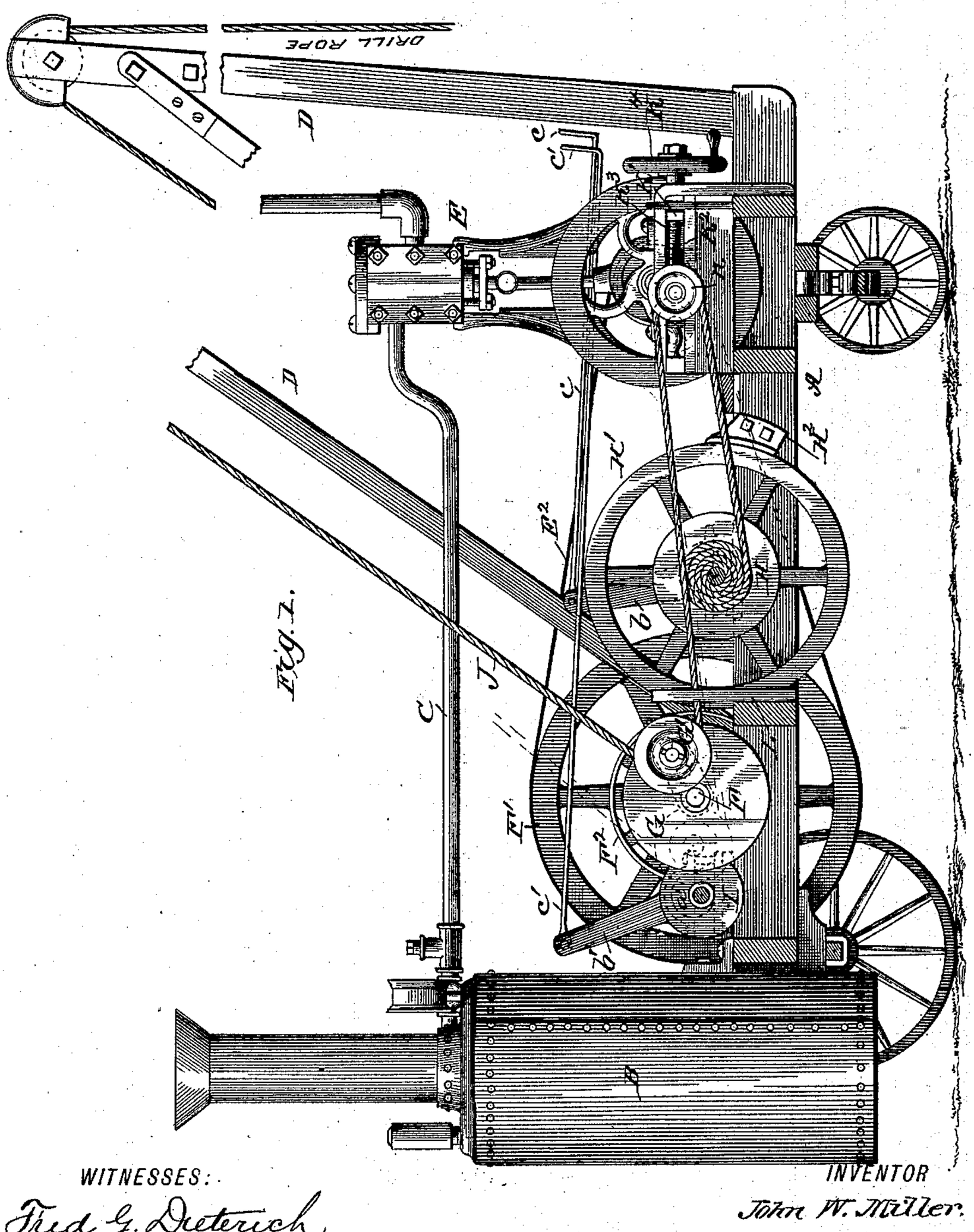
(No Model.) 2 Sheets—Sheet 1.

J. W. MILLER.

WELL DRILLING MACHINE.

No. 413,407. Patented Oct. 22, 1889.



WITNESSES:

Fred G. Dieterich

Edw. W. Byrn.

INVENTOR

John W. Miller.

BY Munn & Co

ATTORNEY

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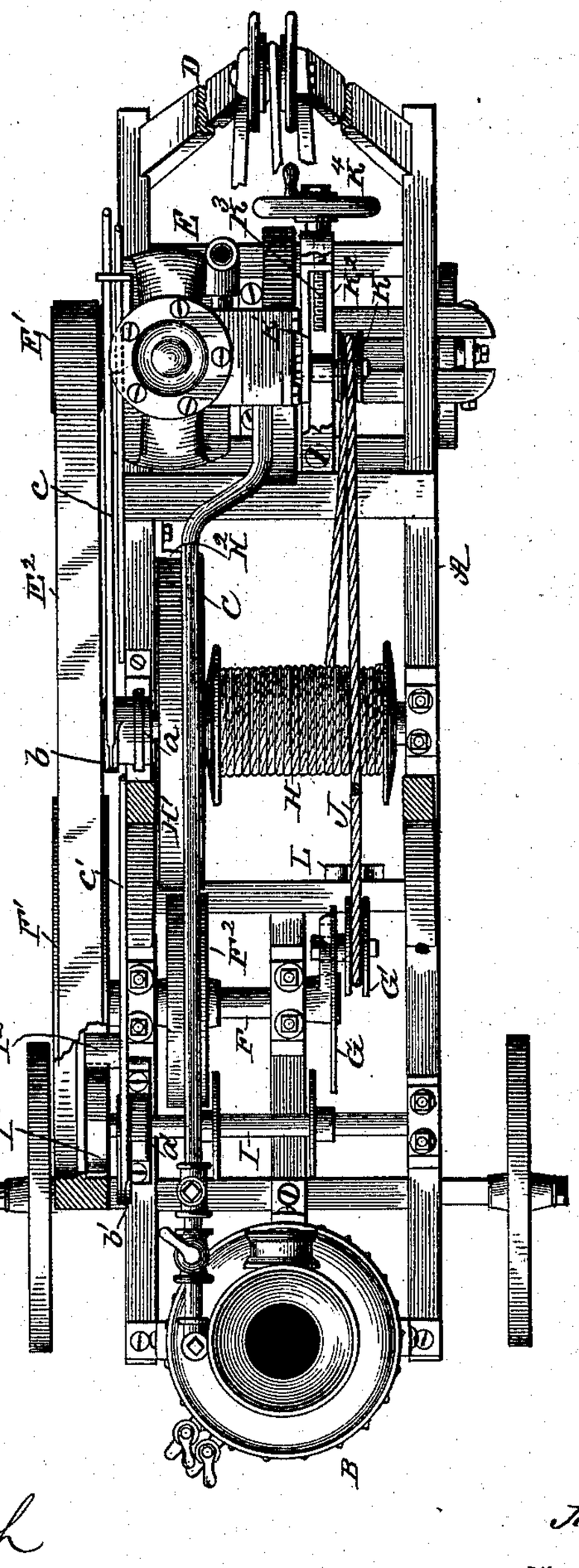

Fig. 2.

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UNITED STATES PATENT OFFICE.

JOHN W. MILLER, OF NEWTON FALLS, OHIO, ASSIGNOR OF TWO-SEVENTHS TO ERNEST A. DURST, OF SAME PLACE.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 413,407, dated October 22, 1889.

Application filed June 21, 1889. Serial No. 315,126. (No model.)

To all whom it may concern.

Be it known that I, JOHN W. MILLER, of Newton Falls, in the county of Trumbull and State of Ohio, have invented a new and useful Improvement in Well-Drilling Machines, of which the following is a specification.

My invention relates to well-drilling machines; and it consists in the peculiar construction and arrangement of the winding-drum, means for lifting and dropping the drill-rope, and a pulley arranged to carry the rope as it passes from the drill-operating mechanism to the winding-drum, whereby the rope is kept in the proper plane on the drill-operating devices, and the rope is also fed down as the drill descends into the well, as hereinafter fully described.

Figure 1 is a side elevation, partly in section, of the working parts of the machine; and Fig. 2, a plan view of the same.

A represents the main frame of the machine, which, for purposes of easy portability, is mounted upon wheels. This frame at one end carries the boiler B and at the other end carries the engine E and derrick D, the engine being connected to the boiler by a steam-pipe C. Between the engine and the boiler and mounted upon the main frame are the operating devices for the drill.

F is the operating-shaft for the drill. This carries at one end a large band-wheel F′, at the other end has a disk G, and in the middle has a friction-pulley F^2. This shaft is rotated by a band E^2, which connects a pulley E′ on the engine-shaft with the large pulley F′ on the operating-shaft.

H is the winding-drum, journaled in bearings in the main frame and provided with a friction-wheel H′, which is adapted to be brought into frictional contact with the pulley F^2, to be rotated thereby, or be removed therefrom and be brought into frictional contact with a brake-shoe H^2, fixed upon the main frame, and be held stationary thereby. To give this adjustment to the wheel of the winding-drum, the end of the shaft bearing said wheel is journaled in an eccentric *a*, oscillated by a lever *b* and a rod *c*.

I is the sand-pump reel, whose shaft bears a friction-pulley I′, that is adapted to be brought into contact with the inner periphery of the large wheel F′, to be rotated thereby or be removed therefrom and brought into contact with a stationary brake-shoe I^2. For giving this adjustment to this shaft, its end is journaled in an eccentric *a*′, oscillated by a lever *b*′ and rod *c*′.

Upon the disk G there is carried a deeply-grooved pulley G′, mounted to revolve upon a wrist-pin placed eccentrically upon the disk and adjusted farther from or closer to the center by a series of holes. In the place of this disk a crank-arm may be used. Around this deeply-grooved pulley there passes the bight or loop of the drill-rope J. From one side of this pulley G′ the rope passes to the top of the derrick, and, descending over the pulley at the top, is attached to the drill. The rope from the other side of this deeply-grooved pulley extends first to a feed-regulating pulley K, and after passing around the same returns to the winding-drum.

L are guides for the rope as it passes from the deeply-grooved or operating pulley to the feed-pulley. This feed-pulley is journaled in a slide K′, moving horizontally in guides K^2. Through a lug at one end of the slide there is tapped a long screw K^3, swiveled in bearings in the guide-frame and provided on the outside with a hand-wheel or crank K^4 for rotating it. By turning this hand-wheel so as to advance the pulley K toward the winding-drum it will be seen that the rope will be paid out and the drill lowered or given a progressive feed down the well from time to time as often as may be required to keep up the cutting action. As the feed-pulley is advanced toward the drum, it will be seen that the rope on each side of the said pulley is shortened, and consequently a definite adjustment of the pulley produces double that amount of feed for the rope.

In the operation of drilling, the wheel on the winding-drum is held stationary by being in contact with the brake-shoe while the operating-shaft F is being revolved by the engine. As the grooved pulley G′ is carried from one side of the shaft to the other in its revolution, it will be seen that the drill-rope

is alternately pulled up and let out to operate the drill. A very large amount of the rope is also alternately pulled in and paid out, and also a very quick drop obtained, by reason of the fact that the pulley alternately elongates and shortens the rope on both sides at once—*i. e.*, in raising the drill the operating-pulley elongates the rope both on the side leading to the drill and the side leading to the feed-pulley, which causes a given movement of the operating-pulley to give twice the pull to the rope. Then when the rope commences to be paid out it is paid out twice as fast, which gives a quick drop to the drill. This action involves a longitudinal movement of the rope around the operating-pulley, which latter oscillates first in one direction and then in the other. In this connection it will be seen that the feed-pulley not only serves the purpose of feeding the drill down, but said feed-pulley always holds the rope in the true plane of the operating-pulley, so that the operating-pulley always has a free action on the rope without binding. This would not be the case if the rope ran directly from the operating-pulley to the drum, because the rope would sometimes be at one end of the drum and sometimes at the other, and the rope would not extend to the operating-pulley in a true and constant plane. After the drilling has progressed far enough to require the sand to be removed, the rope is thrown off the operating and feed pulleys and the drum-wheel is thrown away from the brake-shoe and into the friction-pulley of the operating-shaft. The continued action of the engine now rotates the drum and raises the drill from the well. The sand-pump reel is then put to work and the sand-pump is lowered and the sand pumped out in the usual way.

In defining my invention with greater clearness, I would state that I am aware that it is not new to alternately pull and slacken the rope by a pulley placed in a bight or loop of the rope, and do not claim this, broadly.

Having thus described my invention, what I claim as new is—

The combination, in a drilling-machine, with the winding-drum and the revolving operating-shaft carrying an eccentric pulley caught in a bight or loop of the rope, of a pulley placed in a bight or loop of the rope between the operating-pulley and the winding-drum, the two pulleys being arranged in the same plane, substantially as and for the purpose described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

JOHN W. MILLER.

Witnesses:

EDWD. W. BYRN,

SOLON C. KEMON.