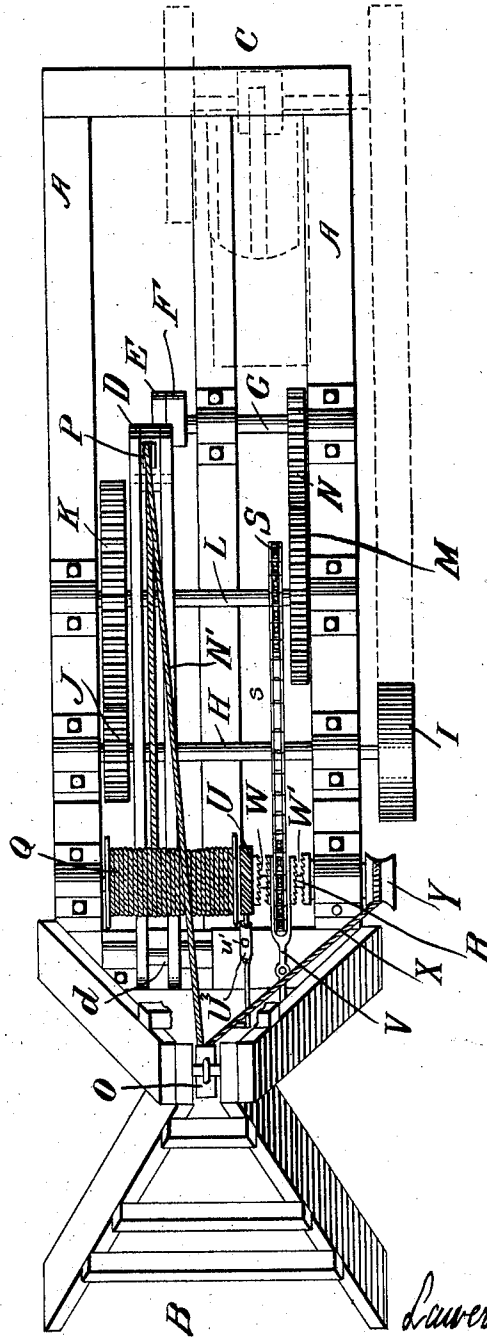


Patented July 5, 1910.

3 SHEETS—SHEET 1.

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Fig. 1.



Witnesses

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364

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3 SHEETS—SHEET 2.

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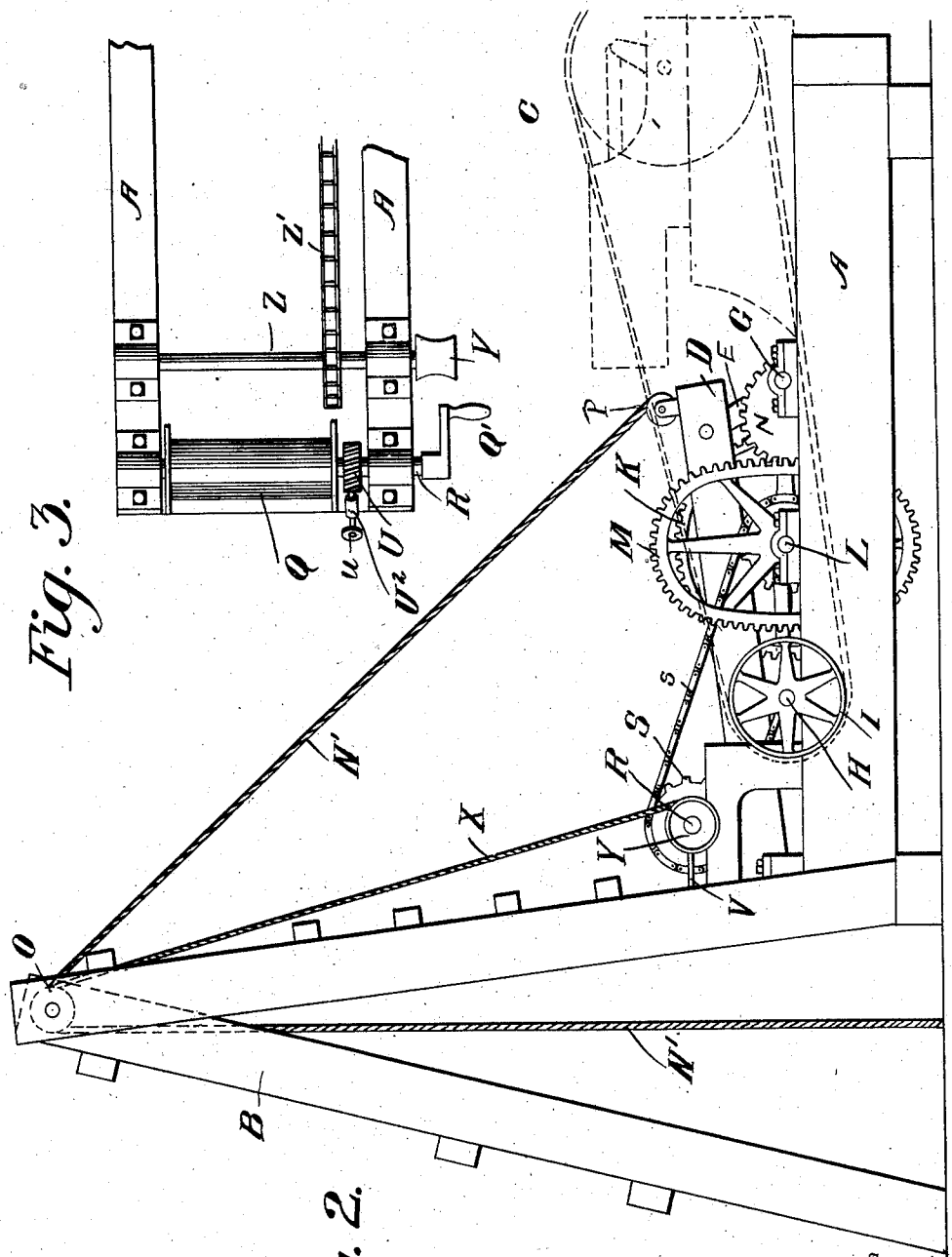


Fig. 3.

Fig. 2.

Witnesses

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Fig. 4.

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UNITED STATES PATENT OFFICE.

LAWRENCE SCHULTZ, OF BUFFALO, NORTH DAKOTA.

WELL-DRILLING APPARATUS.

963,657.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed September 23, 1909. Serial No. 519,198.

To all whom it may concern:

Be it known that I, LAWRENCE SCHULTZ, a citizen of the United States, residing at Buffalo, in the county of Cass and State of North Dakota, have invented certain new and useful Improvements in Well-Drilling Apparatus, of which the following is a specification.

My invention especially relates to machines for drilling wells, such as oil wells, and the object of my invention is to provide improved means whereby the drill rope may be lowered rapidly and raised more slowly, whereby the drill rope may be easily wound or unwound, and whereby another rope used for lowering and raising the drill rods or the sand pump or other parts of the drilling apparatus may be easily raised.

In the accompanying drawings, Figure 1 is a plan view of my improved apparatus. Fig. 2 shows a side elevation of the same. Fig. 3 is a detail view in plan of a modification. Fig. 4 shows a longitudinal section of the apparatus shown in Fig. 1: and Fig. 5 shows an end elevation of the apparatus shown in Figs. 1, 2 and 4.

The foundation frame A of the apparatus may be constructed in any suitable way, as may also the derrick frame B. The frame A is preferably adapted to support a suitable engine, such as a steam engine or gasoline engine, indicated by dotted lines at C in the drawings. The walking beam D is pivoted at *d* to the frame and it is connected at its front end by a link E with a crank F on a shaft G which is driven in the manner hereinafter described. The main driving shaft H is mounted in suitable bearings in the main frame and carries a pulley I which may be belted, as shown, to the engine C, and the shaft H carries a pinion J meshing with a spur wheel K of larger size on a shaft L parallel to the shaft H and carrying an elliptical gear M which meshes with a pinion N eccentrically secured to the shaft G. By this arrangement of gearing, as the shaft H is continuously revolved, a rotary motion at a higher speed is given to the shaft L, and the shaft G is rotated in such manner as to oscillate through its crank F the walking beam K in such a way that the drill which is connected with the walking beam, in the manner before described, is lowered rapidly and lifted more slowly, but both movements of the drill are positive.

The drill rope N' extends upwardly in the derrick over a pulley O at the upper end thereof and down to a pulley P at the front end of the walking beam D. From the pulley P the drill rope passes to a winding drum or windlass Q mounted loosely on a shaft R arranged in suitable bearings at the rear end of the apparatus. By revolving the drum in the proper direction the rope may be wound or unwound and the drill raised or lowered to any desired extent independently of the movements given to it by the walking beam. The shaft R carries a sprocket wheel S which has a tongue and groove connection with the shaft R so as to always rotate with the shaft, but it is capable of sliding endwise thereon. The sprocket wheel S is connected by a chain *s* with a sprocket wheel S' on the shaft L so that during the operation of the apparatus the shaft R is continuously revolved.

U indicates a worm-wheel rigidly attached to the drum Q but loose on the shaft R, and U' indicates a worm operated by a handle *u*. By means of these last mentioned devices the drum may be turned to a slight extent to adjust the drill rope. The worm may be held in engagement with the worm-wheel U by means of a bolt *u'* so as to prevent rotation of the drum or windlass during the drilling operation, but by sliding the shaft of the worm wheel in its support, U², the worm may be held away from the worm-wheel, and thus the drum may be turned on the shaft R when it is in engagement with the sprocket wheel S. Clutch devices W are provided between the worm-wheel U and the sprocket-wheel S and by means of a shifting lever V the sprocket-wheel may be moved endwise on the shaft R so that it is coupled to the winding drum, and when this is the case, the winding drum may be revolved with the shaft R and the drill rope wound up or raised.

X indicates another rope which may be used for raising and lowering the drill rods, sand pump or other parts of the apparatus. This rope extends over the pulley O (which is a double pulley, there being two sheaves arranged side by side) and it passes thence to a grooved pulley Y which I call a cat-head. This may be connected, when desired, by means of clutch mechanism W' with the sprocket-wheel S, and when so connected may be used to wind up the rope X. The

pulley Y may, however, be made to rotate continuously and the rope X need only be connected thereto when it is desired to raise it. Instead of connecting the pulley or cat-head Y with the shaft R, it may be arranged
5 on a separate shaft Z which may be driven in any suitable way by sprocket-gearing, as indicated at Z'. If desired the winding drum Q may be operated by a crank Q'.

10 I claim as my invention:

In a well drilling apparatus, the combination of a supporting frame, a pivoted vertically moving walking beam carried thereby, a power shaft, a crank shaft connected
15 with the walking beam, gearing connecting the power shaft with the crank shaft, a drill-rope connected with the walking beam, a winding drum to which the drill-rope is connected, a sprocket-wheel mounted to rotate with said last mentioned shaft
20 but adapted to slide endwise thereon, gearing connecting this wheel with the power

shaft, a pulley or cat-head loosely mounted on the shaft of the winding drum, clutch mechanism between the cat-head and the
25 sprocket wheel on the shaft of the winding drum, clutch mechanism between such sprocket-wheel and the winding drum, means for shifting the sprocket-wheel in opposite directions to cause it to operatively
30 connect with either the winding drum or the cat-head, a worm wheel rigidly connected with the winding drum, a worm engaging therewith and adapted to move the drum in either direction to lengthen or
35 shorten the drill rope, and means for holding the worm either in or out of engagement with the worm wheel.

In testimony whereof, I have hereunto subscribed my name.

LAWRENCE SCHULTZ.

Witnesses:

O. P. OLSON,

AUG. SCHUCHARTT.