Jan. 5, 1943. R. B. MAGEE 2,307,284

HOIST DRIVING MECHANISM

Filed Dec. 24, 1940 2 Sheets-Sheet 1

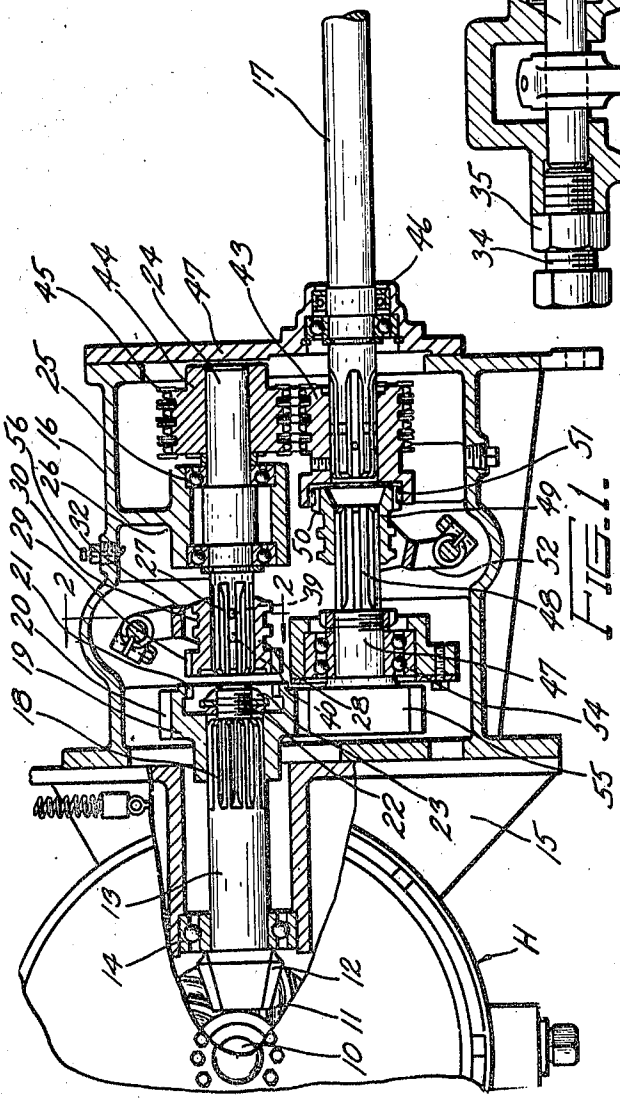


FIG. 1.

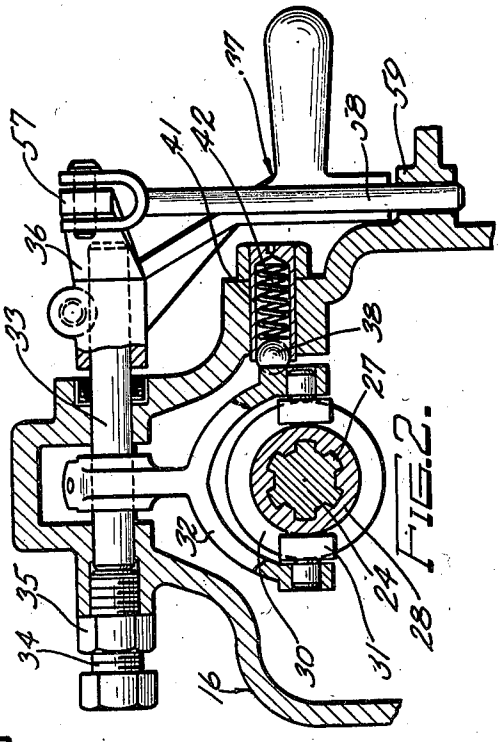


FIG. 2.

INVENTOR
ROBERT B. MAGEE
BY
Malcolm Fraser
ATTORNEY

Jan. 5, 1943. R. B. MAGEE 2,307,284

HOIST DRIVING MECHANISM

Filed Dec. 24, 1940 2 Sheets-Sheet 2

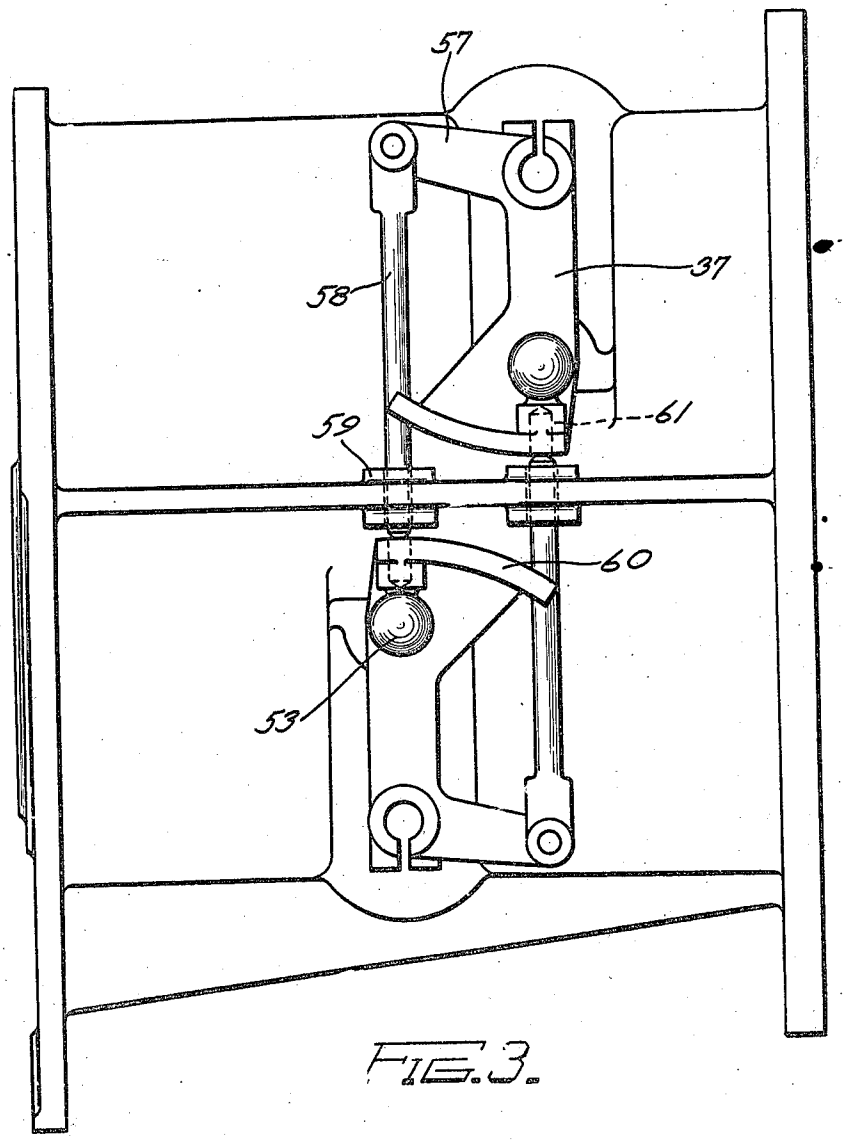


FIG. 3.

INVENTOR
ROBERT B. MAGEE
BY
Malcolm W. Pierce
ATTORNEY.

Patented Jan. 5, 1943

2,307,284

UNITED STATES PATENT OFFICE

2,307,284

HOIST DRIVING MECHANISM

Robert B. Magee, Findlay, Ohio, assignor to The Buckeye Traction Ditcher Company, Findlay, Ohio, a corporation of Ohio

Application December 24, 1940, Serial No. 371,507

1 Claim. (Cl. 74—361)

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.

An object is to produce a new and improved drive for a tractor operated hoist or winch for enabling the hoist to be selectively operated or driven in either direction in such manner as to enable the tractor motor to serve as a brake when the winch is operated in a reverse direction, thus to pay out the cable from the winch at a controlled speed and under power.

Another object is to produce a simple and efficient adaptor for a tractor driven winch or hoist enabling the winch to be driven selectively in one direction or the opposite direction but does not interfere with or otherwise change the operation of the winch.

A further 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;

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 anti-friction 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 anti-friction 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 sild 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 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 is 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 is 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 trac-

tor 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 claim.

What I claim is:

A driving mechanism including a driving shaft, a driven shaft, a clutch member fixed on the driven shaft and having external and internal teeth, a supplemental driven shaft, a clutch member slidably splined on one end of the supplemental driven shaft and having a single series of external teeth engageable only with the internal teeth of the first named clutch member, a sprocket and chain connection between the opposite end of the supplemental driven shaft and the driving shaft to rotate the supplemental driven shaft from and in the same direction as the driving shaft, a supplemental driving shaft, an internally toothed member fixed on said driving shaft, a clutch member slidably splined on the supplemental driving shaft and having a single series of external teeth for engagement only with the internal teeth of said member of the driving shaft, a gear on the supplemental driving shaft engaged with the external teeth of the clutch member of the driven shaft, and means to actuate each of the slidable clutch members of the supplemental driven and driving shafts.

ROBERT B. MAGEE.