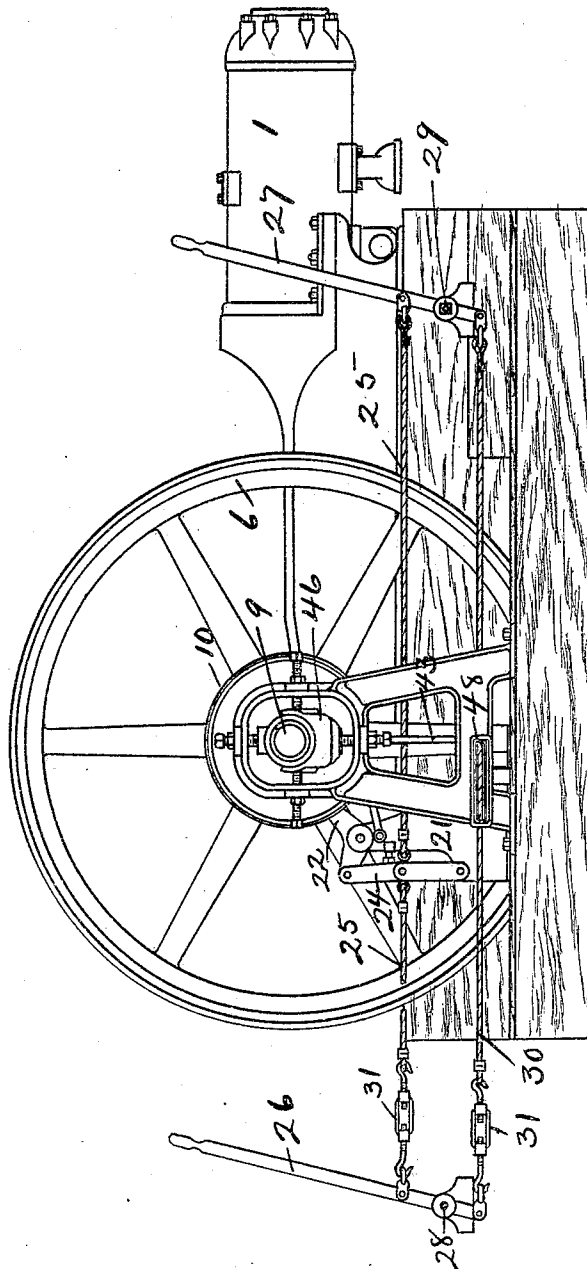


E. J. FITHIAN & H. D. MURRAY.
 APPARATUS FOR DRILLING AND OPERATING WELLS.
 APPLICATION FILED SEPT. 9, 1907.

940,589.

Patented Nov. 16, 1909.
 5 SHEETS—SHEET 1.

Fig. 1.



Witnesses
 John Miller
 C. B. Eagles

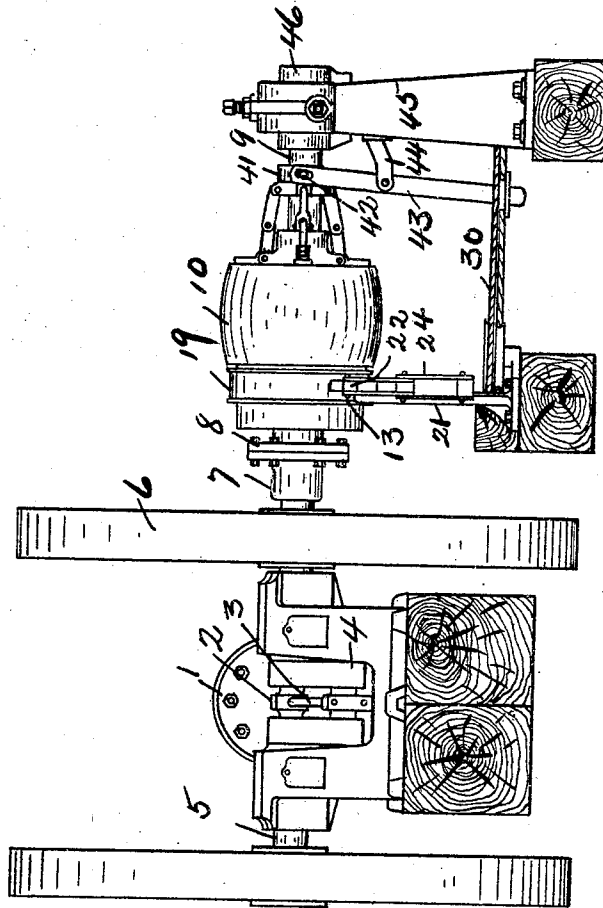
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Fig. 2.



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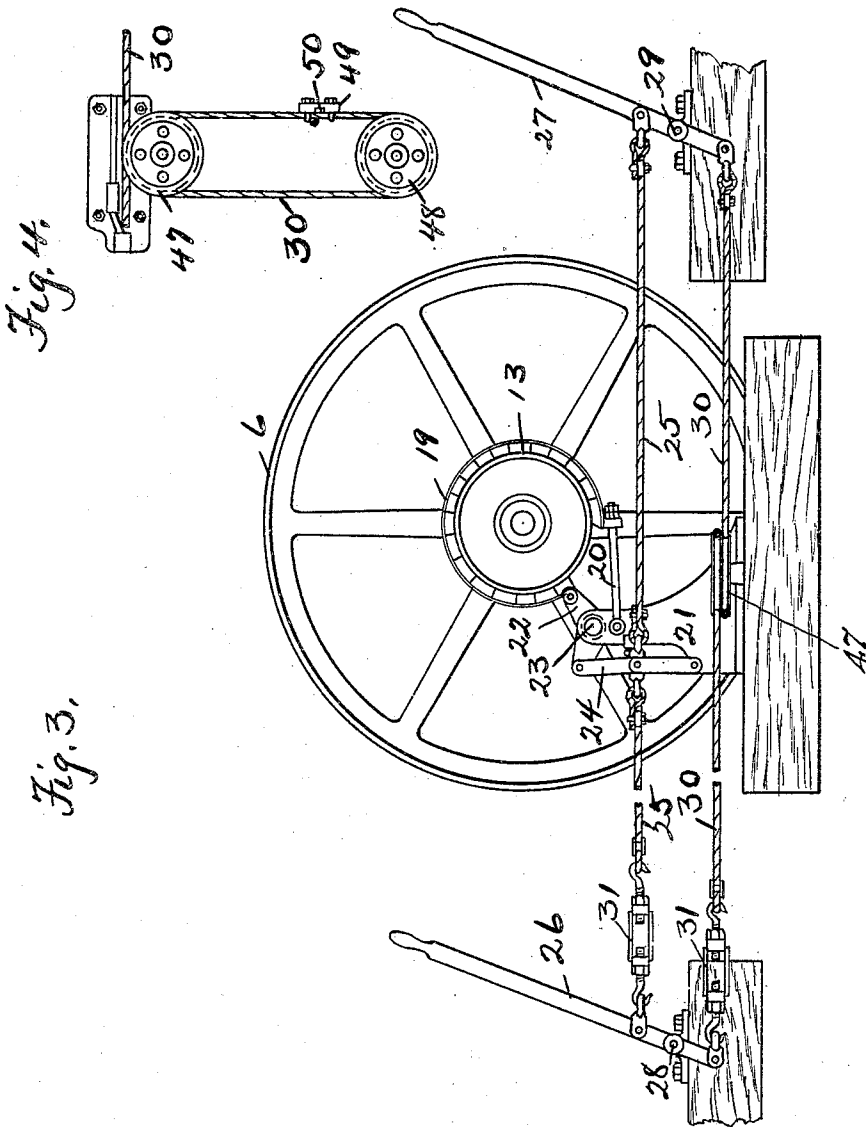
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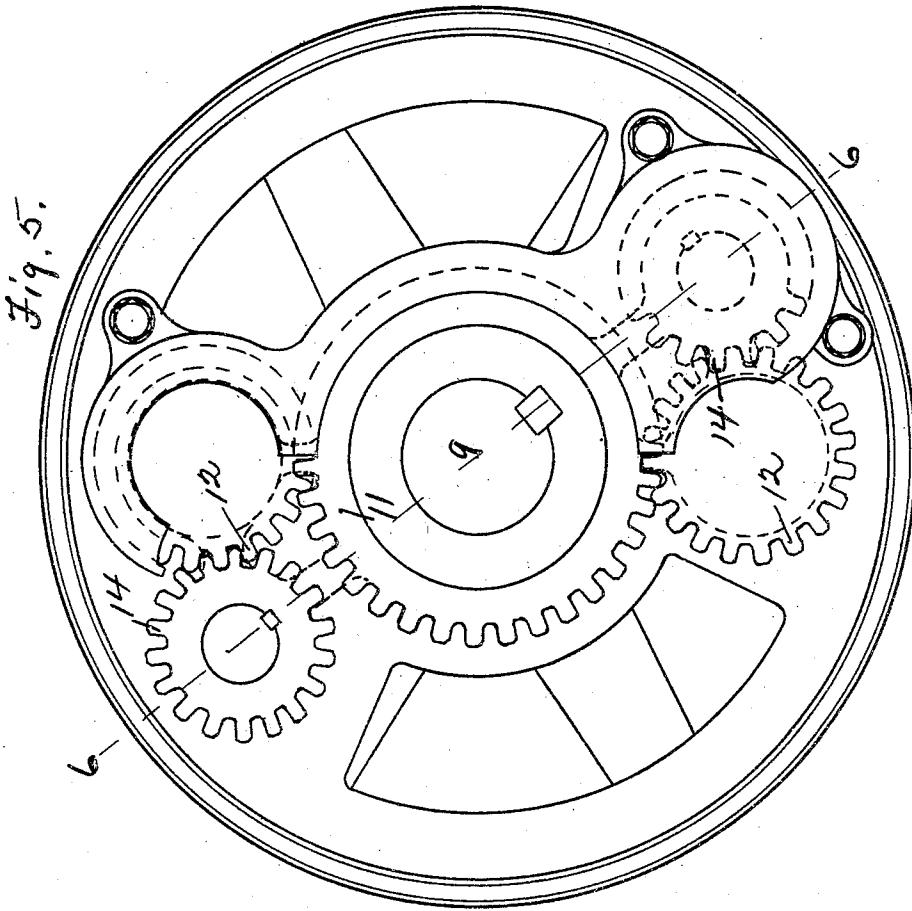
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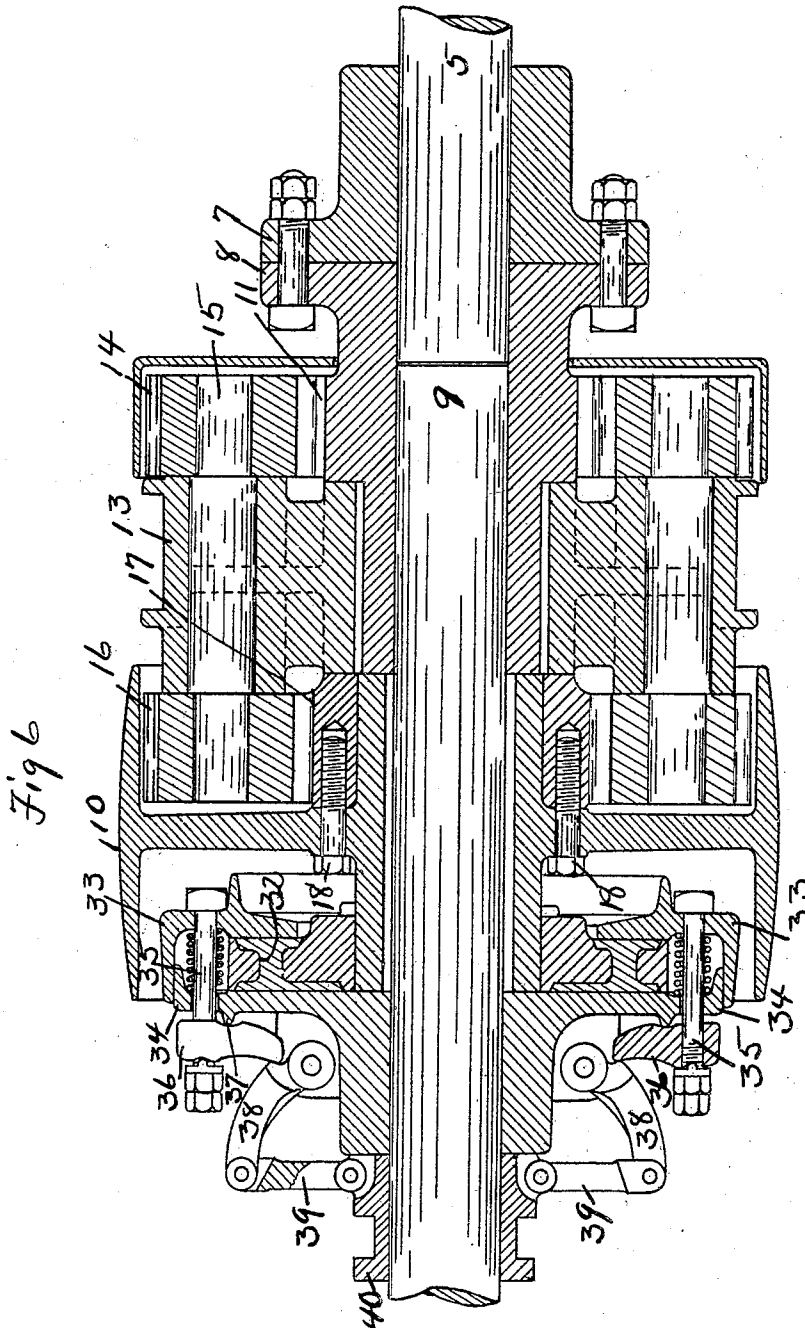
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

EDWIN J. FITHIAN AND HARRY D. MURRAY, OF GROVE CITY, PENNSYLVANIA, ASSIGNORS TO BESSEMER GAS ENGINE COMPANY, OF GROVE CITY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR DRILLING AND OPERATING WELLS.

940,589.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed September 9, 1907. Serial No. 391,853.

To all whom it may concern:

Be it known that we, EDWIN J. FITHIAN and HARRY D. MURRAY, citizens of the United States, residing at Grove City, in the county of Mercer and State of Pennsylvania, have invented new and useful Improvements in Apparatus for Drilling and Operating Wells, of which the following is a specification.

This invention relates to apparatus for drilling and operating wells and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

The object of the invention is to provide a simple and efficient apparatus for controlling a well drilling rig which is driven by an explosive engine. It is not feasible with engines, such as ordinarily made, to reverse the engine itself as frequently as it is necessary to reverse the movement of the well drilling rig and to avoid this a reversing clutch has been interposed between the engine and the driving mechanism of the rig so that the movement of the driving mechanism might be reversed without reversing the engine. It is necessary in the drilling and operation of a well to be able to control the rig from a distance. As ordinarily constructed, the engine and drilling rig are some distance from the derrick floor and some controlling mechanism is necessary on the derrick floor so that the driller or the person operating the well may control the rig from this point. These devices are, from the nature of things, installed on all kinds of settings so that it is desirable to have this controlling means as flexible as possible to permit of its installation under varied conditions. To effect this result we have introduced into the controlling mechanism a cable for communicating the movement from the controlling levers at the derrick to the reversing clutch.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a side elevation of the engine with a drilling rig attached. Fig. 2 an end elevation of the same. Fig. 3 a side elevation of the reversing clutch, some of its parts being removed to better show construction. Fig. 4 a plan view of the cable guiding devices. Fig. 5 an end view of the

reversing clutch, a part being removed. Fig. 6 a section on the line 6—6 in Fig. 5.

1 marks the engine cylinder; 2 the piston rod; 3 the pitman; 4 the crank; 5 the crank shaft, and 6 the fly wheel of the explosive engine. These may be of any desired construction. A coupling flange 7 is secured to the crank shaft and coupling flange 8 on the rig shaft 9 is secured to the flange 7. The shaft 9 is fixed on the hub of the flange 8 so that the rig shaft is driven at all times with the engine shaft.

Any of the well known reversing clutches may be used. As shown a gear 11 is arranged on the hub of the flange 8. This drives the intermediate gear 12 which is mounted on a ring 13 and gear 12 meshes a gear 14; gear 14 is fixed on shaft 15 and shaft 15 is journaled on the ring 13. The ring 13 is rotatively mounted on the shaft 9. The gear 16 is fixed on the opposite end of the shaft from the gear 14. Gear 16 meshes a gear 17 on the belt or driving wheel 10, said gear 17 being fixed on the wheel 10 by means of the bolts 18. The wheel 10 is rotatively mounted on the shaft 9. A band brake 19 is arranged to operate on the ring 13. One end of the band brake is anchored by means of the link 20, the link 20 being mounted on an upright 21. The opposite end of the band brake is connected to a bell crank lever 22. Lever 22 is mounted on a stud 23, and the stud 23 is secured to the upright 21. A toggle lever 24 is connected to the bell crank lever and the upright 21. By operating the toggle lever the band brake 19 is thrown into and out of engagement with ring 13 so as to lock it against movement, or to permit it to run freely as desired.

When it is desired to set the reverse part of the clutch the toggle lever is operated so as to throw the band brake 19 into engagement with ring 13. This locks the ring 13 against movement so that the action of the gears 11, 12, 14, 16, and 17 will drive the pulley 10 in a reverse direction from that of the shaft 9 in a manner common to reversing clutches of this type.

A cable 25 extends from the intermediate point in the toggle lever 24 to the lever 26 on the derrick floor and the lever 27 at some convenient point about the engine.

Lever 26 is pivotally mounted at 28 and the lever 27 is pivotally mounted at 29. A cable 30 connects the lower ends of the levers 26 and 27. Turn buckles 31 are provided for the cables 25 and 30 so that they may be kept caught. It will be noted as the levers 26 and 27 are thrown in either direction, both cables 25 and 30 are moved regardless of the direction in which the levers are moved. This is effected by having the double connected cables so mounted that the pulling of one cable compels the other cable to move in an opposite direction, as shown by the levers 26 and 27. It will readily be observed that one of the levers may be dispensed with and any desirable mechanism for connecting the cable used.

The direct drive of the clutch may be effected by any ordinary clutch, preferably a friction clutch. As shown the friction plate 32 is fixed on the hub of the pulley 10. Friction flanges 33 and 34 are arranged to operate on the opposite faces of the friction plate 32, and bolt 35 extends through the said flanges and the lever 36 is fulcrumed on a lug 37 extending from the flange 34 so as to exert pressure on the bolt, the flange 34 drawing the flanges 33 and 34 toward each other and into engagement with the friction plate 32. Levers 38 are arranged to operate on the levers 36 and the levers 38 are actuated by the levers 39 acting as a toggle with the sliding sleeve 40 forming an intermediate bearing for the links of the toggle. A ring 41 is mounted on the sleeve 40. It is locked against axial movement thereon but free to rotate with relation to the sleeve 40. Pins 42 extend from the ring and are engaged by the lever 43, the lever 43 is fulcrumed on a bracket 44 extending from the upright 45. The upright 45 carries a bearing 46 for the shaft 9.

The cable 30 extends around the double sleeve 47 (see Fig. 4), and around the single sleeve 48. A block 49 is clamped on a cable. This block has a slot 50 through which lever 43 extends. It will readily be observed as the cable 30 is moved the lever 43 is moved with it. By following the movement of the cables 25 and 30, it will be noted as cable 25 throws the toggle lever to move the band brake 19 out of engagement cable 30 moves to carry the lever 43 toward the clutch to throw the direct driving clutch into engagement. There is sufficient movement of the band brake and

driving parts of the clutch to permit of the levers 26 and 27 being placed at a neutral point, at which point neither is in engagement so that the engine may run without driving the rig in either direction. By the use of this cable connection with the controlling mechanism we are enabled to set the levers at any desired point that is most convenient and can lead the cables from said levers to said controlling means in a very simple and efficient manner.

What we claim as new is:

1. In a well drilling rig, the combination of an engine; a reversing clutch actuated by the engine; actuating devices for said clutch, one of said devices moving in a direction parallel to the axis of the clutch and the other at right angles to the axis of the clutch; a cable for actuating said devices, said cable having a portion extending in a direction at right angles to the axis of the clutch connected with the device operating at right angles to the axis of the clutch, and a portion in a direction parallel to the axis of the clutch and connected with the device moving in a direction parallel to the axis of the clutch; and guiding means for the cable.

2. In a well drilling rig, the combination of an engine; a reversing clutch actuated by the engine; actuating devices for said clutch, one of said devices moving in a direction parallel to the axis of the clutch and the other at right angles to the axis of the clutch; a cable for actuating said devices, said cable having a portion extending in a direction at right angles to the axis of the clutch connected with the device operating at right angles to the axis of the clutch in two lines one above the other, and a portion connected with the device moving in a direction parallel to the axis of the clutch; and guiding means for the cable comprising a double sheave pulley at the meeting point of the divergent portions of the cable and a sheave pulley located to give a portion of the cable a direction parallel to the axis of the clutch.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

EDWIN J. FITHIAN.
HARRY D. MURRAY.

Witnesses:

ERWIN J. McCURDY,
J. C. PORTER.