring in position and also act to limit the movement of the parts 13 and 16 toward one another. The other end, 13', has a bolt or rod 20 passing therethrough, and a second coiled spring 21 encircles the rod and bears between the end 13' and the head 22 of the rod. If desired a washer 23 may be interposed between the head 22 and spring 21. A boss 24 is also provided on the end 13' and serves both to hold spring 21 in position and to prevent undue movement of the bolthead 22 toward the end 13. Rod 20 may be provided at its end with an eye 25 serving as a means of attachment for the jerk line. As shown in the drawings the springs 17 and 21 are so arranged as to hold block 16 substantially midway of the ends 13 and 13' (the spring 21 bearing against the head 22 and causing the latter to bear against the block when the jerk line is slack), so that the weight of the device is evenly balanced on both sides of the wrist pin 16', and the member is pivoted at its longitudinal center of gravity; the bosses 18 and 19 preventing the frame being pulled far enough to one end to disturb to any extent its balance on the wrist pin. By this construction also as will be readily understood, the springs can be made of any desired length to give any desired amount of elasticity to the jerk line without disturbing the balance of the member 9 on the wrist pin.

The operation of the device is as follows: When the tool 5 falls after being raised, the jerk line is pulled taut by the drill line and causes spring 21 to be compressed and the pressure of spring 21 against the end 13' causes the whole frame to move against the pressure of spring 17. This yielding allows the tool to dig into the earth while at the same time the drill line is held with sufficient tension to prevent buckling at the point where it is attached to the tools, also a sudden strain on the drill line, should the tool fail to reach bottom, is prevented by the yielding of the springs. It will be readily seen that the balancing of the frame on the wrist pin obviates any tendency of the end 13' dropping when the jerk line slackens to allow the tool to fall and for that reason it will not be caused to oscillate by the tightening of the jerk line as would be the case if the end were dropped and pulled up suddenly.

I claim:

1. In a well drilling apparatus, in combination, a drill line having a drilling tool secured thereto, a rotatable crank arm, a block pivotally secured to the crank arm, a frame slidable on the block and having end

pieces located on opposite sides thereof, a spring bearing between one of the end pieces and the block, a headed rod passing through the other end piece, a jerk line secured at one end to the rod and connected at the other end with the drill line and a second spring bearing between the rod-head and the last mentioned end piece.

2. In a well drilling apparatus, in combination, a drill line having a drilling tool secured thereto, a rotatable crank arm, a block pivotally secured to the crank arm, a rectangular frame slidable on said block and having end pieces located on opposite sides thereof, a pair of springs bearing between the opposite end pieces of the frame and the block and holding the opposite ends of the frame normally in position substantially equidistant from the block, a rod passing through one of the end pieces and provided with a head located between one of the springs and the block, and a jerk line connected at one end with the rod and at the other end with the drill line.

3. In a well drilling apparatus, in combination, a drill line having a drilling tool secured thereto, a rotatable crank arm, a block pivotally secured to the crank arm, a rectangular frame slidable on said block and having end-pieces located on opposite sides thereof, a pair of springs bearing between the opposite end pieces of the frame and the block and holding the opposite ends of the frame normally in a position substantially equidistant from the block, a rod passing through one of the end pieces and provided with a head located between one of the springs and the block, a jerk line connected at one end with the rod and at the other end with the drill line, and means limiting the movement of the frame relatively to the block.

4. A jerk line provided with a resilient member comprising, a block, a frame slidable on the block and having end pieces located on opposite sides thereof, a spring bearing between one of the end pieces and the block, a headed rod passing through the other end piece, and a spring bearing between the rod head and the last mentioned end piece.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses at Los Angeles, county of Los Angeles, State of California, this 21st day of May A. D. 1910.

SAMUEL S. O'CONNOR.

Witnesses:

ALEX. H. LIDDERS,

ALEX. CURRIE.