Aug. 31, 1943. R. B. MAGEE 2,328,088

DRIVING MECHANISM FOR HOISTS

Original Filed Dec. 24, 1940 2 Sheets-Sheet 1

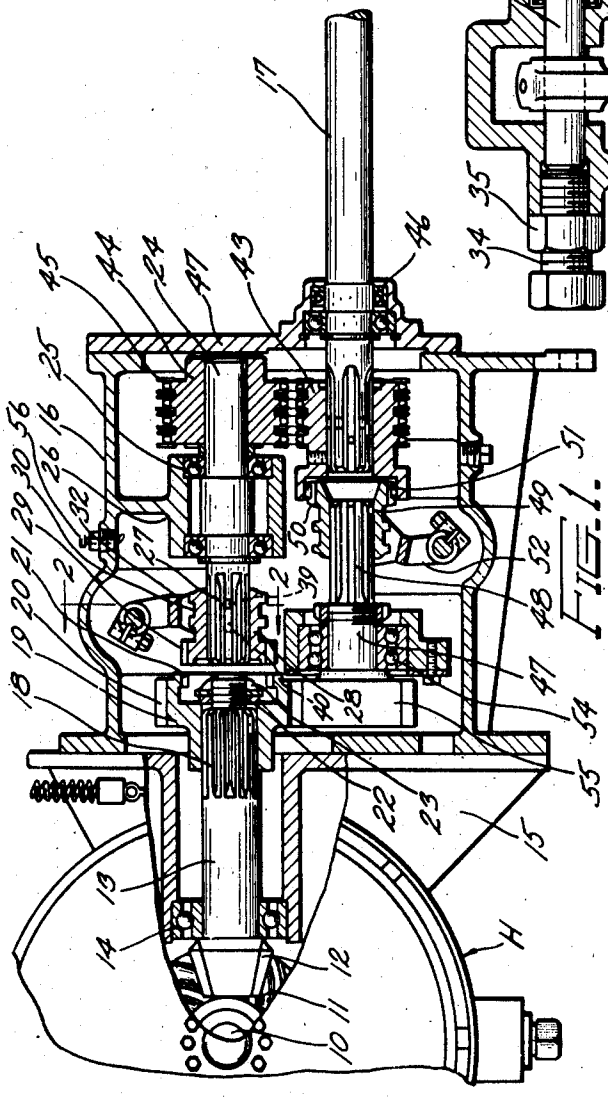


FIG. 1.

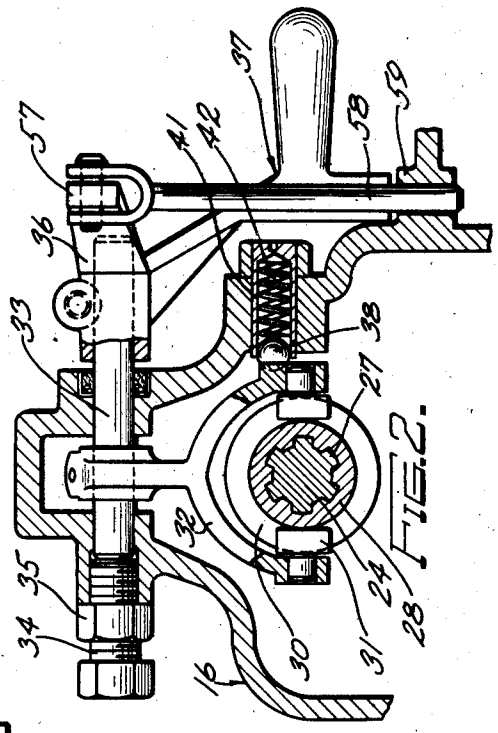


FIG. 2.

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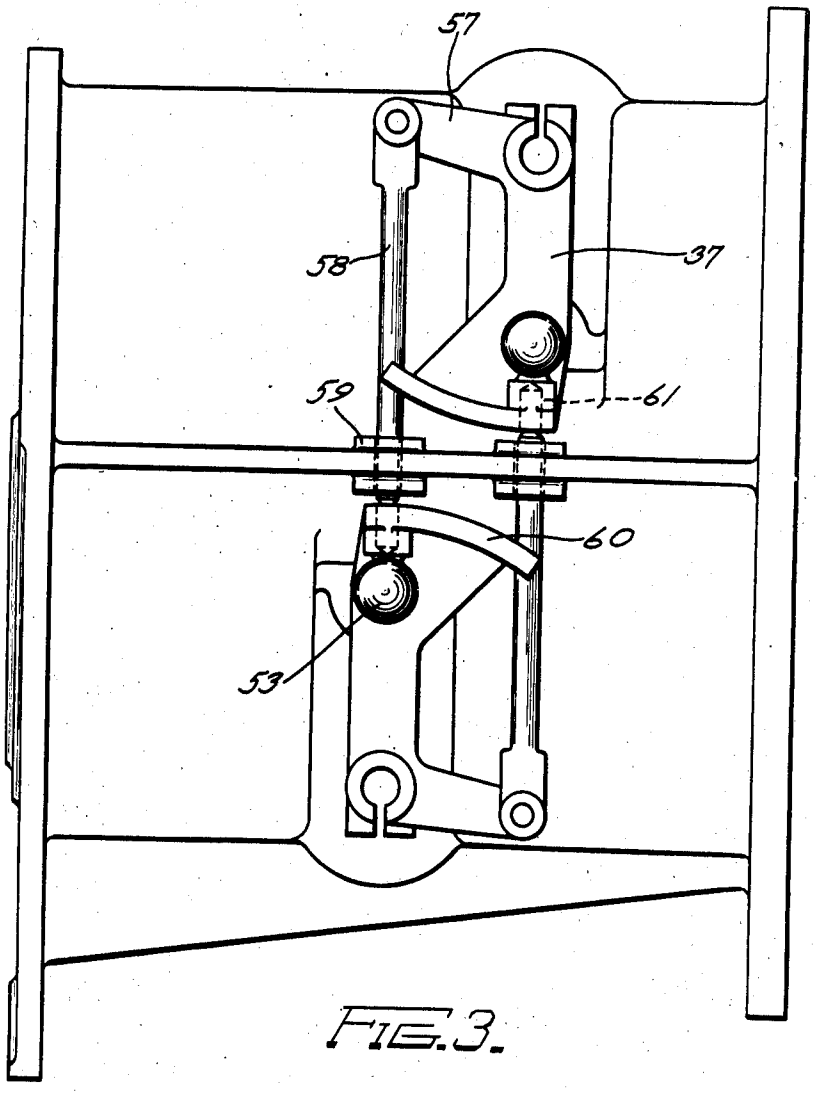


FIG. 3.

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2,328,088

DRIVING MECHANISM FOR HOISTS

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Original application December 24, 1940, Serial No. 371,507. Divided and this application July 13, 1942, Serial No. 450,739

4 Claims. (Cl. 74—477)

This invention relates to driving mechanisms particularly adapted for driving a hoist or a winch mounted at the rear end of a tractor of the type used for raising or lowering earth working tools such as bulldozers, operating scrapers which are towed by the tractor and for numerous other purposes, but more particularly to mechanism or an adaptor interposed between the tractor operating motor and the hoist for establishing the drive between these parts in the desired manner.

This application constitutes a division of my application Serial No. 371,507 filed December 24, 1940, entitled "Hoist driving mechanism."

An object is to provide a hoist drive mechanism of the above character with means for militating against actuation of one of the clutch members to operative clutching position until the other clutch member is disposed in neutral position and positively holding the latter clutch member in neutral position until the first clutch member is returned to its inoperative position.

Other objects and advantages reside in details of construction, arrangement and operation and for purposes of illustration but not of limitation, an embodiment of the invention is shown in the accompanying drawings in which

Figure 1 is a vertical sectional elevation of the driving mechanism for a hoist with the clutches arranged for normal driving of a hoist, part of which is broken away and indicating the motor driven shaft leading from the tractor operating motor;

Figure 2 is an enlarged transverse sectional elevation on the line 2—2 of Figure 1; and

Figure 3 is an enlarged side elevation of the adaptor showing the clutch operating levers and showing the position assumed by the parts when both clutches are in neutral position.

The illustrated embodiment of the invention comprises a hoist H which is suitably mounted at the rear end of a tractor (not shown). The details of construction of the hoist form no part of the present invention so that detail description and illustration thereof are not considered necessary. Suffice it to say that the hoist H is provided with one or more drums on which a cable or cables are wound, the drums being rotatable in opposite directions to wind up or pay out the cable as desired. A hoist of this character is shown and described in the patent to Frank P. Lawler, No. 2,199,668, dated May 7, 1940, for "Hoist." The hoist is provided with a drum operating shaft 10 to which a beveled gear 11 is secured and meshing with the beveled gear 11 is a bevel pinion 12 secured to a driven shaft 13. The shaft 13 is suitably mounted in antifriction bearings 14 mounted in a portion of the hoist casing 15.

Fitting against the rear face of the hoist casing 15 is a relatively oil-tight casing 16 which houses the driving mechanism which receives its power from a driving shaft 17. The shaft 17 may be an extension of the drive shaft to the tractor motor or may be a separate shaft suitably connected for operation by the tractor motor so as to be rotated continuously in one direction so long as it is desired to have the hoist H available for operation.

The inner end of the hoist driven shaft 13 is provided with longitudinal splines as indicated at 18 to receive a gear member 19 having external gear teeth 20 and internal gear teeth 21. The extreme end portion of the driven shaft 13 is screw-threaded as indicated at 22 to receive a suitable fastening device 23 for securing the gear member 19 in place. Axially aligned with the driven shaft 13 and having its inner end spaced a short distance from the adjacent end of the hoist driven shaft 13 is a supplemental driven shaft 24 which is suitably supported by antifriction bearings 25, a bracket 26 forming a part of the housing 16. The inner end of the supplemental driven shaft 24 has a series of splines 27 to receive a gear clutch member 28 which is likewise splined to interfit with the splines 27 and is mounted for longitudinal shifting movements upon the supplemental driven shaft 24. The clutch member 28 is formed with an external gear 29 at one end adapted to mesh with the internal gear 21 on the gear member 19 thereby to drive the hoist driven shaft 13 from the supplemental shaft 24. The clutch member 28 is formed with a groove collar 30 for receiving diametrically opposed substantially rectangular fingers 31 carried by a yoke 32. The clutch operating yoke 32 is fixed to a transverse shaft 33 which is suitably mounted in the housing 16 and for centering purposes is engaged at one end by a bolt 34 which is secured in place by a nut 35. The opposite end of the shaft 33 projects outwardly of the housing 16 and sleeved thereupon is a hub portion 36 of an operating handle 37, the hub portion being fixed to the shaft 33 for turning movements therewith. It will be manifest that by actuation of the handle 37 the gear clutch 28 may be slid into and out of engagement with the internal gear 21.

The clutch actuating yoke 32 is yieldably retained either in the inoperative position of the

clutch member 28 or in the operative position thereof with the gears 29 and 21 in mesh, by a ball 38 which is engageable either in a socket 39 or a socket 40 formed in the outer side wall of the yoke. The ball 38 is urged outwardly of a cup 41 carried by a side wall of the housing 16 by a coil spring 42. The spring 42 bears at one end against the ball 38 urging it outwardly of the cup and at the opposite end abuts against the inner end of the cup.

The supplemental driven shaft 24 is driven by the motor driven shaft 17 and in the same direction of rotation as the shaft 17. In this instance, the operative driving connection between these shafts is effected by a sprocket member 43 which is splined to and slidable axially of the motor driven shaft 17 and a sprocket member 44 which is suitably fixed to the supplemental driven shaft 24 for rotation therewith. In this instance each of the sprocket members 43 and 44 are formed with four annular series of sprocket teeth and the opposite sprocket teeth of one of the members is connected to the corresponding sprocket of the other member by chains 45. A sprocket and chain connection of this character is of particular advantage in that it enables the supplemental driven shaft 24 to be rotated in the same direction as the motor driven shaft 17 which is disposed parallel thereto but spaced laterally therefrom.

The motor driven shaft 17 is suitably mounted in anti-friction bearings 46 carried by the face plate 47 of the housing 16 and disposed in alignment with but spaced slightly therefrom is a supplemental driving shaft 47 which has a splined end portion 48 to receive a gear clutch member 49 having an external gear 50 which is movable axially to and from meshing engagement with an internal gear 51 forming an integral part of the sprocket member 43 at the inner end thereof. The gear clutch member 49 is shifted axially along the splined end portion 48 of the supplemental shaft by a yoke 52 which is similar to the yoke 32 above described. The yoke 52 is similarly mounted to the yoke 32 and is provided with an operating handle 53 (Figure 3) which is in all respects identical to the handle 37 above described. In view of the similarity of these parts further detail description of the yoke 52 and its associated parts is not considered necessary since the same will be readily understood by those skilled in this art.

The supplemental driving shaft 47 is suitably mounted in anti-friction bearings 54 carried by the housing 16 and rigid with the opposite end portion thereof is an external gear 55 which is at all times in mesh with the gear 20 which, as above described, is fixed for rotation with the hoist driven shaft 13.

It will be understood that the housing 16 is normally filled with oil so that the various parts run in a bath of oil, a suitable breather 56 being provided for venting the interior of the housing.

It will be manifest that when the gear clutch member 28 is engaged with the internal gear 21, the hoist shaft 13 will be rotated in the same direction as the motor driven shaft 17. At this time the gear clutch 49 is disposed in inoperative position with the gear 50 shifted away from the gear 51. On the other hand, with the gear clutch 28 shifted to inoperative position or to such position that the gears 29 and 21 are out of mesh, the clutch member 49 may be shifted to operative position to bring the gears 50 and 51 into mesh. With the parts in this position, the hoist shaft 13 is driven from the motor driven shaft 17 through the supplemental driving shaft 47 and gears 55 and 20. With the parts connected in this manner which constitutes the normal drive for the hoist, the hoist shaft will be driven in a direction of rotation opposite to that of the motor driven shaft 17. This construction makes possible the normal driving of the cable drum of the hoist H in one direction but when it is desired to rotate the cable drum in the opposite direction and by shifting the clutch members as above described, the cable drum may be reversed and the motor which operates the shaft 17 may serve as a brake to check the rotation of the hoist drum but at the same time operating the drum by power means.

It is important that while one of the clutch members 28 and 49 is in operative position that the other clutch member be retained in inoperative position. For this purpose, each of the operating handles or levers 37 and 53 is provided with a laterally extending arm 57 to which a pin 58 is pivoted. The free end portion of each of the pins 58 passes through a boss 59. When both of the operating handles 37 and 53 are in neutral position, the operating levers or handles 37 and 53 are in the positions indicated on Figure 3, the pins 58 projecting through their respective bosses 59 and terminating close to but out of engagement with the opposite operating handle. As shown each of the handles 37 and 53 are provided adjacent their outer ends with an arcuate portion or sector 60 of such curvature that the respective handle can be rocked without interference from the pin 58 of the other operating handle. However, upon swinging movement of either of the operating handles 37 and 53, it will be apparent that the respective pin 58 is forced longitudinally through the respective boss 59 and into a socket 61 formed in the other operating handle, a sufficiently loose fit between the pin 58 and boss 59 enabling this movement to be accomplished. It is manifest that when one of the pins is in engagement with the socket 61 of the other arm, the latter is locked against movement thereby retaining the respective gear clutch in inoperative or neutral position. This is a safety factor which militates against accidental damage or injury to the gears. It will also be understood that both of the operating handles 37 and 53 must again be in neutral position or in the position indicated on Figure 3 before the other operating handle can be actuated and at that time the first operating handle is positively retained in neutral position. As above indicated, both the operating handles and associated parts are similarly constructed so that detail description of one is deemed sufficient.

It is apparent that the hoist driven shaft 13 is spaced vertically above the tractor driving shaft 17. This is advantageous because it enables the hoist H to be raised above the usual drawbar of the tractor. It is to be understood that the hoist may be mounted at any desired place on the tractor and accordingly the drive mechanism above described may be mounted at the rear, sides or front of the tractor as desired depending upon the position of mounting for the hoist.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. In a hoist driving mechanism having a pair of clutching members alternatively movable into operative driving relation, means to insure that one clutch member is in inoperative position before the other clutch member is actuated to operative position, said means comprising a pair of levers arranged in offset relation, each lever having a laterally projecting arm, a rod pivoted to the outer end of each arm, a frame member interposed between said levers and apertured to receive said rods respectively, each rod being disposed in substantially parallel relationship to the respective lever, an arcuate surface on the end portion of each lever over which the end portion of the rod of the other lever is adapted to ride, each lever being socketed to receive the end portion of the rod connected to the other lever so that when the latter is actuated to operative position, the respective rod locks the other lever against movement.

2. In a hoist driving mechanism having a pair of clutch members alternatively movable into operative driving relation, means to insure that one clutch is in inoperative position before the other clutch member is actuated to operative position, said means comprising a rocking handle connected to each clutch member, and a latching member connected to each handle and movable thereby into and out of latching engagement with the other handle.

3. In a hoist driving mechanism as claimed in claim 2, the rocking handles being arranged in superposed offset relationship, and a pivotally mounted detent movable into socketed engagement with the other handle to hold the latter stationary when the first handle is rocked to actuate its clutch member.

4. In a hoist driving mechanism as claimed in claim 2, each rocking handle comprising an arm extending at right angles to the handle, a rod pivotally connected to said arm, a frame member apertured to receive said rods, and each handle having a socketed portion to receive the rod of the other handle when the latter is rocked to actuate its clutch member thereby to hold the former securely in position.

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