

No. 626,933.

Patented June 13, 1899.

J. REID.
APPARATUS FOR DRILLING WELLS.

(Application filed Feb. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.

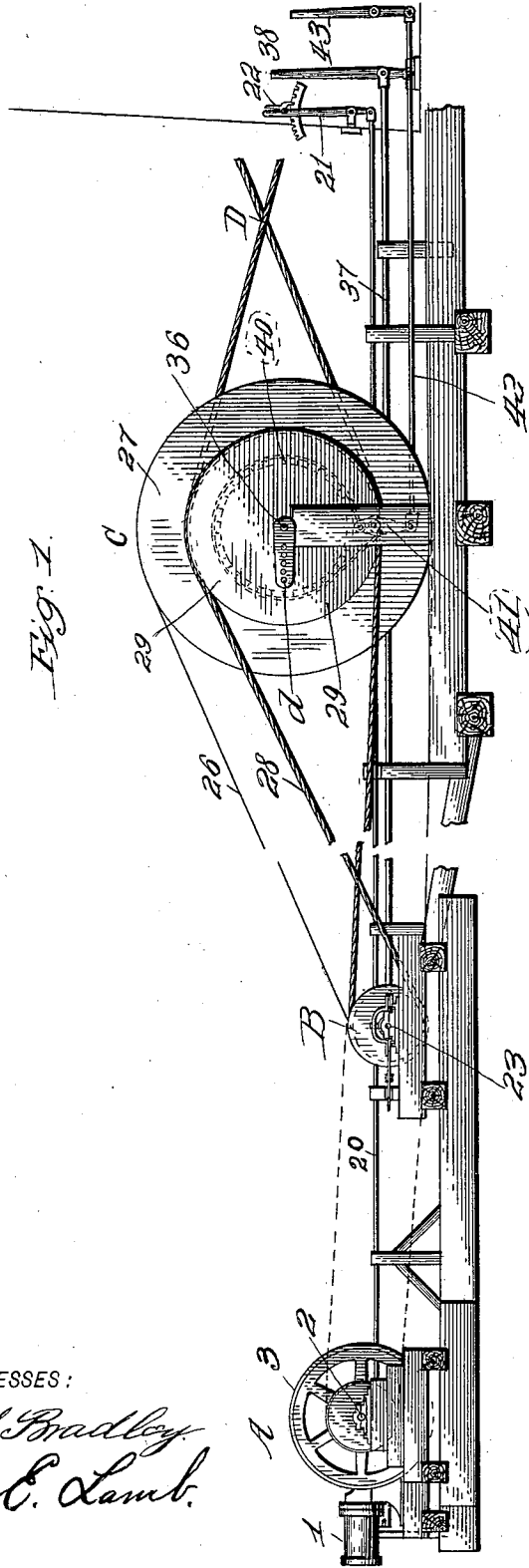


Fig. 1.

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Fig. 2.

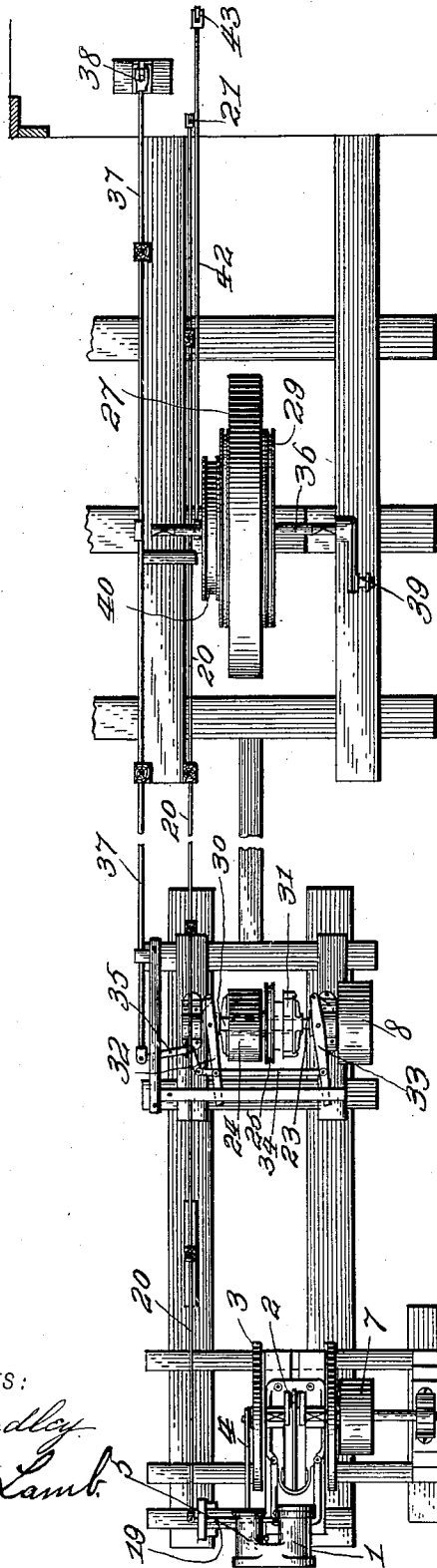
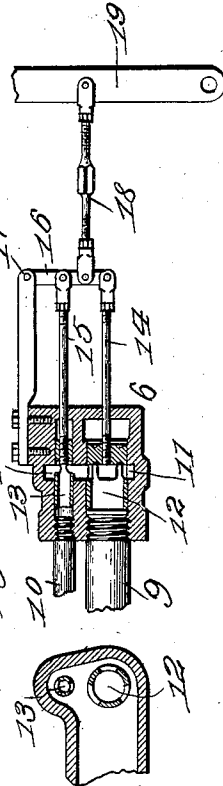


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR DRILLING WELLS.

SPECIFICATION forming part of Letters Patent No. 626,933, dated June 13, 1899.

Application filed February 16, 1899. Serial No. 705,671. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH REID, a citizen of the United States, and a resident of Oil City, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Drilling Wells, of which the following is a specification.

My invention relates to apparatus through the medium of which explosive-engines may be combined with ordinary well-drilling apparatus in a manner to meet all the requirements of the drilling operation and the handling of the tools and performance of other work incident to the operation of deep-well boring. Explosive-engines have not been available for this purpose, owing to the impracticability of readily reversing them or accurately varying their speed at will or stopping or starting. My invention provides means whereby explosive-engines may be used as the source of power employed for performing all of the various kinds of work incident to deep-well drilling.

My invention consists in combining with the ordinary well-drilling rig an explosive-engine, means whereby the speed of the engine may be controlled at will, means whereby the engine may be connected or disconnected with the well-rig or such connections reversed, and a brake for controlling the operation of the well-rig when the driving power is disconnected.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the combined apparatus embodying the features of my invention. Fig. 2 is a plan of the same, and Fig. 3 is a detail view of the valve for controlling the speed of the engine.

A represents the source of power, which is an oil or gas engine.

B is a reversing and disconnecting gear through the medium of which the source of power is connected with the rigging to be operated, and C represents the operating mechanism of the well.

The source of power comprises the cylinder 1, a counter-shaft 2, driven by a piston in said cylinder, a balance-wheel 3, a pitman 4, connected with the balance-wheel and oper-

ating a pump 5 and injecting the explosive fuel into the cylinder 1, and a controlling-valve 6, which regulates the supply of fuel, as will be hereinafter explained. The shaft 2 is further provided with a pulley 7, which is suitably belted to a pulley 8 of the reversing and disconnecting gear B, which is continuously rotated by the explosive-engine. The regulating-valve 6 will be understood upon reference to Fig. 3. It is connected with oil or gas pipe 9 and air-pipe 10, which discharge into a mixing-chamber 11 in quantities and proportions regulated by the valves 12 and 13, whose stems 14 and 15 are connected to a lever 16, fulcrumed at 17, and connected through an adjustable rod 18 with a controlling-lever 19. The valve-rod 15 is nearer the fulcrum of the moving lever 16 than is the valve-rod 14, and the proper proportion between the areas of the openings of the valves 13 and 12 is thereby maintained. As shown in Fig. 3, the valves are regulated by the extent of exposure of their radial discharge openings in the mixing-chamber 11, which extent of exposure is controlled by the position of the valve in the casing. By moving the lever 19 upon its fulcrum the valves 12 and 13 are moved transversely through the mixing-chamber 11, and their ports, through which contents of the pipes 9 and 10 discharge into the chamber 11, are exposed to greater or less extent, and consequently the quantity and proportions of the fuel which enters the chamber 11 and the air to be mixed therewith are accurately determined, and hence the speed of the engine may be regulated at will. Lever 19 is for convenience connected to a rod 20, which extends forward to a point within convenient reach of the operator and is there connected with the lever 21, having a common form of locking-dog 22, by means of which said lever 21, and consequently the valves 12 and 13, may be held in any desired position. The lever 19 is simply substituted upon the engine for the ordinary governor, and may be thus put in place without disarrangement of the parts other than the removal of the governor. The parts are thereby left so that the governor can at any time be readily replaced, and hence this lever 19 and the governor are interchangeable. 23 represents the shaft of the reversing and

disconnecting gear. This shaft has loosely mounted upon it a belt-pulley 24 and a grooved pulley 25, through the medium of which motion is imparted in opposite directions to the drilling-rig. Pulley 24 is connected by a straight belt 26 with the main drive-wheel 27 of the drilling-rig, while grooved pulley 25 is connected by a crossed round belt 28 with a grooved pulley 29 of the same rig.

30 and 31 represent clutches on the shaft 23, which may be respectively brought into engagement with the pulleys 24 and 25 in order to cause either of said pulleys to rotate with the shaft 23. These clutches are controlled by levers 32 and 33, which are connected by a link 34, which is under control of a bell-crank lever 35. By moving the lever 35 in the appropriate direction either of the clutches may be brought into engagement with its pulley and the latter caused to rotate. Inasmuch as the belt 28 is crossed the rotation of the rigging-shaft 36 will vary in direction according to which clutch is moved into engagement with its pulley. To bring the bell-crank lever 35 within convenient reach of the operator, it is connected by means of a rod 37 with lever 38, preferably located adjacent to the speed-controlling lever 21.

D represents the band or belt through which the rig-shaft 36 performs its work. This band is understood to extend to apparatus commonly employed for controlling the winding-drum or other means employed for running the tools up and down or for operating the sand-pump. Said shaft 36 is also provided with the crank 39, which may be connected to the walking-beam for operating the tools when in position and which requires no further description here. If the clutches 30 and 31 are allowed to rest in an intermediate position, both the pulleys 24 and 25 will be loose upon the shaft 23 and the shaft 36 will rotate under gravity of the tools or other load carried by the rigging which is being operated. To facilitate the running down of the tools, the shaft 36 is further provided with a brake-wheel 40, the band of which (shown in dotted lines in Fig. 1) is connected in the usual manner to a binding-lever 41, which in turn is connected by a rod 42 with a controlling-lever 43, adjacent to the levers 21 and 38.

With an arrangement as above described I am enabled to employ a constantly-running explosive-engine, to connect or disconnect the same at will with a well-drilling rig, to regulate the speed of the engine at will, to reverse the connections with the well-drilling rig, to permit the well-drilling rig to run by gravity during disconnection, and to control the last-named movement, all by means located within convenient reach of a single operator. I have therefore provided means whereby a constantly-running explosive-engine may be used for performing all of the work incident to drilling deep wells, while the

operation is completely under control of the operator, as in the use of ordinary steam-engines for the purpose.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In combination with a well-drilling rig, a constantly-running explosive-engine, means whereby said engine may be at will connected, disconnected, or reversed in its connections with the drilling-rig, a speed-controlling valve for regulating the admission of explosive material to the engine, whereby the speed of the engine may be regulated at will, a manually-controlled and positively-actuated lever and rod connection for controlling said valve extending to the derrick-floor, and means for controlling the connecting and reversing mechanism, also extending to points where they are simultaneously within reach of the operator; substantially as set forth.

2. The combination of a drilling-rig shaft having independent pulleys and a brake-wheel, a clutch-shaft having loose pulleys and a clutch for connecting either of said pulleys with the shaft, reverse connections between the clutch-shaft pulleys and the pulleys on the drilling-rig shaft, an explosive-engine provided with a speed-regulating valve, and having driving connection with the clutch-shaft, and controlling-levers connected respectively to the brake and the reversing-clutch and to the speed-regulating valve; substantially as and for the purposes set forth.

3. In combination with the shaft of a well-drilling rig, pulleys upon said shaft for driving it in opposite directions, a clutch-shaft having loose pulleys with reversed connections to the rig-shaft pulleys, an explosive-engine which is provided with governor-valves, and is connected to the clutch-shaft, a lever substituted for the governor and connected with the governor-valve stem, and suitable controlling-levers within the reach of the operator respectively connected with the reversing-clutch and with the governor-valve lever; substantially in the manner and for the purposes set forth.

4. The combination of the drilling-rig shaft 36 having the pulleys 27 and 29, and the brake-wheel 40 provided with the brake-band, the shaft 23 having independent pulleys 24, 25 loosely mounted thereon and respectively connected by straight belt 26 and cross-belt 28 with the pulleys 27 and 29 on shaft 36, a constantly-running explosive-engine connected with the shaft 23, clutches whereby either of the pulleys 24, 25 may be made to rotate with the shaft 23, or both left loose thereon, and means substantially as described whereby the brake-band and the clutches are under control of the operator; substantially as explained.

5. In combination with a well-drilling rig, the reversely-connected independent pulleys for driving said rig in opposite directions,

the constantly-running explosive-engine connected with the shaft of said pulleys, clutches controlling the respective reversely-connected pulleys, the levers 32, 33 for controlling the respective clutches, the link 34 connecting said levers, bell-crank lever 35 for controlling the levers, and the rod 37 connected to the operating-lever 38; all substantially as and for the purposes set forth.

6. In combination with a well-drilling apparatus, an explosive-engine connected with said apparatus through the medium of suitable reversing-gear, and a governor-valve controlling the speed of the oil-engine and

having operating connections, rods 15 and 14 controlling said valves, the fulcrumed lever 16 to which said rods are connected and controlling connections comprising suitable levers within the reach of the operator, and connections between the respective levers and the governor-valve lever and the reversing-clutch; substantially as and for the purposes set forth.

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Witnesses:

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