

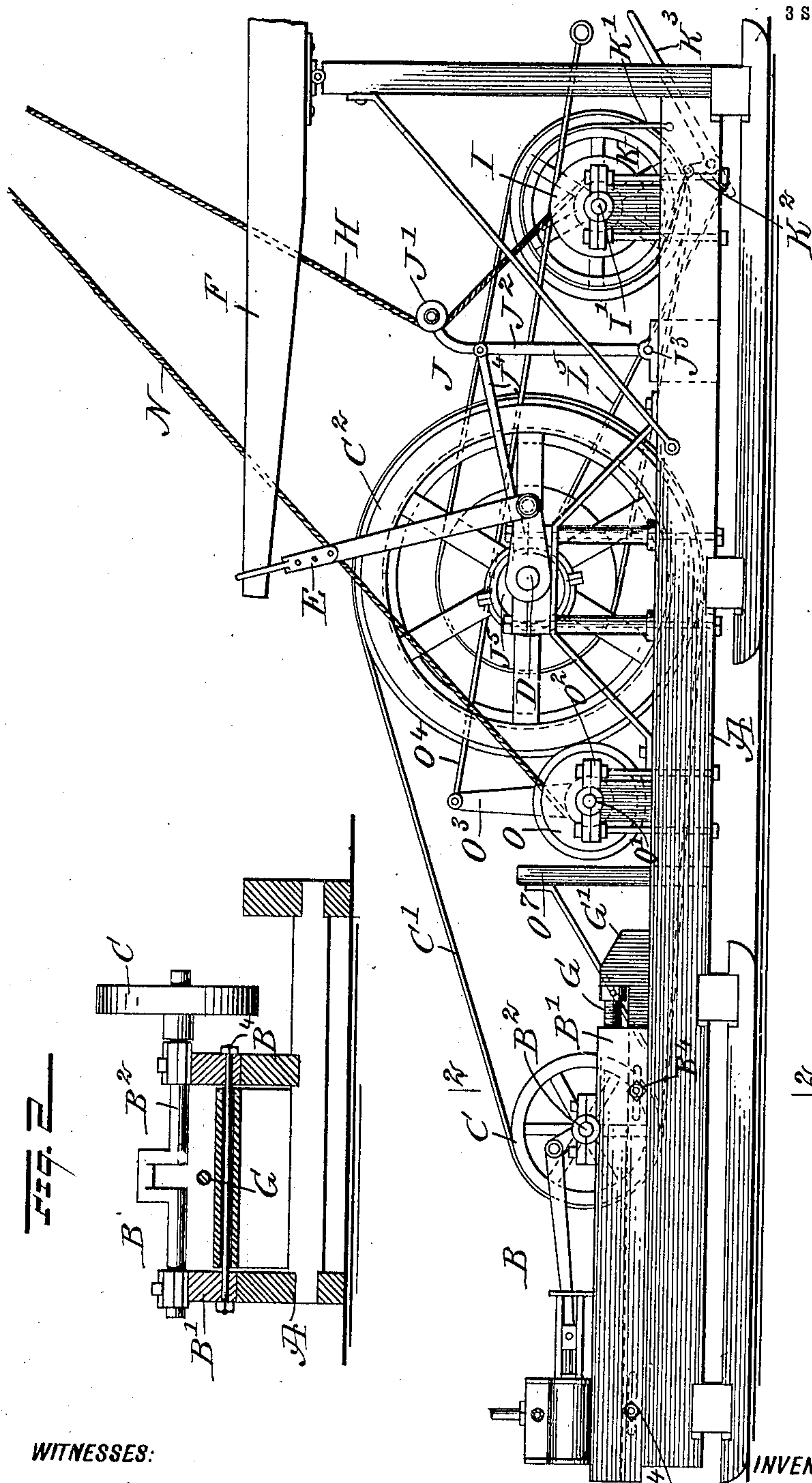
No. 871,014.

PATENTED NOV. 12, 1907.

N. D. WELLS  
WELL DRILLING MACHINE.

APPLICATION FILED APR. 21, 1906.

3 SHEETS—SHEET 1.



**WITNESSES:**

John A. Repton  
New York

**INVENTOR**

*Nelson D. Wells*

**BY**

Mumolo

**ATTORNEYS**

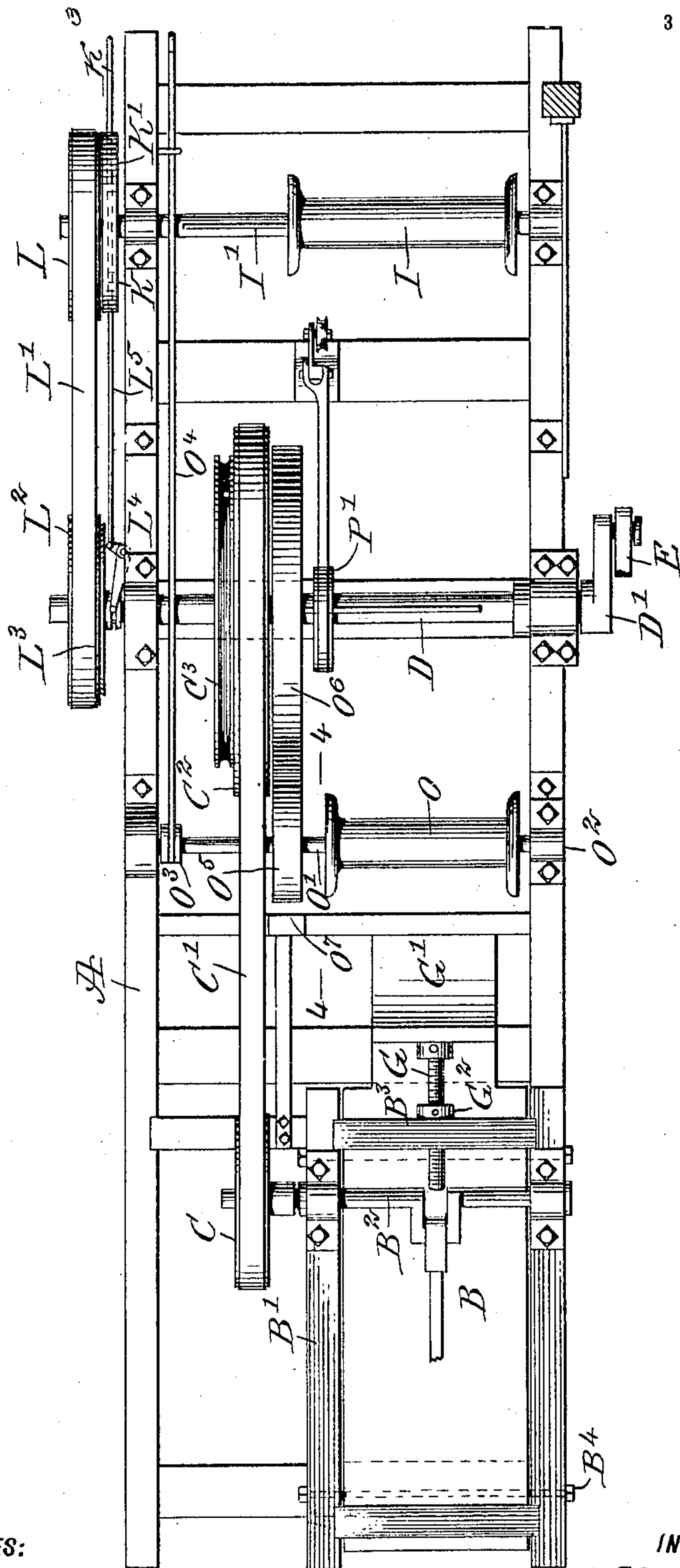
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3 SHEETS—SHEET 2.



**WITNESSES:**

John A. Crockett  
Rev. J. H. Foster

**INVENTOR**

*Nelson D. Wells*

BY *Mum Co*

**ATTORNEYS**



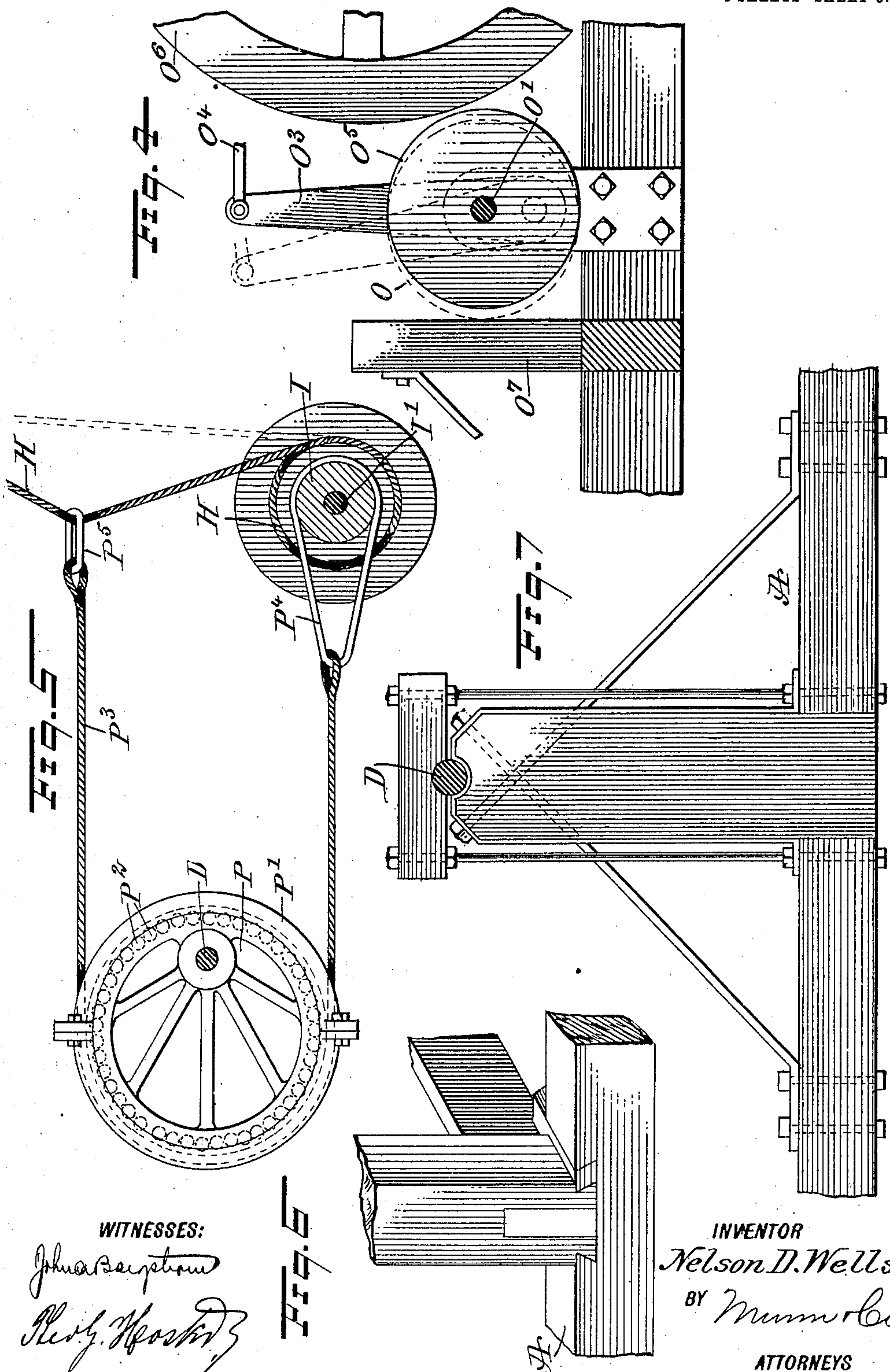
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3 SHEETS—SHEET 3.



WITNESSES:

*John A. S. Thompson*  
*Henry H. Foster*

INVENTOR

*Nelson D. Wells*

BY *Mum & Co*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

NELSON DOUGLAS WELLS, OF TULSA, INDIAN TERRITORY.

## WELL-DRILLING MACHINE.

No. 871,014.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed April 21, 1906. Serial No. 312,983.

*To all whom it may concern:*

Be it known that I, NELSON DOUGLAS WELLS, a citizen of the United States, and a resident of Tulsa, District No. 8, Indian Territory, have invented a new and  
5 Improved Well-Drilling Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved well-drilling machine arranged to permit  
10 convenient actuating of the drill-rod at the beginning of the drilling operation by the employment of a spudding device, without the use of the walking-beam, and to allow convenient and quick lifting of debris, &c., out of the well, independent of the spudding device and walking-beam.

15 The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of  
20 this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement; Fig. 2 is a cross section of the same, on the line 2—2 of  
25 Fig. 1; Fig. 3 is a plan view of the improvement; Fig. 4 is an enlarged side elevation of the friction-drive for winding up the lifting or sand rope, the section being on the line 4—4 of Fig. 3; Fig. 5 is a side elevation of a modified form of the spudding device; Fig. 6 is an enlarged perspective view of a modified form of the support for the crank-shaft; and Fig. 7 is an enlarged side  
30 elevation of another modified form of the same.

On a suitably constructed frame A is adjustably mounted the frame B' of an engine B or similar motor,  
35 having its main shaft B<sup>2</sup> provided with a pulley C connected by a belt C' with a pulley C<sup>2</sup> secured on a crank-shaft D journaled in suitable bearings carried on the main frame A. The crank-shaft D is connected at its crank-arm D' by the usual pitman E with a walking-  
40 beam F, for operating the drill in the usual manner.

In order to insure a proper connection of the belt C' with the pulleys C and C<sup>2</sup> it is desirable to adjust the frame B' of the engine lengthwise on the frame A, to hold the belt C' taut, and for this purpose a screw G is  
45 preferably employed, abutting with its head against an abutment G' secured to and forming part of the main frame A, the screw also screwing in a nut G<sup>2</sup> held on the cross-beam B<sup>3</sup> of the engine-frame B'. Thus, when the screw-rod G is turned, the frame B' of the  
50 engine can be adjusted lengthwise on the main frame A, so as to bring the belt C' in taut position, for the proper transmission of the power from the engine to the crank-shaft D. When the desired adjustment of the engine-frame B' has been made, then the engine-frame  
55 is securely locked in position on the main frame A by suitable bolts B<sup>4</sup>, as plainly shown in Figs. 1 and 2.

At the beginning of the drilling operation the walking-beam F is not used, and instead a drill-rope H is employed, extending over a pulley on the derrick, to connect at one end with the drill and to wind up at its  
60 other end on a spool or reel I, secured on a shaft I' mounted to turn in suitable bearings attached to the main frame A. This drill-rope H is actuated by a spudding device J driven from the crank-shaft D and arranged in such a manner as to impart the desired  
65 movement to the drill-rope H, for the latter to alternately raise and lower the drill-rod, for drilling the well. When the well has been drilled for say about one hundred feet, then the drill-rope H is disconnected from the spudding device and connected with the  
70 walking-beam F for drilling the well deeper, in the usual manner.

The spudding device J is arranged as follows: A pulley J' engages the drill-rope H and is journaled on the free end of a rock-arm J<sup>2</sup>, fulcrumed at its lower  
75 end at J<sup>3</sup> on the main frame A. The rock-arm J<sup>2</sup> is pivotally connected with the eccentric-rod J<sup>4</sup> of an eccentric J<sup>5</sup> secured on the crank-shaft D, so that when the latter is rotated the eccentric J<sup>5</sup> and its eccentric-rod J<sup>4</sup> impart a rocking motion to the rock-arm J<sup>2</sup>,  
80 whereby the pulley J' alternately pulls and releases the drill-rope H, held stationary at the spool or reel I, and the drilling tools are alternately lifted and dropped, for drilling the well.

As the well is drilled it is necessary to feed out  
85 more drill-rope H, and for this purpose the spool or reel I is periodically turned, to unwind more drill-rope H, and after the desired amount of drill-rope H has been unwound, the shaft I' of the spool I is held against turning, and for this purpose a suitable brake  
90 mechanism is employed, preferably consisting of a brake-wheel K secured on the shaft I' and engaged by a brake-band K', fixed at one end and connected at its other end with a lever K<sup>2</sup> having a handle K<sup>3</sup>, under the control of the operator, for applying and releasing  
95 the brake-band K'.

The spool or reel I is adapted to be periodically driven from the crank-shaft D at the time the brake mechanism is off, and for this purpose the shaft I' is provided with a pulley L, connected by a belt L' with  
100 a pulley L<sup>2</sup>, mounted loosely on the crank-shaft D and adapted to be connected with the same by a clutch L<sup>3</sup>, thrown in and out of gear by a lever L<sup>4</sup> connected by a link L<sup>5</sup> with the brake-lever K<sup>2</sup>, so that when the operator throws the brake-handle K<sup>3</sup> downward the  
105 brake-band K' is applied on the wheel K, and at the same time the clutch L<sup>3</sup> is thrown out of gear, to disconnect the crank-shaft D from the pulley L<sup>2</sup>. When it is desired to turn the spool or reel I for unwinding some of the drill-rope H, then the operator swings the  
110 handle K<sup>3</sup> upward and in doing so releases the brake mechanism and at the same time causes the clutch L<sup>3</sup>



to connect the crank-shaft D with the pulley L<sup>2</sup>. When this takes place the rotary motion of the crank-shaft D is transmitted by the clutch L<sup>3</sup>, pulley L<sup>2</sup>, belt L' and pulley L to the shaft I' of the spool or reel I, to unwind a portion of the drill-rope H. When this has been done, then the handle K<sup>3</sup> is returned to its normal position, to throw the clutch L<sup>3</sup> out of gear and thereby stop the rotation of the spool I, at the same time locking the latter against turning movement by the application of the brake mechanism. To wind up the drill the clutch is thrown into operative position and the motor reversed.

The hoisting or sand rope N for hoisting debris or other matter out of the well winds on a spool or reel O, having its shaft O' journaled in bearings O<sup>2</sup> and O<sup>3</sup>, of which the bearing O<sup>2</sup> is fixed on the main frame A and the other bearing O<sup>3</sup> is in the form of a pivoted arm, mounted to swing on the main frame A. A rod O<sup>4</sup> is pivotally connected with the bearing O<sup>3</sup>, to allow of imparting a swinging motion to the bearing O<sup>3</sup>. On the shaft O' is secured a friction-pulley O<sup>5</sup>, adapted to be thrown in engagement either with a friction-pulley O<sup>6</sup> secured on the crank-shaft D or with an abutment O<sup>7</sup> secured to the main frame A. When the operator pulls on the rod O<sup>4</sup>, the pulley O<sup>5</sup> is moved in frictional contact with the pulley O<sup>6</sup>, to drive the shaft O' and the spool O from the shaft D, to wind up the rope N, and when the rod O<sup>4</sup> is pushed from the right to the left, then the pulley O<sup>5</sup> is moved in engagement with the abutment O<sup>7</sup>, to bring the shaft O' and the reel O quickly to a standstill. Thus, by the operator manipulating the rod O<sup>4</sup>, the spool or reel O can be quickly actuated, with a view to wind up the lifting-rope N or to stop the rotation of the spool after the lifting operation has been completed.

The modified form of spudding device shown in Fig. 5 consists essentially of an eccentric P, secured on the crank-shaft D, and the eccentric-strap P' of this eccentric is mounted on ball-bearings P<sup>2</sup> and the strap is in the form of a pulley, for the passage of a rope P<sup>3</sup> having loops P<sup>4</sup> and P<sup>5</sup> at its ends, of which the loop P<sup>4</sup> is hung onto the spool I while the loop P<sup>5</sup> engages the drill-rope H. When the shaft D is rotated the eccentric P imparts the desired motion to the rope P<sup>3</sup>, to actuate the drill-rope H, for raising and lowering the drilling tools. If desired, the loop P<sup>4</sup> may also be engaged with the drill-rope H, when it is desired to give less stroke to the drill-rope H.

The bearings for the crank-shaft D may be of any approved construction, such, for instance, as indicated in Fig. 1, Fig. 6 or Fig. 7, but it is evident that I do not limit myself to any one of the particular constructions shown, as the same can be varied without deviating from my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A well-drilling machine comprising a walking beam, a drill-rope, a spool for the same, a crank-shaft for connection with the walking-beam, a spudding device actuated from the said crank-shaft and connected with the said drill-rope, a brake mechanism connected with the said spool, to hold the latter against turning, and a driving device for unwinding the drill rope from the said spool, connected with the said crank-shaft, the said driving device having a clutch operating in conjunction with the said brake mechanism.

2. A well drilling machine, comprising a walking beam, a crank shaft for connection with the walking beam, a friction wheel on the crank shaft, a spool for a hoist rope, a friction disk on the spool, said spool being movable toward and from the crank shaft whereby to move the friction disk into and out of contact with the friction wheel, a spool for a drill rope, a connection between said spool and the crank shaft for operating said spool, a brake mechanism on the spool shaft, and a link connection between the brake mechanism and the hoist rope spool, whereby the operation of the braking mechanism will move the hoist rope spool toward and from the crank shaft.

3. A well drilling machine, comprising a walking-beam, a crank shaft for connection with the walking-beam, a spool for a hoisting rope, means for connecting the spool to the crank shaft, a spool for a drill rope, a connection between said spool and the crank shaft for operating said spool, a brake mechanism in connection with the spool, and a link connection between the brake mechanism and the hoisting rope spool, whereby the operation of the braking mechanism will operate the means for connecting the hoisting rope spool with the crank shaft.

4. A well drilling machine, comprising a walking-beam, a crank shaft for connection with the walking beam, a friction wheel on the crank shaft, a spool for a hoisting rope, a friction disk on the spool, said spool being movable toward and from the crank shaft whereby to move the friction disk into and out of contact with the friction wheel, a spool for a drill rope, a connection between said spool and the crank shaft for operating said spool, braking mechanism on the spool shaft, and means whereby the operation of the braking mechanism will move the hoist rope spool toward and from the crank shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NELSON DOUGLAS WELLS.

Witnesses:

ROBT. COBB, JR.,  
W. T. BAIRD.