Oct. 14, 1924. 1,511,968

F. A. HOPPER

PORTABLE HOIST

Filed June 15, 1920 2 Sheets-Sheet 1

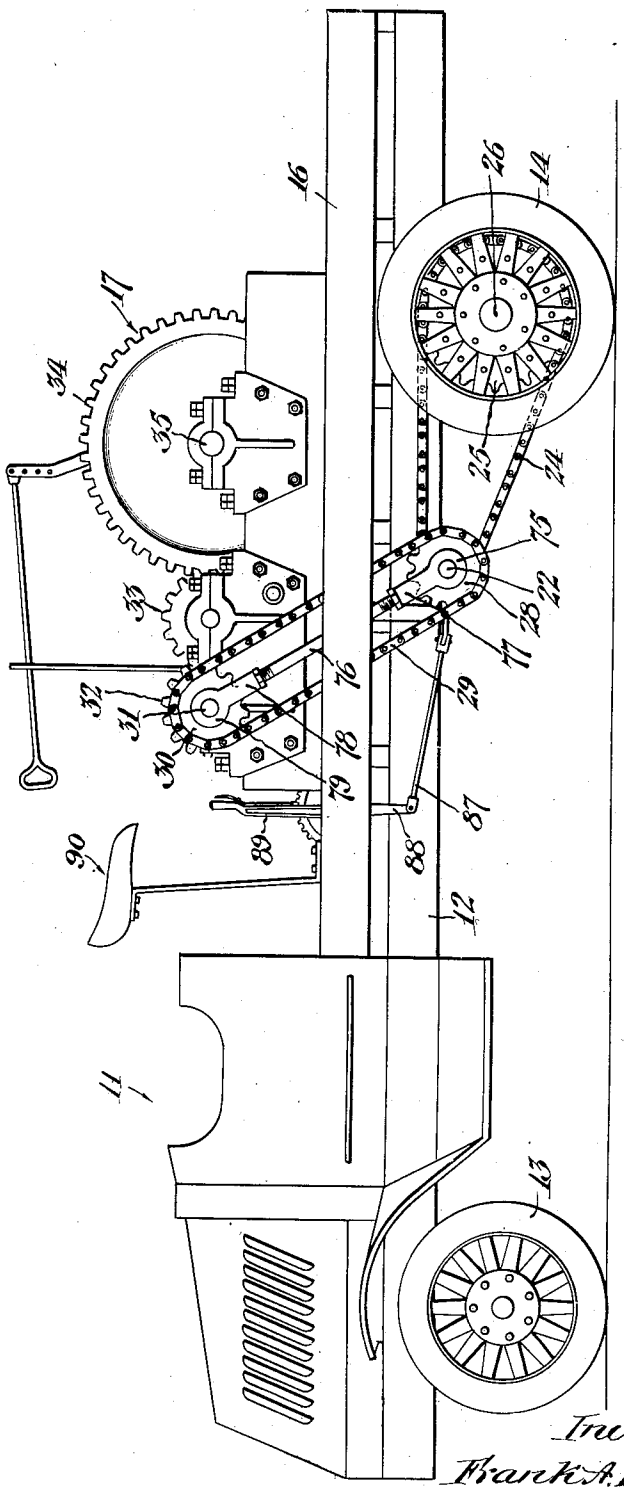

Fig. 1.

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Fig. 4.

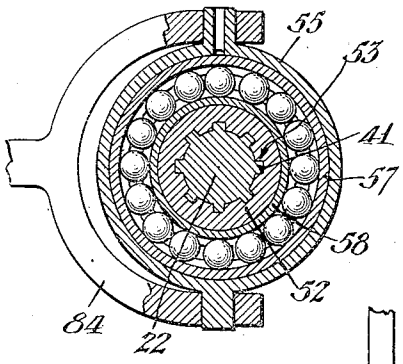


Fig. 5.

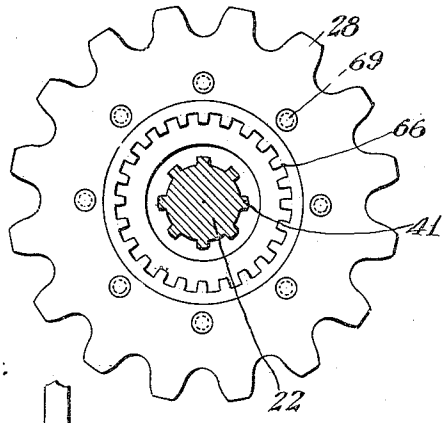


Fig. 2.

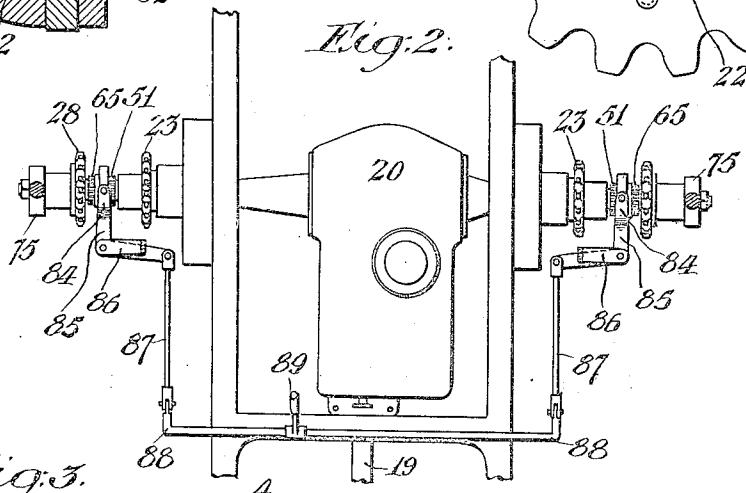
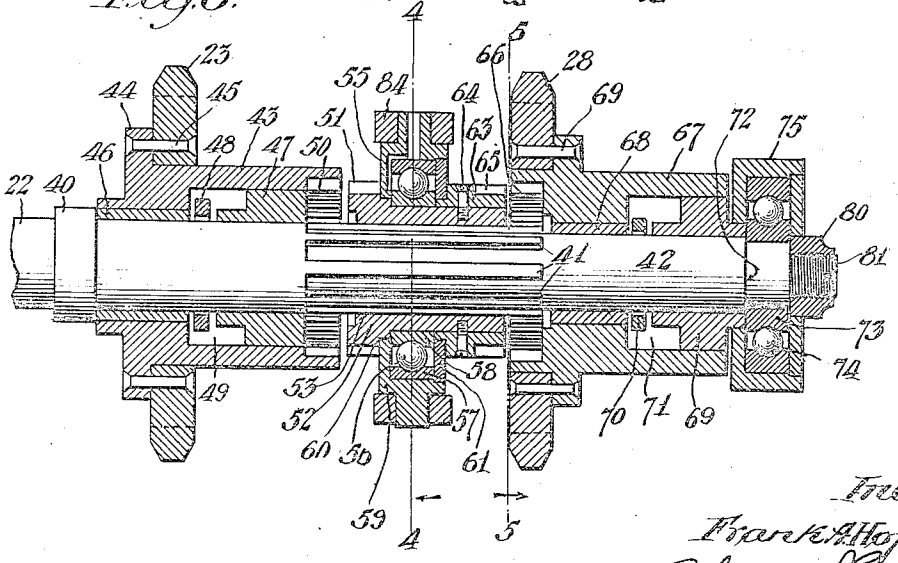


Fig. 3.



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Patented Oct. 14, 1924. 1,511,968

UNITED STATES PATENT OFFICE.

FRANK A. HOPPER, OF BAKERSFIELD, CALIFORNIA, ASSIGNOR OF ONE-HALF TO MACK-INTERNATIONAL MOTOR TRUCK CORPORATION, A CORPORATION OF NEW YORK.

PORTABLE HOIST.

Application filed June 15, 1920. Serial No. 389,237.

To all whom it may concern:

Be it known that I, FRANK A. HOPPER, a citizen of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented a new and useful Portable Hoist, of which the following is a specification.

My invention relates to a form of portable hoist, being more particularly a hoist mounted on an auto truck, my invention residing in the mechanism whereby the truck and hoist may be operated by a single controlling lever.

In some classes of work it is extremely desirable to use a portable hoist which may be readily moved to various locations, particularly is this true in the oil fields where a hoist may be used in cleaning the wells, pulling and lowering the sucker rod and pump pipe. By mounting a hoist upon a truck the hoist may be readily transported to different parts of the field, and a single truck and hoist may thus be utilized for performing the work of a great number of stationary hoists.

The principal object of my invention is to produce a simple form of mechanism whereby the operation of the truck and hoist may be controlled by simple mechanism without the necessity of connecting the chains or other mechanism as is commonly done.

Other objects and advantages will appear hereinafter from the following specification.

Referring to the drawings which are for illustrative purposes only,

Fig. 1 is a diagrammatic side elevation of a truck, a hoist thereon and the driving connections for the truck and hoist embodying a form of my invention.

Fig. 2 is a plan view partly in section showing a portion of the chassis of the truck, the differential, the jack shaft and parts mounted thereon.

Fig. 3 is a longitudinal sectional view of a portion of the jack shaft and driving mechanism mounted thereon.

Fig. 4 is a cross-sectional view on line 4—4, Fig. 2, and

Fig. 5 is a cross-sectional view on line 5—5, Fig. 2.

As shown in the drawings, 11 designates a truck, 12 the chassis and 13 and 14 the front and rear wheels respectively. 16 designates a floor secured to the chassis of the truck in any suitable manner, and 17 a hoist mounted upon the floor 16, the hoist being of any suitable form of what is commonly known as a power pulling and lifting hoist. 19 designates the driving shaft of the truck, it being understood that this shaft is driven from any suitable form of truck motor power such as an internal combustion engine (not shown), and 20 designates the differential to which is connected and which drives a jack shaft 22. The jack shaft 22 extends transversely under the chassis of the truck, being mounted thereon in any suitable manner, and has loosely mounted thereon sprocket wheels 23 which are connected by means of suitable chains 24 to sprocket wheels 25 on the rear shaft 26 of the truck whereby the rear wheels 14 of the truck are driven.

The jack shaft 22 also has loosely mounted thereon sprocket wheels 28 which are connected by means of suitable chains 29 to sprocket wheels 30 mounted upon a counter shaft 31, the shaft 31 having a gear 32 mounted thereon, which meshes with a gear 33 which in turn drives a gear 34 on the hoist shaft 35 whereby the hoist is operated in the usual manner.

It is understood that each end of the jack shaft embodies the same construction which may be described as follows:

40 designates a collar formed on the jack shaft 22 and 41 a plurality of longitudinally extending keys or ribs, the shaft being reduced in diameter between the keys and outwardly therefrom as indicated at 42. Abutting against the collar 40 is a sleeve 43 provided with a flange 44 to which is secured by means of suitable rivets 45 the sprocket wheel 23, suitable bushings 46 and 47 being provided in the sleeve 43 so that the sleeve 43 may be freely rotated on the shaft 22. 48 designates an oiling ring loosely mounted on the shaft 22 in a chamber 49 formed within the sleeve 43.

One end of the sleeve 43 is provided with a series of internal teeth 50 arranged to be engaged by external teeth 51 formed on a clutch member 52. The clutch member 52 is provided with a series of longitudinally extending grooves 53 formed on its inner face, which receive and slidably engage the ribs 41 on the shaft 22 thereby permitting the member 52 to slide upon the shaft, but being rotatably secured thereto. 55 designates a collar loosely mounted upon the clutch member 52 whereby the clutch member may be moved longitudinally on the shaft 22, this

collar 55 being mounted upon the clutch member 52 by means of a series of balls 56 which rotate between bearing rings 57 and 58. One side 59 of the collar is fitted against a shoulder 60 formed on the clutch member 52, and the other side of the collar is closed by a circular plate 61, being held in proper position by means of a collar 63 secured to the clutch member 52 by means of suitable bolts or pins 64 so that the collar 63 and the clutch member 52 rotate together.

The collar 63 is provided with a series of external teeth 65 which are arranged to engage a series of internal teeth 66 formed on a sleeve 67, the sleeve 67 being mounted upon bushings 68 and 69 upon the shaft 22. Secured to the sleeve 67 by means of rivets or bolts 69 is the sprocket wheel 28.

70 designates an oil ring loosely mounted on the shaft 22 in a chamber 71 formed within the sleeve 67. The outer end of the shaft 22 is provided with a shoulder 72 against which is seated the inner ring 73 of a ball race 74, the ball race being mounted within a head 75 secured to one end of a rod 76, the end of the rod being shown as threaded into a shank 77 formed on the head 75, the other end of an interconnecting means in the form of a rod 76 being shown as similarly threaded into a shaft 78 formed on a head 79 which is mounted upon the counter shaft 31.

80 designates a nut threaded on the loose end 81 of the shaft 22 whereby the head is contained in proper position on the shaft 22.

It will be noted from the construction of the mechanism mounted upon the jack shaft just described that the parts may be very readily assembled, that is, the sleeve 43 is first placed on the shaft in engagement with the collar 40. The clutch member 52 is then placed on the shaft after which the sleeve 67 is placed on the shaft and the head 75 secured thereto. The clutch members 52 on each end of the jack shaft 22 are operated simultaneously, each of the collars 55 on the clutch members being engaged by a yoke 84 formed on the end of a bell crank lever 85 mounted by means of a suitable hanger 86 to the chassis of the truck. 87 designates a rod pivotally connected to one end of the bell crank lever 85, the other end of the rod being connected to a lever bar 88, shown as extending laterally beyond the sides of said chassis and operated by means of a hand lever 89 which is arranged in a convenient place to the operator's seat, indicated at 90.

The mechanism above described is operated in the following manner:

When it is desired to drive the truck the lever 89 is operated and through the connections above described the clutch members 52 are simultaneously moved into engagement with their associated sleeves 43 thereby connecting the sleeves 43 through the medium of the clutch member to the jack shaft, it being understood that the jack shaft is driven through the differential from the engine shaft 19 of the truck. The engagement of the clutch member with the sleeve 43 drives such sleeves and sprockets 23 mounted thereon, which through the medium of the chains 24 drive the sprockets 25 on the rear axle of the truck and drive the truck, it being understood that during this operation the clutch member 52 is free of the sleeve 67 so that the mechanism of the hoist is not operated.

Upon arriving at the point where it is desired to operate the hoist, the hand lever 89 is operated to move the clutch members 52 out of engagement with the sleeves 43 and into engagement with the sleeves 67. This locks the sleeves 67 to the jack shaft thereby driving the sprocket wheels 28, the chains 29 and the counter shaft 31, thereby operating the hoist, and when the hoisting operation is completed the clutch member may be moved into neutral position or moved into connection with the sleeve 43 for the purpose of moving the truck.

It is to be understood that the direction of rotation of the jack shaft 22 is controlled through the ordinary truck control mechanism and that the speed of rotation of the jack shaft is similarly controlled. The hoist, however, it is understood, is operated in the usual manner, the same being driven through the mechanism heretofore described from the counter shaft 31.

By constructing the mechanism as above described a single power unit, that is, the engine on the truck, is utilized for motive power for both the truck and hoist controlled by means of a single controlling lever so that either the truck or hoist may be operated at will.

I claim as my invention:—

1. In combination: a truck body comprising a floor supported by a chassis; wheels upon which said truck body is carried; a motor for driving said wheels by means comprising a single integral jack shaft; a hoist mounted upon said floor with the axis of the hoist extending across the body of the truck and provided with hoist driving means comprising a counter shaft; means comprising a lever bar and clutches movable therefrom and positioned outside said chassis and beneath said floor, for disconnecting the motor from the wheels and connecting it to said hoist driving means, the outer ends of the mentioned jack shaft and the mentioned counter shaft being interconnected, and control means on said hoist being so arranged as to be accessible to an operator on said body ahead of said hoist.

2. In combination: a truck body comprising a chassis; wheels upon which said truck body is carried; a motor on said truck; an

integral jack shaft and gearing through which said motor drives said wheels; means for disconnecting said motor from said wheels; a hoist on said truck body so placed that the axis of the hoist is transverse to the line of motion of the truck and the lines from the hoist may be taken off the rear end of the truck, hoist driving means comprising a countershaft; mechanism comprising a plurality of clutches on said jack shaft and outside said chassis, and control means for said mechanism so situated that they may be operated by a man on said truck body in front of said hoist, the outer ends of said jack shaft and said counter shaft being interconnected to withstand the strains incidental to operation and control.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 10th day of May, 1920.

FRANK A. HOPPER.