Oct. 20, 1925. 1,557,781

F. L. SCOTT

WEIGHT INDICATOR

Filed July 5, 1921

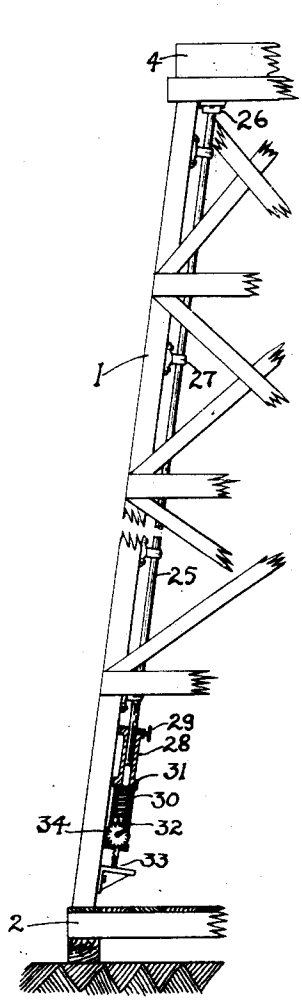


Fig. 2.

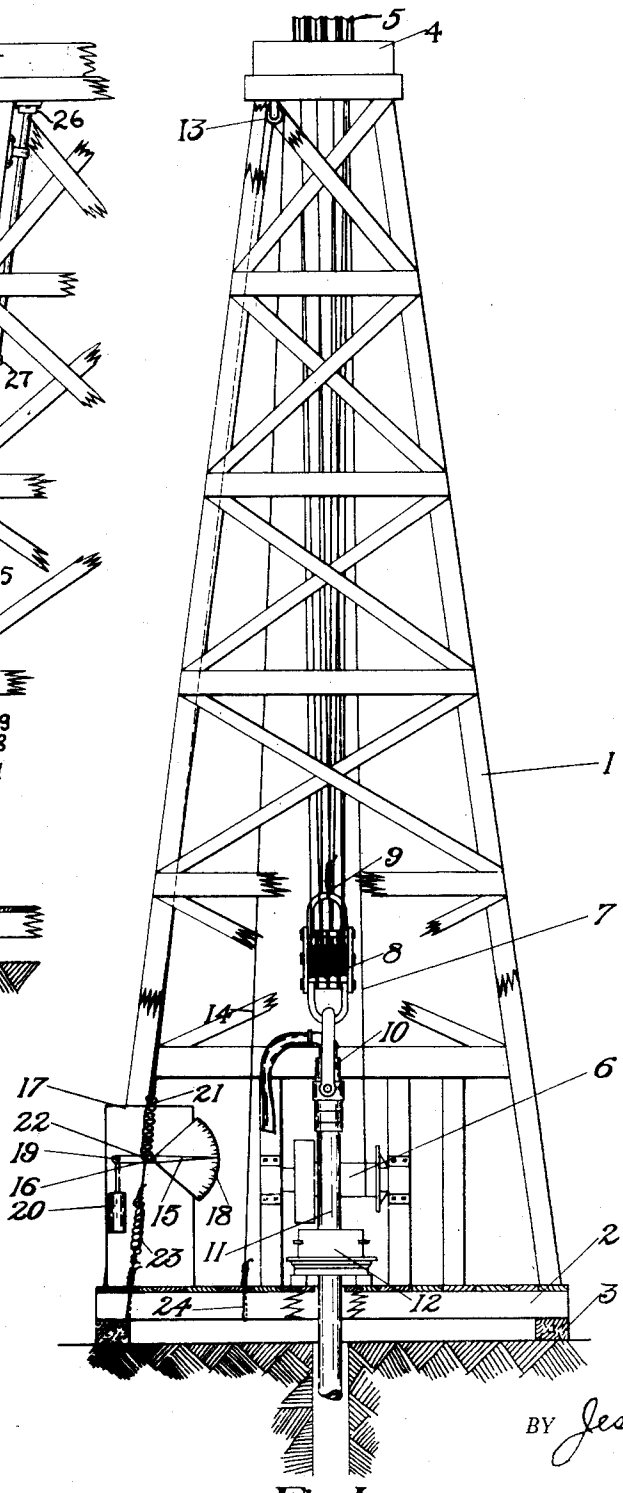


Fig. I.

F. L. Scott
INVENTOR.

BY Jesse R. Stone

HIS ATTORNEY.

Patented Oct. 20, 1925. 1,557,781

UNITED STATES PATENT OFFICE.

FLOYD L. SCOTT, OF HOUSTON, TEXAS, ASSIGNOR TO HUGHES TOOL COMPANY, OF HOUSTON, TEXAS.

WEIGHT INDICATOR.

Application filed July 5, 1921. Serial No. 482,311.

To all whom it may concern:

Be it known that I, FLOYD L. SCOTT, a citizen of the United States, residing at Houston, Harris County, Texas, have invented a certain new and useful Improvement in Weight Indicators, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in weight indicators and is designed for particular application to derricks used in oil well drilling.

To obtain the best results in well drilling for oil, gas, sulphur and the like it is important that the driller have some way of determining, with a close degree of accuracy, the amount of load resting upon the drill or sustained by the cable.

The object of my invention is to provide a device for indicating the load, which may be easily and quickly attached to a derrick upon which the weight carrying cable is supported.

Another object is to so apply such an indicator that it will not interfere with the handling of the line but may be secured in the derrick alone.

Referring to the drawing herein: In Fig. 1 I have shown my invention as applied to a well derrick such as is in ordinary use in oil fields, certain parts of the derrick and drilling apparatus being broken away, and others shown diagrammatically. Fig. 2 is a broken view, illustrating another embodiment thereof.

The derrick 1 is of the usual frame construction. The derrick platform is supported on side sills 2 and 3. The upper end of the derrick supports a crown block 4, having a plurality of sheaves or pulleys 5 thereon. A hoisting drum 6 near the platform of the derrick serves to reel up the cable 7. This cable passes up over one of the sheaves of the crown block 4 and down around one of the sheaves of the travelling block 8 and back over another sheave of the crown block. This operation is repeated and the line is thus threaded back and forth from crown block to travelling block a number of times, the forward end being finally extended downward and tied at 9 to the upper bail of the travelling block.

To the lower end of the travelling block is secured the swivel 10, supporting the rotary drill stem 11, which is adapted to be operated by a rotary shown diagrammatically at 12. This construction is the usual and common type of rig employed in oil field operations.

In using my invention in relation to an equipment such as has been described, I contemplate securing a pulley 13 at the upper end of the derrick. A cable 14 may then be secured at 24 to one of the sills of the derrick. The forward end of this cable is passed around the pulley 13 and drawn down tightly and secured at its opposite end to an indicator.

Any usual type of spring weight indicating device may be employed. I have shown a hand 15 pivoted at 16 to a support 17. The forward end of this hand is positioned to move along a dial 18 graduated to show weight in pounds. The opposite end of the hand 15 is extended rearwardly and has connection at 19 with a dash-pot 20 to steady the movements of the hand.

The cable is attached to the hand 15 through a spiral spring 21 secured at 22 adjacent the pivot 16 and between the same and the dash-pot. A second spring 23 is secured in the opening 22 and extended downwardly for attachment to some fixed support such as the sill 2.

The operation of my invention depends upon the resiliency of the derrick in combination with the apparatus described. When a heavy load is sustained by the cable upon the crown block of the derrick, the said derrick is compressed slightly in a longitudinal direction. When the weight is released, the derrick will spring upwardly to its original position. It has been found that the derrick framework makes a sort of spring the compression or expansion of which by the load may be measured with a fair degree of accuracy. As the cable 14 is capable of adjustment, it may be drawn taut so that the hand 15 will indicate the zero point on the dial when no load is sustained. The dial may be so graduated that variations in the weight will be indicated in an obvious manner. The springs 21 and 23 assist in somewhat diminishing the force of the shock of abrupt changes in the load. The dash-pot will prevent the rapid fluctuations of the hand 15 which might result from the jumping of the drill stem in rapid rotation on

hard rock. The amount of load on the cable can thus be readily calculated. On the other hand, by watching the dial the load released from the cable and allowed to rest on the bit at the bottom can be easily seen.

This conception of using the frame of a derrick as a part of a weight indicating combination may be carried out in other ways than the one just described as will be obvious. In Fig. 2 I have shown another embodiment of this idea. In this form of my invention I contemplate transmitting the contraction or expansion of the derrick frame under the load to the indicator through a rigid rod or pipe 25 secured at 26 to the crown block support. It is slidably supported in guides 27 on the derrick frame and the lower end is preferably received in a sleeve 28 in which it may be adjustably secured by means of a hand screw 29. The lower end of the sleeve 28 furnishes a chamber to house a spiral spring 30. This spring bears at the upper end upon a shoulder 31 within the sleeve and at its lower end against a plunger on the upper end of a rack 32 said rack being supported at its lower end upon a spiral spring 33. The rack is adapted to operate an indicator hand on a dial 34 by some means such as a small pinion on the pivot pin of the hand. The exact construction of the indicating device is not in itself an important part of this invention, the idea being to use some type of indicator and to operate it by means of a connection with the derrick, whereby the frame of the derrick becomes the main spring, the compression or expansion of which actuates the indicator.

The advantage of this type of indicator is that it can be quickly installed on any derrick without in any way interfering with the cable or the drilling apparatus. The indicator will be conveniently at hand where the driller can read it and ascertain when the proper load is resting on the bit, and when any variations occur in the load due to accident or through changes in the character of the formation being drilled.

Having thus described my invention, the objects and advantages will be apparent without further description.

What I claim as new and desire to protect by Letters Patent is:

1. A weight indicator for well drilling, comprising a derrick, a derrick platform, a dial, an indicating hand pivoted to move relative to said dial, a cable secured at one end to said derrick platform, the other end being passed over a pulley at the upper end of the derrick and brought down and attached resiliently to said hand adjacent its pivotal point, and means to steady the action of said hand.

2. In a weight indicator for well drilling, a derrick, a load operating means thereon, a support, an indicating hand pivoted to said support, a dial adjacent one end of said hand, a pulley at the upper end of said derrick, a cable secured at one end to the lower end of said derrick, passing over said pulley and attached at its other end to said hand, and a spring secured to said hand to said derrick below said hand.

3. In a device of the character described, a well derrick, a platform at the lower end thereof, a pulley at the upper end, a weight indicator, a cable secured at one end to said platform, the other end being passed around said pulley and brought down and attached to said weight indicator and load supporting means on said derrick.

4. In a device of the character described, the combination of a well derrick for handling loads, with a load indicating device, comprising a support, an indicating hand pivoted thereto, a graduated dial at one end of said hand, a cable secured toward the other end of said hand and having engagement with the upper end of said derrick and resilient means to hold said hand normally at zero point on said dial and to govern the movement of said hand when the tension on the said cable is varied by the load suspended.

5. In a device of the character described, a well derrick, load supporting means thereon, a support, a load-indicating device on said support, comprising a graduated dial and pointer thereon and a spring on said pointer, and connections between said device and the upper end of said derrick, separate from said load supporting means, in the manner described.

6. A weight indicating combination for well drilling means, comprising a derrick, a derrick platform, and a load supporting means secured to the upper end of said derrick, a weight indicator positioned adjacent the lower end of said derrick, and including a dial, an indicating hand pivoted to move relative to said dial, and means separate from the derrick and connecting the upper end thereof with said indicating hand, whereby the variations in compression of the derrick, due to the load thereon, will result in the movement of said indicating hand.

7. In a device of the character described, a well derrick having a platform at the lower end thereof, a weight indicating device attached to the derrick adjacent the lower end thereof, a load supporting means secured to the upper end of the derrick, and separate means connecting the upper end of the derrick with the indicating device, whereby the variations in compression of the derrick due to the load thereon will result in the actuation of the indicating means.

In testimony whereof, I hereunto affix my signature this the 28th day of June, A. D. 1921.

FLOYD L. SCOTT.