March 30, 1926. 1,578,341

T. S. MILLER

HOISTING ENGINE

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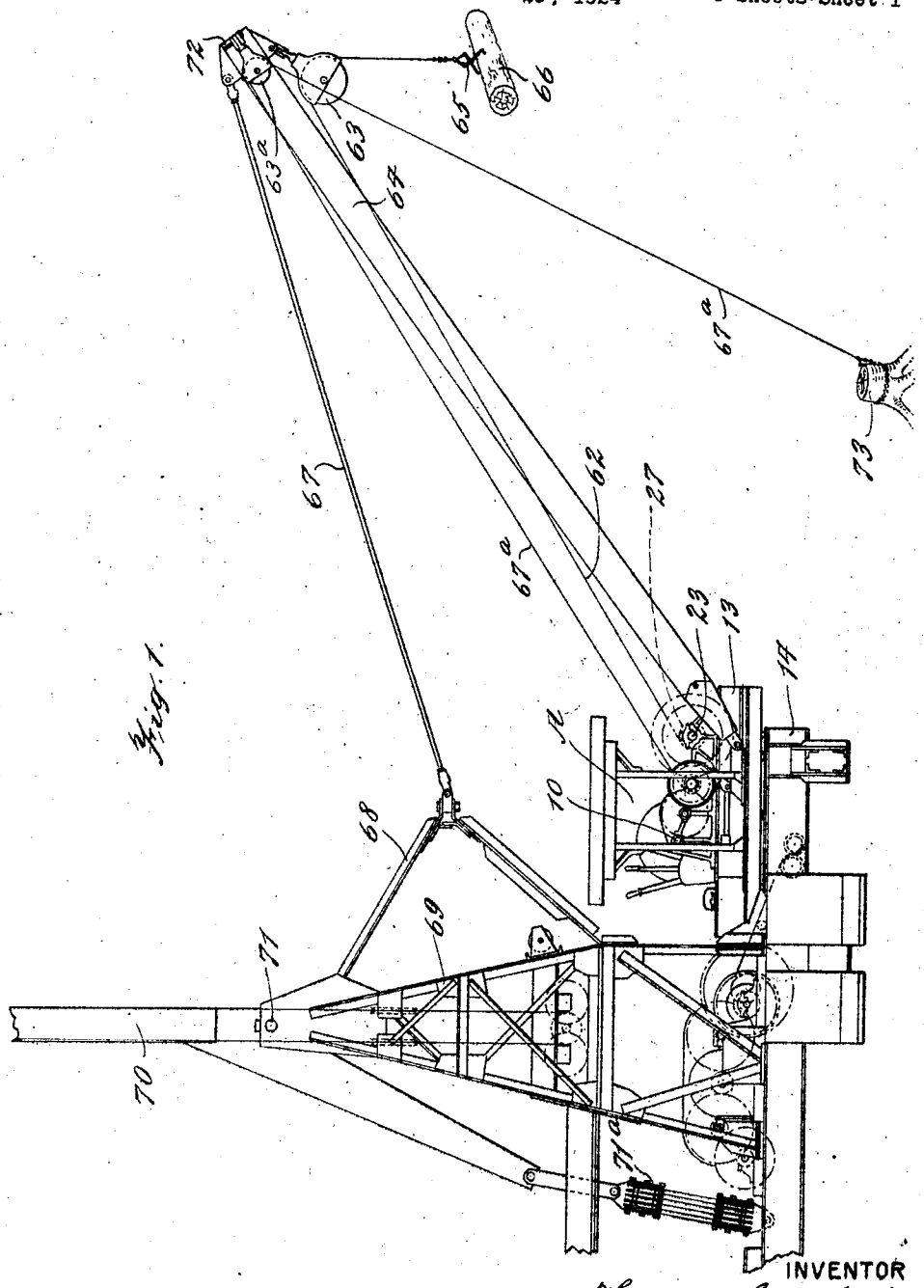


Fig. 1.

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Fig. 2.

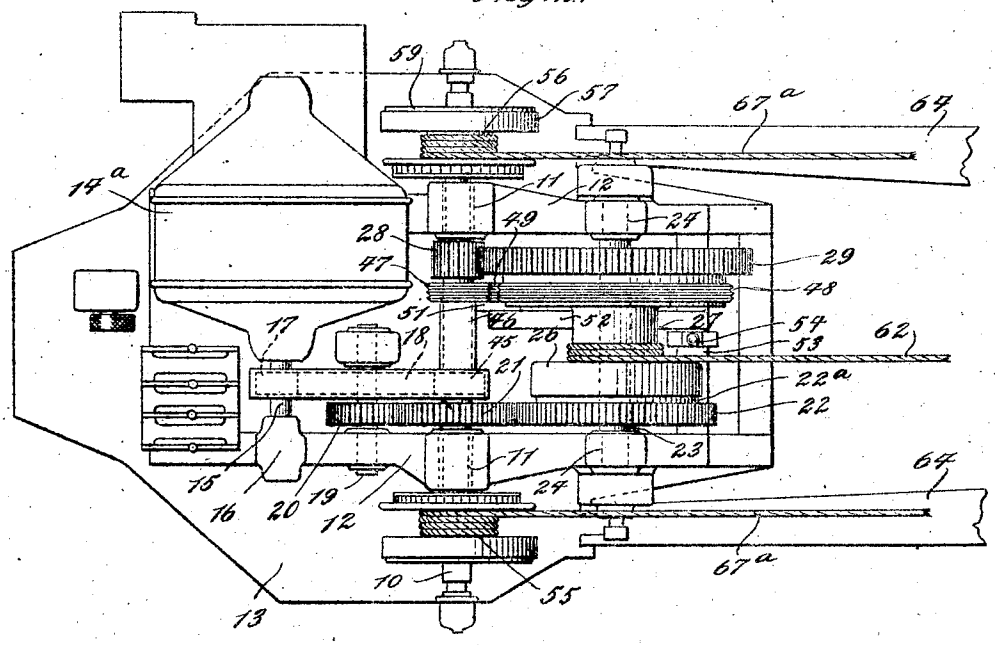
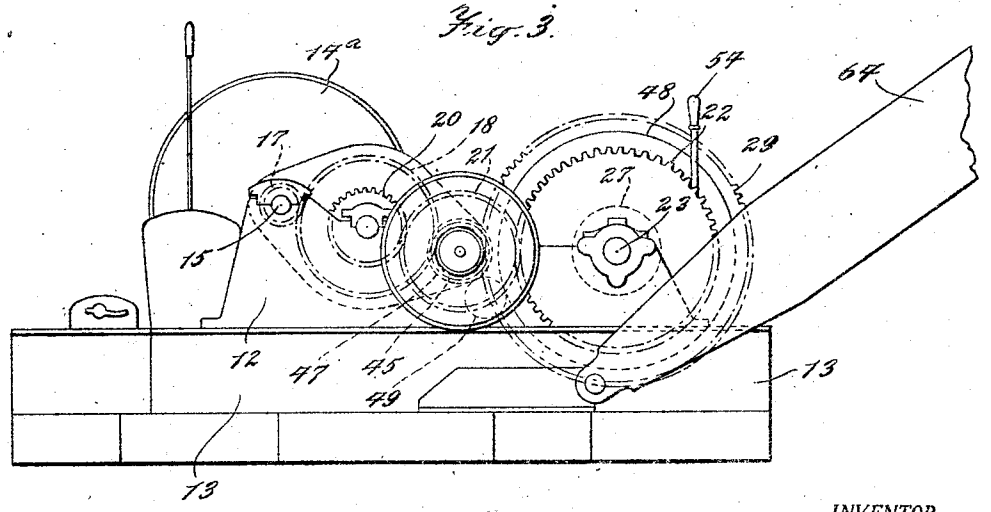


Fig. 3.



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Fig. 4.

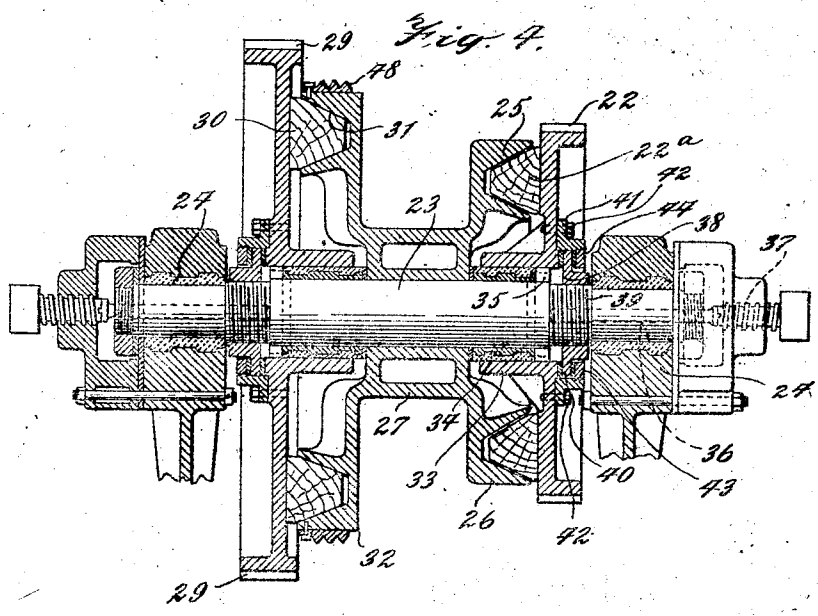


Fig. 5.

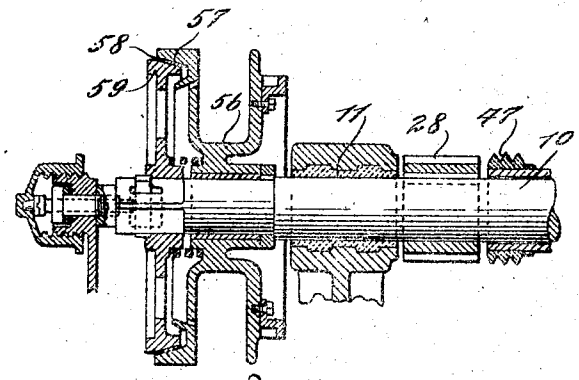
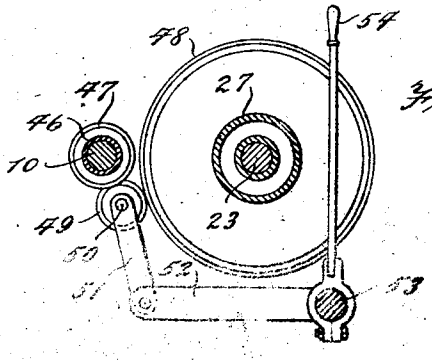


Fig. 6.



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Patented Mar. 30, 1926. 1,578,341

UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

HOISTING ENGINE.

Application filed December 23, 1924. Serial No. 757,588.

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, a citizen of the United States, residing at South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Hoisting Engines, of which the following is a specification.

My invention consists of certain novel parts and combinations of parts, particularly pointed out in the claims.

The following is a description of a hoisting engine embodying my invention in the form at present preferred by me, but it will be understood that various modifications and changes may be made therein without departing from the spirit of my invention and without exceeding the scope of my claims.

My invention will best be understood by reference to the accompanying drawings, in which Fig. 1 is a side view of a skidding and loading engine in connection with which my invention may be used; Fig. 2 is a plan view of the loading engine; Fig. 3 is a side view of Fig. 2; Fig. 4 is a longitudinal section through the main drum and associated parts; Fig. 5 is a fragmentary longitudinal section through one of the spaced drums used for swinging the loading boom and Fig. 6 is a view illustrating the operating mechanism for the idler.

Like reference characters indicate like parts throughout the drawings.

Referring now to the drawings, 10 is a main drive shaft extending across the hoist and having its bearings at 11—11 in standards 12—12, mounted on the main frame 13, which is illustrated in Fig. 1 as a turntable and in turn mounted on the bed frame 14. The main drive shaft 10 is operated, in the form illustrated, by an electric motor 14^a, suitably mounted on the frame 13 and provided with a shaft 15, one of the bearings of which as indicated at 16 (Fig. 2). On the shaft 15 of the motor is fixedly mounted a driving pinion 17 which meshes with a gear 18 keyed on a counter shaft 19, to which is also keyed a pinion 20 which meshes with and drives a gear 21 fixed on the shaft 10. The gear 21 drives a gear 22 loosely mounted on the drum shaft 23, having its bearing at 24 in the standards 12. The gear 22 is provided on its inner face with an annular conical friction member 22^a, the conical friction surface of which engages a complementary conical friction surface 25 on one of the flanges 26 of the main drum 27, mounted on the drum shaft 23. Keyed on the drive shaft 10 is also a driving pinion 28, which engages a gear 29 loosely mounted on the drum shaft 23, and which is provided with a cone friction member 30, engaging a complementary friction member 31 on the flange 32 of the main drum 27. It will be noted that the gear ratio between the gears 21 and 22 is higher than that between the gears 28 and 29, so that when the drum 27 is forced into engagement with the friction gear 22, by means which will hereinafter be described, the drum is driven forwardly at a relatively high speed, whereas when it is forced into engagement with the friction gear 29, it is also driven forwardly but at a relatively low speed.

Each of the gears 22 and 29 while free to revolve on the drum shaft 23 is preferably prevented from longitudinal movement therealong, though they are preferably adjustable thereon. The gear 22 is preferably provided with a hub 33 between which and the shaft 23 is preferably interposed a friction bearing sleeve 34. The sleeve 34 is preferably engaged by a cross key 35, located in an elongated slot extending transversely through the drum shaft 23 in a well-known manner. The key 35 is engaged by a pin 36 located in an opening arranged longitudinally of the axis of the shaft and the outer end of which is engaged by a screw member 37, the rotation of which in a manner well known in the art moves the pin 36 longitudinally of the shaft and forces the key 35 against the sleeve 34, which sleeve, in turn, engages the drum 27 to force the same into engagement with the friction member 30 on the gear 29. Inasmuch as the means associated with the gear 29 for forcing the drum 27 to the right, as viewed in Fig. 4 are, or may be, the same as those described in connection with the gear 22, the description of one will suffice for both.

The gear 22 is prevented from moving longitudinally of the shaft 23 by means of an annular thrust resisting member 38, which is screw-threaded on and adjustably

secured to a screw-threaded portion 39 of the shaft. The thrust resisting member 38 is provided with an outwardly extending flange 40, the opposite faces of which form bearings with a part secured to or forming a part of the gear 22. To the gear 22 is preferably secured an annular member 41, as by bolts 42. The inner surface of the member 41 is screw-threaded at its outer portion as at 43 and receives a screw-threaded ring 44 between which and one face of the flange 40 of the thrust resisting member 38 a bearing is formed, while the opposite side thereof engages the hub of the gear 22, suitable washers preferably being interposed between the flange 40 of the thrust resisting member and the rings 44 and the hub of the gear 22, respectively. As the means for adjustably securing the gear 29 longitudinally of the shaft 23 are, or may be, the same as those described in connection with the gear 22, they will not be specifically described.

The gear 18 which is mounted on the shaft 19 engages a pinion 45 fixed on a sleeve 46, which is loosely mounted on the main drive shaft 10. Means are provided for driving the main drum 27, from the sleeve 46 in the reverse direction and at a higher rate of speed than that at which it is driven forwardly by the gears 21 and 28. In the arrangement illustrated, the gear ratio between the gear 18 and pinion 45 is higher than that between the pinion 20 and the gear 21, so that the sleeve 46 is rotated at a higher speed than is the shaft on which it is mounted, and in the same direction. In the form illustrated, the sleeve 46 is provided with a V-shaped friction member 47. The drum 27 is also provided with a corresponding V-shaped friction member 48 spaced from the friction member 47 on the sleeve. The friction member 48 is preferably brought into operative relation to the friction member 47 by an idler friction member 49 (see Fig. 6), pivoted at 50 on the end of an arm or arms 51, which is, in turn, pivoted to the end of an arm 52, fixed on a shaft 53. The shaft 53 may be rotated by a manually-operated lever 54 to bring the idler 49 into engagement both with the friction members 47 and 48. The idler 49 is preferably removed from operative relation to the friction members 47 and 48 by lowering it away from the friction member 48 and still permitting it to rest by gravity against the friction member 47, so that the idler is continously in engagement with the friction member 47.

Friction drums 55 and 56 are also preferably mounted on the overhung ends of the main driving shaft 10; that is to say, these friction drums are mounted on the ends of the shaft 10 beyond the bearings 11—11, and in the form illustrated, are used for swinging a loading boom laterally. Each of the drums 55 and 56, one of which is fully illustrated in Fig. 5, is provided with a cone friction 57 engaging a cone friction 58 on a driving head 59, fixed on the shaft 10. The operative connections for the drum 55 on the opposite end of the shaft 10 may be the same as those described in connection with the drum 56.

Referring now to Fig. 1, A indicates generally the loading engine above described, the main drum 27 which is used for raising and lowering the log. A hoisting cable 62 is wound upon the drum 27 and passes over a sheave 63 at the end of the boom 64, the end of the cable 61, in the form shown, being provided with tongs 65, which may engage a log 66. The boom 64 may be supported by a rod or cable 67, attached at its outer end to the end of the boom 64, and at its inner end to a bracket 68 on the frame work 69 of the engine. A skidding boom 70 may be pivoted at 71 and operated by suitable blocks and tackle 71a, but as this skidding boom constitutes no part of my present invention, it will not further be described. The cables 67a for swinging the hoisting boom are wound upon the drums 55 and preferably extend outwardly substantially parallel to the loading boom to the end thereof, each cable passing over a sheave 63a (only one of which is shown in the drawings) and each of which is preferably suspended from the end of a bracket 72 on the end of the boom. The end of the cable 67a may be secured to a stump 73 or other anchor located at one side of the device. By the described arrangement, the main drive gears for the main drum and which transmit the heaviest power are located between the bearings for the main drive shaft and preferably close thereto as illustrated, so that they do not bend the shaft to a substantial extent, the sleeve being located between the gears. On the other hand, but little power is required for operating the boom swinging drums, and they may be mounted on the overhanging ends of the drive shaft without danger of bending it, and the arrangement provides a simple, compact and effective construction for operating the main drum at different speeds in the forward direction, and at a higher speed in the reverse direction, and for swinging the loading boom.

The operation of the illustrated form of my invention will readily be understood from the foregoing description and is as follows. When it is desired to lift the load at high power and low speed, the drum 27 is forced into engagement with the gear 29, and when it is desired to operate the drum at low power and high speed, it is forced into engagement with the gear 22. When it is desired to lower the tongs for connec-

tion with the next load, it is desirable to lower them at a high speed. This is accomplished by permitting the drum 27 to occupy an intermediate position between the gears 22 and 29 and not operatively engaging either of them. The idler 49 is then thrown into operative engagement with both of the friction members 47 and 48 by the means above described, and the drum 27 is thereby rotated in the reverse direction at a higher speed than either of its forward speeds.

While not limited thereto, my invention is particularly adapted for use with an electric motor which is not capable of operation at variable speeds in the same way as a steam engine.

I claim:

1. In a winding engine, a main drum, a drive shaft, means for driving said drum from said drive shaft in a forward direction, a sleeve mounted on said drive shaft, means for rotating said sleeve on its shaft at a higher rate of speed than the shaft itself, and means operable from said sleeve for driving said drum in the reverse direction.

2. In a winding engine, a main drum, a drive shaft, means for driving said drum from said drive shaft in a forward direction, a sleeve mounted on said drive shaft, means for rotating said sleeve on its shaft, and means operable from said sleeve for driving said drum in the reverse direction at a higher rate of speed than in the forward direction.

3. In a winding engine, a main drum, a drive shaft, means for driving said drum from said drive shaft in a forward direction, a sleeve mounted on said drive shaft, means for rotating said sleeve on its shaft at a higher rate of speed than the shaft itself, said sleeve and said drum being provided with spaced friction members, a friction idler, and means for moving said idler into and out of operative engagement with said friction members.

4. In a winding engine, a main drum, a drive shaft, means including friction clutches for driving said drum forwardly at different speeds, a sleeve mounted on said shaft, means for rotating said sleeve on the shaft at a higher rate of speed than the shaft itself, and means for driving said drum in the reverse direction from said sleeve.

5. In a winding engine, a winding drum, a drive shaft and the bearings therefor, separate means mounted on said shaft between the bearing for driving said drum forwardly at different speeds, a sleeve rotatably mounted on said shaft between the said means, means for rotating said sleeve, and associated means for driving said drum from said sleeve in the reverse direction.

6. In a winding engine, a winding drum, a drive shaft and the bearings therefor, separate means mounted on said shaft between the bearing for driving said drum forwardly at different speeds, a sleeve rotatably mounted on said shaft between the said means, means for rotating said sleeve, and associated means for driving said drum from said sleeve in the reverse direction, and boom swinging drums mounted on the ends of said shaft beyond said bearings, and means for connecting said shafts to and disconnecting them from said shaft.

7. In a winding engine, the combination of a motor, a counter shaft, a driving shaft, a drum, means on the driving shaft for driving the drum at two different forward speeds and means driven from the counter shaft for driving the drum in reverse direction at a speed higher than either forward speed.

8. In a winding engine, the combination of a motor, a counter shaft, a driving shaft, a drum, means on the driving shaft for driving the drum at two different forward speeds, a friction element on the drum and a friction element driven from the countershaft and normally disconnected from the drum and means for connecting said friction elements in driving relation to rotate the drum in reverse direction at a high rate of speed.

9. In a winding engine, the combination of a motor, a drive shaft, means on the shaft for driving the drum at two different forward speeds, a friction element on the drum, a friction element driven by the motor and normally out of contact with the drum friction and means for connecting the two frictions together to drive the drum in reverse direction at a high rate of speed.

10. In a winding engine, the combination of a motor, a shaft driven by said motor, a drum, means on said shaft for driving the drum at different speeds in the same direction and means acting independently of the last-mentioned means for driving the drum in reverse direction at a speed higher than that produced by either of said means.

11. In a winding engine, a main drum, a drive shaft, means including friction clutches for driving said drum forwardly at different speeds, driving means loosely mounted on said shaft, means for rotating said driving means on the shaft at a higher rate of speed than the shaft itself, and means for driving said drum in the reverse direction from said driving means.

THOMAS SPENCER MILLER.