March 7, 1933. H. LEDEEN 1,900,452

DRIVING MEANS FOR OIL WELL EQUIPMENT

Filed Aug. 18, 1931 2 Sheets-Sheet 1

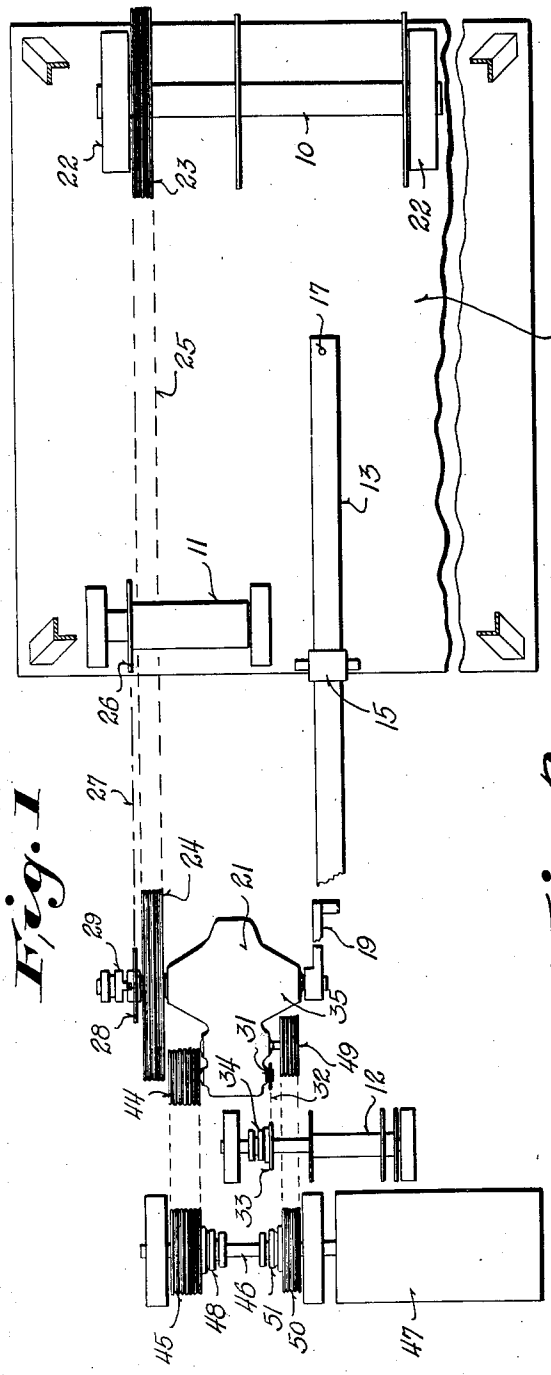

Fig. 1

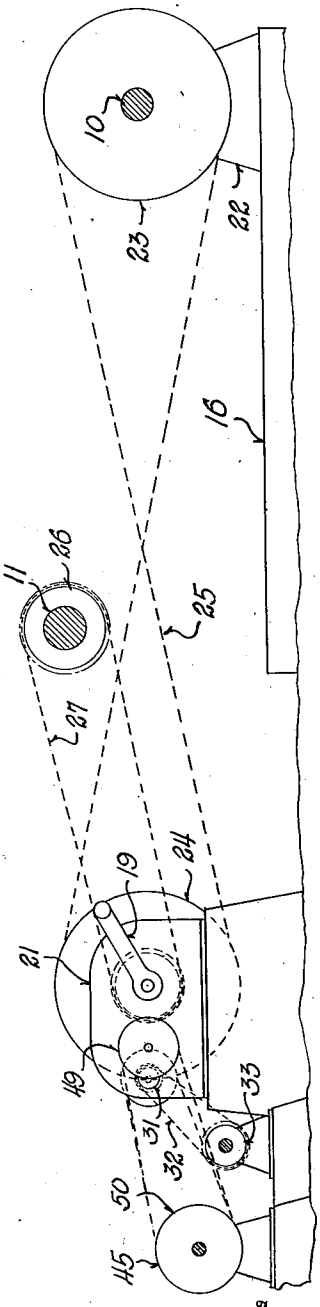

Fig. 2

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DRIVING MEANS FOR OIL WELL EQUIPMENT

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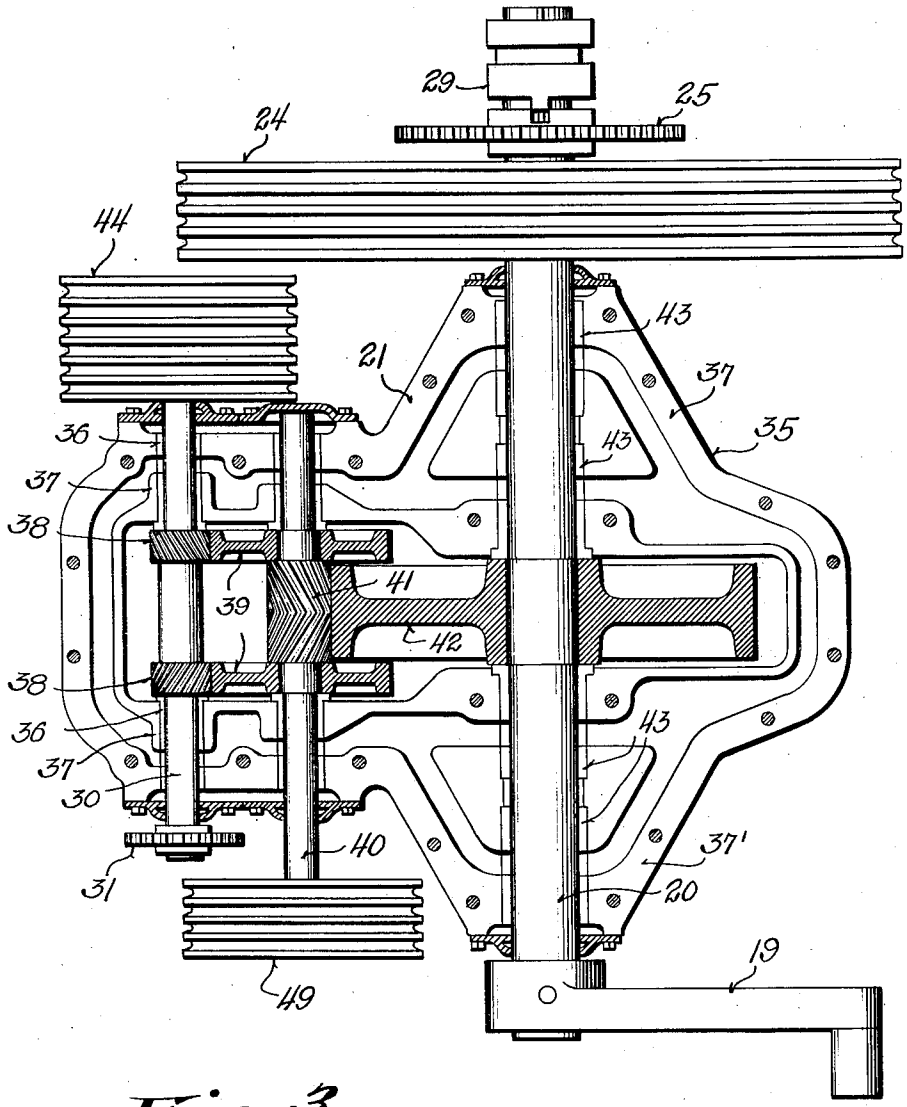

Fig. 3

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UNITED STATES PATENT OFFICE

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DRIVING MEANS FOR OIL WELL EQUIPMENT

Application filed August 18, 1931. Serial No. 557,841.

This invention relates to oilwell equipment and particularly to a driving system therefor.

A complete oilwell equipment ordinarily includes a bull wheel, a calf wheel, and a sand reel, which are used from time to time for drilling and maintaining the well, and which are ordinarily disposed beneath or about a derrick erected over the well, together with a crank driven walking beam for operating the pump. These several devices heretofore have been variously operated by large cumbersome machinery which is difficult and expensive to install and maintain and which occupies much valuable ground space about the derrick.

One object of the present invention is the provision of a simple, compact, and relatively inexpensive driving means for effectively and efficiently operating the several devices ordinarily included in a complete oilwell equipment. This I have accomplished by the use of a speed reducer of a well known type and by a novel arrangement of the several devices by which they may be driven by belts or otherwise from the several shafts ordinarily included in the speed reducer. Since the several speed reducer shafts rotate at different speeds each device may be driven at a speed most appropriate for efficient operation.

Another object is the provision in a drive system of the character mentioned of a simple means for reversing the direction of operation of the speed reducer to thereby reverse the operation of the several devices operated thereby.

Other more specific objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the accompanying drawings:—

Fig. 1 is a diagrammatic plan view of an oilwell equipment including a drive system embodying the present invention.

Fig. 2 is a side elevation.

Fig. 3 is a plan view, on a larger scale, of the speed reducer included in Figs. 1 and 2, and showing the same with the cover removed.

The oilwell equipment shown in Figs. 1 and 2 includes a bull wheel 10, calf wheel 11, sand reel 12, and walking beam 13, all of conventional design.

The walking beam 13 is rockably supported upon the usual Sampson post 15 at one side of the derrick floor 16 with its inner end 17 centrally disposed directly over the well. The outer end 18 of the walking beam is connected through the usual link (not shown) to an operating crank 19 which in this instance is keyed or otherwise fixed to one end of a low speed shaft 20 of a speed reducer 21.

The bull wheel 10 is mounted upon appropriate uprights 22 at that side of the derrick floor 16 opposite the walking beam 13, and is driven in this instance by a large grooved pulley 23 aligned with a similarly grooved driving pulley 24 carried by that end of shaft 20 opposite the crank 19. The two pulleys are operatively connected by a type of belting 25 commercially known as drive ropes and comprising a plurality of relatively narrow wedge shaped belts respectively engaged in the several pulley grooves. This belting is preferably crossed, as indicated in Fig. 2.

The calf wheel 11 in this instance is mounted in elevated position over the belting 25, as indicated in Fig. 2, and is driven by a sprocket wheel 26 connected through a chain 27 with a driving sprocket 28 loosely mounted on the shaft 20 adjacent the pulley 24. A jaw clutch 29 of a well known type provides a releasable driving connection between the sprocket 28 and shaft. By thus mounting the calf wheel 11 above the belting 25 all possible interference is eliminated and by crossing the belting, as indicated, the calf wheel need not be elevated to such a height as would otherwise be required.

The sand reel 12 is mounted adjacent the speed reducer 21 and rearwardly thereof, and is driven in this instance by the high speed shaft 30 of the speed reducer through a sprocket 31 fixed to one end of shaft 30 and connected through a chain 32 with a sprocket 33 on the sand reel. The sand reel is controlled by an appropriate friction clutch 34 of a well known type, operable to effect a releasable driving connection between the sprocket 33 and reel.

The speed reducer shown at 21 comprises

a high speed shaft 30 extending transversely through a casing 35 and journalled in extended bearings 36 rigidly supported in wide flanges 37 at opposite sides of the casing. Shaft 30 carries a pair of helical pinions 38 of opposite pitch which mesh, respectively, with a pair of mating helical gears 39 carried by an intermediate shaft 40 disposed parallel to the shaft 30 and journalled in a similar manner. Shaft 40 is thus normally driven by shaft 30 at a slower intermediate speed and in a direction opposite to that of shaft 30. Shaft 40 carries a double-helical pinion 41, disposed between the gears 39, and meshing with a double-helical gear 42 on the low speed shaft 20, through which shaft 20 is driven at a further reduced speed but in the same direction as shaft 30. In this instance those portions 37′ of the casing flanges in the vicinity of the shaft 20 are laterally extended to afford rigid supports for the pairs of double bearings 43 in which the shaft 20 is journalled, in order to sustain the severe transverse loads imposed by the crank 19, pulley 24, and sprocket 28.

The speed reducer is normally driven in one direction by a grooved pulley 44, fixed to that projecting end of shaft 30 opposite the sprocket 31, and operatively connected preferably through Texrope belting to a similarly grooved pulley 45, loosely mounted on shaft 46 driven by appropriate means such as an internal combustion engine 47. The pulley 45 is controlled by a clutch 48, preferably of the friction type, which is operable to make and break a driving connection between the shaft 46 and pulley.

Provision is also made for driving the speed reducer in the opposite direction and preferably at a higher speed. This is accomplished in this instance by mounting a pulley 49 on the end of the intermediate speed shaft 40 and by connecting this pulley through appropriate belting, preferably of the Texrope type, to a second pulley 50 loosely mounted on the shaft 46. Pulley 50 is controlled by a clutch 51, similar to clutch 48. The arrangement is such that, when clutch 48 is closed and clutch 51 open, the speed reducer and devices actuated thereby are driven by shaft 46 in one diretion, and when clutch 48 is open and clutch 51 closed the speed reducer and connected devices are driven at an increased speed in the opposite direction.

It will thus be noted that a simple, compact, and efficient driving means has been provided by which the several devices ordinarily included in a complete oilwell equipment may be operated at appropriate speeds and in either direction by power derived from a single prime mover.

Various changes may be made in the embodiment of the invention hereinabove specifically described without departing from or sacrificing the advantages of the invention as defined in the appended claims.

I claim:—

1. In oilwell equipment the combination of a bull wheel, a calf wheel, a walking beam, a sand reel, a speed reducer comprising a casing, a high speed shaft journalled in said casing, an intermediate speed shaft journalled in said casing, a low speed shaft journalled in said casing, and a train of gears within said casing operatively connecting said shafts, a crank on one end of said low speed shaft for driving said walking beam, means on the other end of said low speed shaft for driving said bull wheel and said calf wheel, means on said high speed shaft for driving said sand reel, a unidirectional drive shaft, a releasable driving connection between said drive shaft and said high speed shaft, a releasable driving connection between said drive shaft and said intermediate speed shaft, and means operable to render either of said driving connections effective, selectively, to thereby drive said speed reducer in either direction.

2. In oilwell equipment the combination of a bull wheel, a calf wheel, a walking beam, a speed reducer comprising a casing, a high speed shaft journalled in said casing, an intermediate speed shaft journalled in said casing, a low speed shaft journalled in said casing, and a train of gears in said casing operatively connecting said shafts, a crank on one end of said low speed shaft for driving said walking beam, means on the opposite end of said low speed shaft for driving said bull wheel and said calf wheel, and driving means selectively operable on said high speed shaft or on said intermediate speed shaft to drive said speed reducer in either of two directions.

3. The combination with oilwell operating equipment of means for driving the same comprising a speed reducer having a casing and intergeared high, intermediate, and low speed shafts journalled in said casing, a drive shaft, a releasable driving connection between said drive shaft and said high speed shaft, a separate releasable driving connection between said drive shaft and said intermediate shaft, and means operable to render either of said driving connections effective.

In witness whereof, I hereunto subscribe my name this 20 day of July, 1931.

HYMAN LEDEEN.