April 6, 1943. R. C. LAMOND 2,315,628

HOISTING APPARATUS

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Fig. 1.

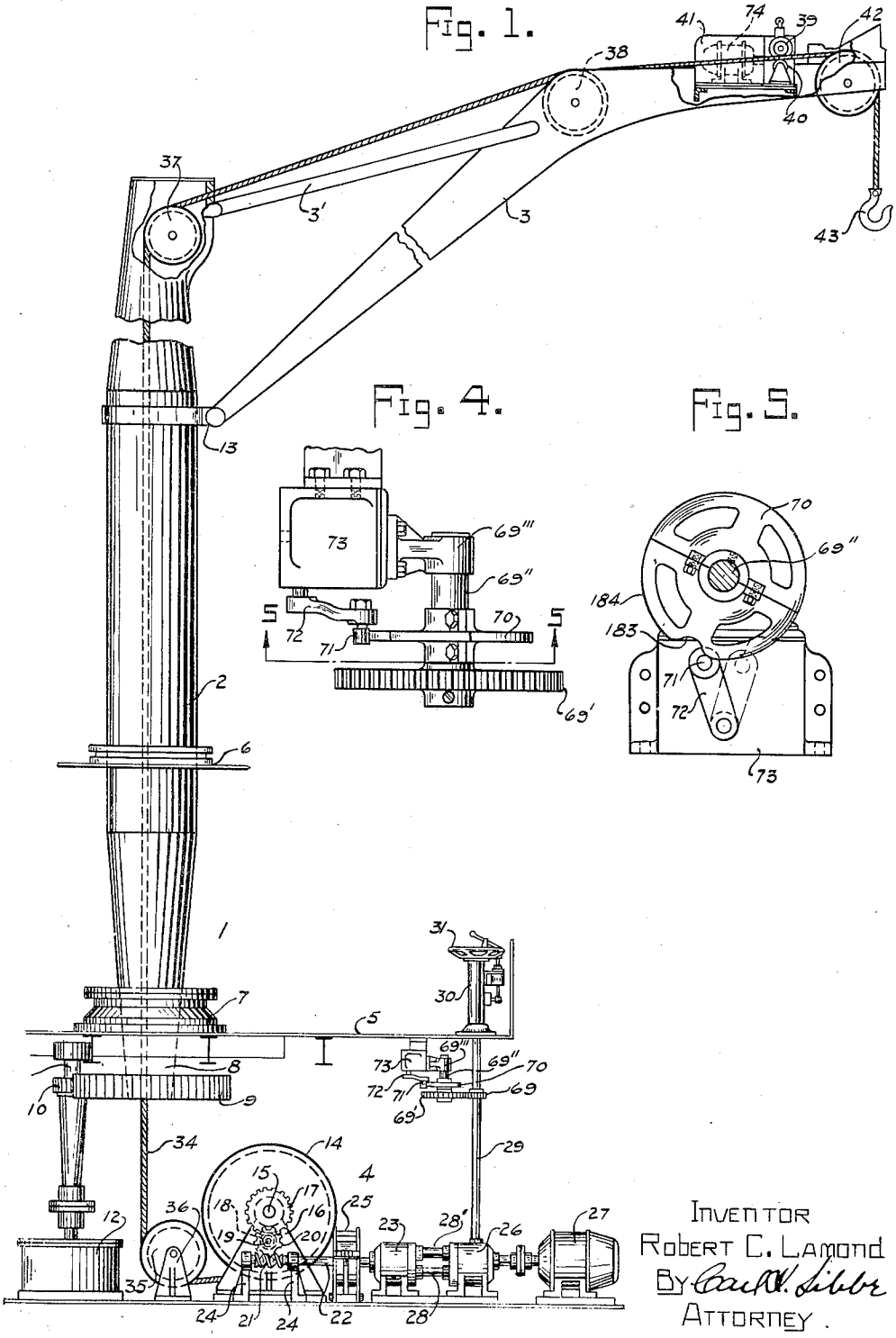

Fig. 4.

Fig. 5.

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HOISTING APPARATUS

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Fig. 3.

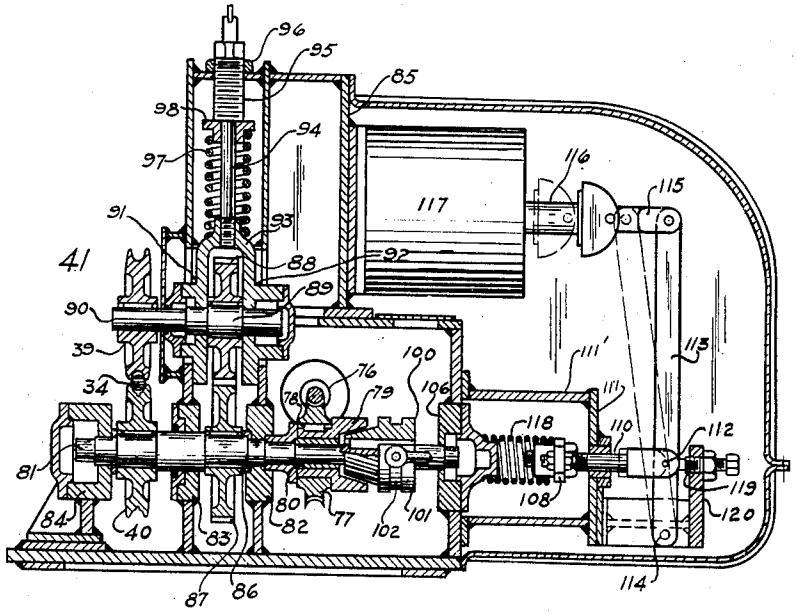
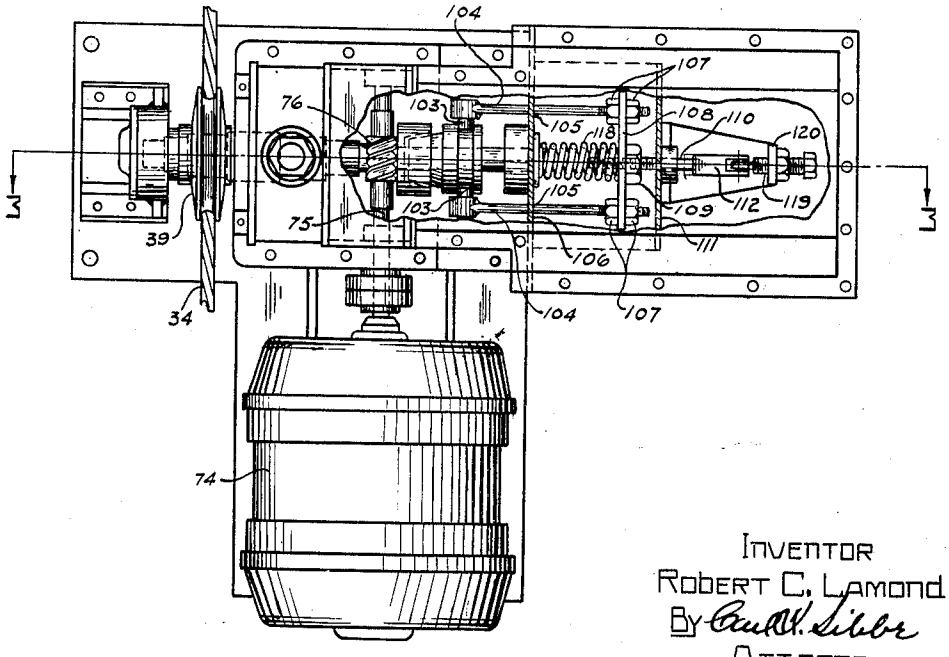


Fig. 2.



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HOISTING APPARATUS

Filed March 7, 1940 3 Sheets-Sheet 3

Fig. 7.

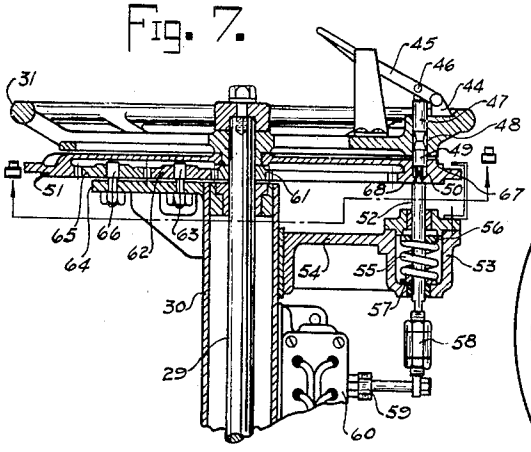


Fig. 8.

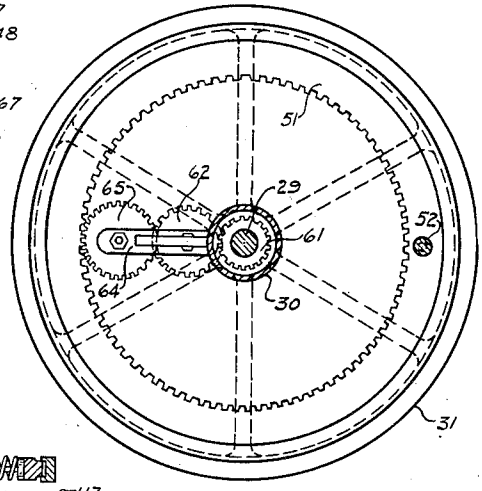


Fig. 6.

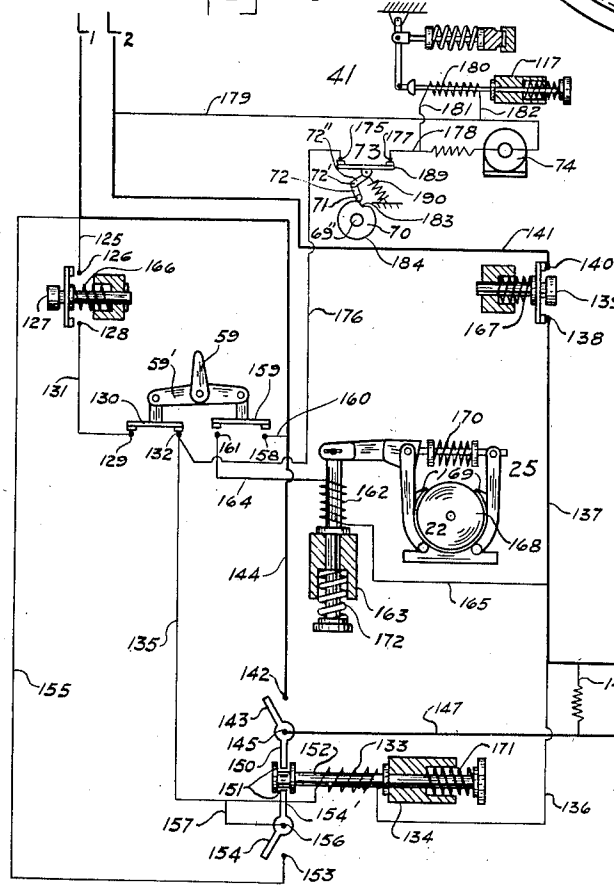
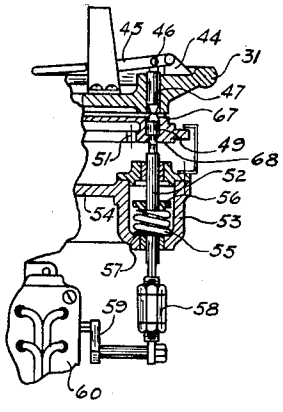


Fig. 9.



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Patented Apr. 6, 1943

2,315,628

UNITED STATES PATENT OFFICE

2,315,628

HOISTING APPARATUS

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Application March 7, 1940, Serial No. 322,708

4 Claims. (Cl. 254—172)

This invention relates to winches, and more particularly to certain safety devices, control mechanisms and overhauling devices associated with winches.

One object of the present invention is to provide in a winch an overhauling device which insures proper movement of the hook end of the cable and prevents undue slack from occurring between the various pulleys of the winch disposed between the drum and the hook.

A further object is to provide in an overhauling device of the type described, a control mechanism which functions to condition the device for operation when the cable is being paid out and to disconnect the device when the cable is being wound in.

Another object is to provide a novel locking device for the hydraulic operating mechanism for winches which prevents operation of the controls therefor from a neutral position until manually released, and also until an associated brake is released, thereby preventing undue pressure conditions in the hydraulic system.

A further object is to provide a generally improved and simplified winch construction which insures best efficiencies under all conditions of operation.

Other and further objects will become apparent as the description of the invention progresses.

Of the drawings:

Fig. 1 is an elevational view of the entire winch construction with parts removed to more clearly illustrate certain operating parts of the associated overhauling device.

Fig. 2 is a plan view of the cable overhauling mechanism with parts removed to show certain of the elements thereof.

Fig. 3 is a sectional elevational view taken substantially along line 3—3 of Fig. 2.

Fig. 4 is an end view of a switch mechanism and operating means therefor for controlling the operation of the overhauling device.

Fig. 5 is a view partly in section, taken substantially along line 5—5 of Fig. 4.

Fig. 6 is a diagrammatic view of the electrical control circuit of the winch and overhauling device associated therewith.

Fig. 7 is a sectional elevational view of the control wheel for the pump end of the hydraulic operating mechanism, having associated therewith a locking mechanism and a switch operating device.

Fig. 8 is a view partly in section taken along line 8—8 of Fig. 7, and

Fig. 9 is a fragmentary sectional view showing the switch operating mechanism and locking device for the control wheel shown in Figs. 7 and 8 in operated position.

Referring to the drawings, the numeral 1 designates generally a crane consisting of a mast 2 and a boom 3. A winch indicated generally at 4, winding in and paying out cable is disposed in the present instance beneath the mast 2 and a supporting platform or deck 5. The mast 2 extends through and is rotatably supported in an upper platform or deck 6, and the lower end thereof is mounted in any suitable bearing indicated generally at 7. A portion 8 depends from the lower end of the mast 2 and has secured thereto a large gear 9 which meshes with a pinion 10 provided intermediate the ends of a shaft 11 driven by any suitable power mechanism 12. By operating power mechanism 12 in one direction, the mast 2, and consequently the boom 3, may be swung in one direction and when the operation of said power mechanism is reversed the mast and boom are actuated in the reverse direction. The specific operating mechanism for the mast just described, forms no part of the present invention, and accordingly a detail description thereof is unnecessary.

Boom 3 is pivotally supported on the mast 2 at 13, and a tie rod 3', extending between the upper end of mast 2 and a point intermediate the ends of the boom 3, affords an additional support for the boom.

The winch 4 consists of a cable winding drum 14 mounted on any suitable shaft 15, journaled in side frames 16 (only one of which is shown). The outer end of shaft 15 has secured thereto a gear 17 which meshes with a pinion 18 secured to a second shaft 19. Shaft 19 has also secured thereto a worm wheel 20 which meshes with a worm gear 21 secured to a drive shaft 22 of a fluid motor 23. The outer end of shaft 22 is journaled in any suitable bearings 24, 24. A braking mechanism indicated generally at 25 normally holds drive shaft 22, and consequently motor 23, against operation, as will appear more fully hereinafter. Fluid for operating motor 23 is delivered by a pump 26 through pipes 28 and 28'. Pump 26 may be driven by any suitable electric motor 27. Pump 26 and motor 23 may be of reversible discharge type of any well known construction, such, for example, as that shown in the patent to Hele-Shaw, No. 1,077,979, granted November 11, 1913, to which reference may be had for a full description thereof.

The stroke of pump 26 may be varied by means of a control shaft 29 extending through deck 5

and journaled in any suitable manner in a standard 30 suitably supported on deck 5. The upper end of shaft 29 has secured thereto in any suitable manner a control wheel 31.

Control wheel 31 has associated therewith locking means which will be more fully described hereinafter, which, when the pump is on neutral stroke, automatically locks the wheel against movement. However, when this locking means is released wheel 31 may be turned in either direction. When wheel 31 is turned in one direction, the stroke of pump 26 will be so adjusted as to cause a rotation of motor 23 and consequently of drum 14, in such a direction as to pay out the cable 34, and when control wheel 31 is turned in the reverse direction from a neutral position the stroke controls of pump 26 will be so adjusted as to cause a reverse operation of motor 23, and consequently of drum 14, causing the latter to wind in the cable 34.

As shown in Fig. 1, the cable 34 wound on drum 14 extends under a sheave 35 mounted in any suitable bearings 36, disposed adjacent drum 14, and then extends upwardly through the hollow interior of mast 2 and over a sheave 37, rotatably mounted near the upper end of said mast. Cable 34 then extends over a sheave 38 rotatably mounted intermediate the ends of boom 3 and then extends between sheaves 39 and 40 of a cable overhauling device indicated generally at 41. The cable then extends over a sheave 42 rotatably mounted at the outer end of boom 3, and has a hook 43 attached to the outer end thereof.

Referring more particularly to Figs. 7, 8 and 9, it will be noted that wheel 31 has pivoted to a vertically extending bracket 44 secured to one side thereof, a latch releasing lever 45. Pivoted in any suitable manner at 46 on lever 45 is a plunger 47 operating in a cylindrical bore 48 provided in the rim of wheel 31. The lower end of plunger 47 engages the upper end of a locking lug 49 which normally extends into the lower end of bore 48, and also into the enlarged end of a recess 50 extending through the rim of an internal gear 51. Recess 50 and bore 48 coincide when the stroke controls of pump 26 have been adjusted by wheel 31 to neutral position. Under these conditions locking lug 49 is urged upwardly by a rod 52, extending through openings provided at the upper and lower ends of the cylindrical portion 53 of a bracket 54, the upper reduced end of said rod also extending through the lower reduced portion of recess 50. Bracket 54 may be secured in any suitable manner to the standard 30. As shown more particularly in Figs. 7 and 9, a coil spring 55 is provided within the cylindrical portion 53 of bracket 54 and extends between an upper spring seat 56 secured to rod 52, and a lower spring seat 57 loosely mounted on said rod. The lower end of rod 52 is secured in any suitable manner to a coupling 58, the lower end of which is attached in any suitable manner to an arm 59 provided for the purpose of actuating certain switches provided within a box 60 secured in any suitable manner to the standard 30. A description of the switches provided in box 60 will appear more fully hereinafter.

From the foregoing description it is seen that to release wheel 30 for operation, lever 45 is simply urged downwardly to the position shown in Fig. 9. By this action plunger 47 urges locking lug 49 out of the bore 48 of wheel 31. By this movement of locking lug 49 the upper end of rod 52 is moved out of the recess 50. Wheel 31 is now free to rotate in either direction.

Referring to Figs. 7 and 8, it will be observed that shaft 29 has secured thereto in juxtaposition with the internal gear 51 a pinion 61 which meshes with a gear 62, journaled on a stud 63, mounted in any suitable manner in an arm 64 secured near the upper end of standard 30. Gear 62 meshes with a second gear 65 journaled on a stud 66, also secured in any suitable manner near the outer end of arm 64. Gear 65 meshes with internal gear 51. The lower surface 67 at the bottom of the rim of wheel 31 is flat, and consequently when wheel 31 is turned when locking lug 49 is in the position shown in Fig. 9, the said lug will now be held in that position by the engagement with the smooth unbroken surface 67 of said wheel. The lower surface 68 of the rim of internal gear 51 is also flat, and consequently the upper end of rod 52 is held in the position shown in Fig. 9 by engagement with the surface 68. Now, upon movement of wheel 31 in either direction internal gear 51 is rotated through gears 61, 62 and 65. The gear reduction between wheel 31 and internal gear 51 may be such that three full turns of wheel 31 are required to cause one rotation of gear 51. The purpose of this reduction is to insure proper operation of the pump controls from neutral position to full stroke in either direction, since in the present instance three full turns of wheel 31, and consequently of shaft 29, may be necessary to actuate the pump controls, as stated, from neutral position to full stroke in either direction. Thus by employing such a gear ratio between wheel 31 and internal gear 51 locking lug 49 and rod 52 will remain in the position shown in Fig. 9 during the movements of wheel 31 just described. However, when wheel 31 has been so operated as to return the pump controls to neutral position recess 50 will register with bore 48, and consequently spring 55 will urge rod 52 upwardly bringing the reduced upper end thereof into said recess 50 and causing locking lug 49 to extend partly into bore 48 and partly in recess 50. Thus both the wheel 31 and gear 51 are locked against further movement. To release wheel 31 and gear 51 for operation, it will now be necessary to again urge lever 45 downwardly to the position shown in Fig. 9, at which time the wheel 31 may again be rotated in either direction.

As shown in Fig. 1, shaft 29 has secured thereto a gear 69 which meshes with an enlarged gear 69' mounted for rotation on a shaft 69'' suitably journaled in a bracket 69''', secured in any suitable manner to the casing of a switch 73, which in turn is secured to the lower surface of deck 5. Shaft 69'' has also secured thereto a cam 70 which, as shown more particularly in Figs. 4, 5 and 6, is adapted to engage a cam follower 71 provided at one end of arm 72 of a bell crank lever 72'. Bell crank lever 72' is adapted to actuate switch 73, which controls the operation of the electric motor 74 associated with the overhauling device 41 which will now be described in detail.

Referring more particularly to Figs. 2 and 3, it will be observed that the shaft 75 of motor 74 has secured thereto a worm gear 76, meshing with the worm wheel 77, keyed to the hub 78 of a clutch member 79. Hub 78 of clutch member 79 is loosely mounted on a collar 80 provided on a shaft 81 which is suitably mounted in bearings 82, 83, 84 and 106 provided in the casing bracket 85 of overhauling device 41. The enlarged portion 86 of shaft 81 extending between bearings 82 and 83 has keyed or otherwise secured thereto

a gear 87 which meshes with a gear 88 secured to the enlarged portion 89 of a shaft 90 journaled in bearings provided in the bifurcations 91 and 92 of a spring urged member 93. The upper end of member 93 has secured thereto a rod 94 which extends through the central bore of a threaded bolt 95 which makes threaded engagement with a nut 96 provided at the upper end of casing 85. A spring 97 extends between the upper end of member 93 and a spring seat 98 which engages the lower end of bolt 95. Thus, by adjusting bolt 95 the pressure of spring 97 may be varied. By this arrangement it is seen that spring 97 normally tends to urge member 93, and consequently shaft 90, downwardly. The left hand end of shaft 90 has secured thereto sheave 39 which is slightly spaced from sheave 40 mounted near the left hand end of shaft 81 and disposed between bearings 83 and 84. It therefore is seen that by means of spring-urged member 93, sheave 39 is brought into frictional engagement with the cable 34.

Slidably mounted on shaft 81 adjacent clutch element 79 is a complementary clutch element 100. The enlarged portion 101 of clutch element 100 has provided therein a circular groove 102 for receiving lugs 103, 103, extending inwardly from a pair of rods 104, 104. Rods 104, 104 extend through openings 105 provided in the wall 106 of casing 85, and are secured in any suitable manner, such as by bolts 107, 107 to a crosshead 108. Crosshead 108 is secured in any suitable manner, such as by a nut 109 to a rod 110 slidably mounted in the end wall 111 of casing 111'. The outer end of rod 110 has secured thereto a bifurcated member 112 to which is pivotally attached intermediate its ends a lever 113. Lever 113 is pivoted at its lower end at 114. The upper end of lever 113 is pivoted to one end of a link 115, the other end of which is pivotally attached to the core 116 of a solenoid 117. Extending between wall 106 and crosshead 108, is a coil spring 118. Spring 118 tends to urge crosshead 108 and rods 104, 104, and consequently clutch element 100, to the right. To limit the movement of lever 113 and the associated elements an adjustable stop 119 is provided. This stop extends through a threaded aperture provided near the upper end of a vertical member 120 and is adapted to engage the outer side of vertical lever 113 when the latter has been actuated to the right (Figs. 2 and 3) by spring 118.

From the foregoing description it is seen that upon energization of solenoid 117 lever 113 is urged to the left. This causes movement of crosshead 108 and rods 104, 104, against the pressure of spring 118, and consequently clutch element 100 is brought into engagement with the complementary clutch element 79, thereby connecting worm wheel 77 to shaft 81. Any movement of motor 74 now causes rotation of worm 76, worm wheel 77, and shaft 81. Upon operation of shaft 81 sheaves 39 and 40 are actuated, thereby causing paying out of cable 34 and any slack in the cable is immediately taken up. Motor 74 operates in one direction only. When the wheel 31 is turned to condition the winch to wind in cable, motor 74, as will appear more fully hereinafter, will be disconnected from the circuit. Upon deenergization of solenoid 117 spring 118 will urge clutch element 100 out of engagement with element 79. Consequently motor 74 is now disconnected from shaft 81 and any movement thereof will simply cause clutch element 79 to rotate about sleeve 80 without imparting any movement to shaft 81.

Referring more particularly to the wiring diagram shown in Fig. 6, the operation of the mechanism as a whole will be understood. Current from any suitable source enters the system through bus bar L_1 and returns through bus bar L_2. Connected to the main circuit is a motor starting circuit which is indicated by the lighter lines in the diagram. A wire 125 connects bus bar L_1 to the pole 126 of a starting switch 127. The other pole 128 of switch 127 is connected to the pole 129 of a normally closed interlocking switch 130 by wire 131. The other pole 132 of switch 130 is connected to one end of the coil 133 of a solenoid 134 by a wire 135. A wire 136 connects the other end of coil 133 of solenoid 134 to a wire 137 connected at one end to the pole 138 of a stop switch 139. The other pole 140 of stop switch 139 is connected to bus bar L_2 by a wire 141. Bus bar L_1 is connected to the pole 142 of a single pole switch 143 by a wire 144. The central pole 145 of switch 143 is connected to motor 27 by a wire 147. Motor 27 is connected to wire 137 by a wire 148. A shunt field 149 of motor 27 is connected across wires 147 and 148. An insulated arm 150 of single throw switch 143 extends into the groove 151 provided at the end of the core 152 of solenoid 134. Bus bar L_1 is also connected to the pole 153 of a second single pole switch 154 by a wire 155. The central pole 156 of switch 154 is connected to wire 135 by a wire 157. The insulated arm 154' of switch 154 extends into the groove 151 of core 152 of solenoid 134. Wire 144 is also connected to the pole 158 of fluid motor brake switch 159 by a wire 160. The other pole 161 of switch 159 is connected to the coil 162 of a solenoid 163 by a wire 164. The other end of coil 162 is connected to wire 137 by a wire 165. Starting switch 127 is normally held in open position by a spring 166 and accordingly, upon release of said switch the spring urges the same to open position. Stopping switch 139 on the other hand is normally held in closed position by a spring 167, and upon release of the switch button the spring will urge the same to closed position. Interlocking switch 130 and brake switch 159 are enclosed within the casing 60 secured to the standard 30 and are simultaneously operated by arm 59 through the medium of a lever 59' pivoted intermediate its ends and operatively connected to the said switches 130 and 159.

Fluid motor shaft 22 has secured thereto a drum 168. A pair of brake shoes 169 are normally urged into engagement with said drum by a spring 170. Upon energization of solenoid 163, however, the brake shoes 169 are moved out of engagement with drum 168 and shaft 22 is then free to rotate. Upon deenergization of solenoid 163 spring 170 urges brake shoes 169 into engagement with drum 168, thereby holding the shaft 22 against further movement.

It is also seen that upon energization of solenoid 134 single pole switches 143 and 154 are closed, and that upon deenergization of said solenoid said switches are moved to open position by means of a coil spring 171. A coil spring 172 also assists the spring 170 of the brake mechanism 25 to apply the brake when solenoid 163 is deenergized.

From the foregoing description it is seen that to start motor 27 in operation the operator simply closes switch 127. When the parts are in the normal position shown in Fig. 6, interlock

switch 130 is closed. The closing of switch 127 also causes energization of solenoid 134 which now closes switches 143 and 154, thereby connecting motor 27 in the circuit. Since stop switch 139 is normally closed, the circuit between bus bars L_1 and L_2 is now complete, and the motor 27 is started in operation. When switch 154 is closed it will be seen that by virtue of wire 157 the circuit to the coil 133 of solenoid 134 may be closed even though interlocking switch 130 is subsequently opened. Now when the operator actuates lever 45 downwardly to close brake switch 159 through arm 59, and lever 59', interlocking switch 130 is simultaneously opened. Motor 27, however, as pointed out before, will continue to operate. Upon closing of brake switch 159 the brake 25 is released by the action of solenoid 163 thereby conditioning fluid motor shaft 22 for operation. Upon movement of lever 45 downwardly, control wheel 31 and internal gear 51 are also released for operation, as pointed out hereinbefore. Wheel 31 may now be moved in either direction to effect stroking of pump 26. The electric control mechanism including the starting and stopping switches, the interlock and brake switches, and the single pole switches, as well as the controls for the brake mechanism 25, are fully shown and described in my pending application Ser. No. 302,643, filed November 3, 1939, upon which Patent No. 2,250,586 was granted on July 29, 1941, and in the specific sense form no part of the present invention.

The control mechanism for the overhauling device which constitutes one of the novel features of the present invention, and which forms a part of the general hookup just depicted, will now be described in detail.

As shown in Fig. 6, the switch 73, which controls the operation of electric motor 74, and of the solenoid 117 of overhauling device 41, is normally closed. Inasmuch as switch 127 is normally open the circuit to motor 74 and solenoid 117 consequently is normally open.

Referring more specifically to the specific connections included in this device it will be seen that pole 132 of interlocking switch 130 is connected to the pole 175 of switch 73 by a wire 176. The other pole 177 of switch 73 is connected to the field and armature coils of motor 74 by a wire 178. Motor 74 in turn is connected to bus bar L_2 by wire 179. Wire 178 is connected to one end of the coil 180 of solenoid 117 by wire 181. The other end of coil 180 is connected to wire 179 by a wire 182.

Motor 74 may be of a type whose speed may vary directly in accordance with the load to which it is subjected. When the load is light the motor will have a relatively high speed, and when the load increases the speed will decrease correspondingly. Thus, in the event any slack should occur in the cable 34 before motor 27 is started, upon closing switch 127 the circuit of motor 74 will be completed, and consequently said motor will actuate sheaves 39 and 40 to operate the cable to the right (Fig. 1) and thereby take up the slack in the cable and cause the hook 43 to be lowered toward the object to be hoisted. It is to be understood that motor 74 operates only when cable is being paid out by drum 14. When the controls of pump 26 are so adjusted as to cause motor 23 to operate drum 14 in the hoisting direction, switch 73 will be open, thereby disconnecting the circuit to motor 74, as well as to solenoid 117. During the hoisting operation it is seen that cable 34 will now tend to drive sheaves 39 and 40, and consequently shaft 81. However, it will be remembered that when solenoid 117 is deenergized spring 118 operates to disengage clutch elements 79 and 169. Worm wheel 77 and worm gear 76, and consequently motor 74, will not be overhauled since clutch element 79 is loosely mounted on collar 89 of shaft 81, and consequently the shaft may move relative thereto.

As shown in Fig. 6, cam 70 is provided with a recessed portion 183 and a concentric portion 184. A cam follower 71 is provided at the lower arm 72 (Fig. 6) of bell crank lever 72'. The other arm 72'' of bell crank lever 72' is pivotally attached to the contact bar 189 of switch 73. Fig. 6 shows the parts in normal position, in which position cam follower 71 engages the concentric portion 184 of cam 70 immediately adjacent the recess 183, thereby holding contact bar 189 in engagement with poles 175 and 177 of switch 73. Upon continued movement of shaft 29, cam follower 71 will simply ride on the concentric portion of cam 70, and since the gear ratio between shaft 29 and cam 70 is 4 to 1, and since it will be remembered that three full turns of shaft 29 will effect actuation of the pump controls to full stroke position, cam 70 will not have made a complete rotation. When the pump controls are returned to neutral again the parts will again assume the position shown in Fig. 6. In the event that the pump control should be turned in the reverse direction to cause the winding drum 14 to wind in cable, cam 70 will be moved in a counter-clockwise direction by wheel 31, bringing the recess 183 thereof opposite the cam follower 71 whereupon the spring 190 will rock lever 72' in a clockwise direction (Fig. 6) causing movement of bar 189 out of engagement with the poles 175 and 177 of switch 73. Upon a continued movement of cam 70 in this direction bell crank lever will be swung in a clockwise direction, bringing bar 189 a further distance away from the poles of switch 73 until cam follower 71 engages the concentric portion of the cam 70 (as shown in dotted lines in Fig. 5), when the elements will be held against further movement. Upon movement of bar 189 out of engagement with the poles 175 and 177 of switch 73 the circuit to motor 74, as well as to solenoid 117, will be interrupted. The parts will remain in this position until wheel 31 is so actuated as to return the controls of pump 26 to neutral position at which time cam 70 and the elements actuated thereby will assume the position shown in Fig. 6.

From the foregoing description it is seen that a highly useful mechanism has been provided. The hand control mechanism for the hydraulic transmission which operates the winch is normally held in neutral position. In order to release this mechanism for operation manual releasing means must be operated. This not only releases the control means for operation, but also causes the brake for the fluid motor shaft to be released, thereby preventing undue pressure surges in the system. Upon starting of the electric motor for driving the fluid transmission, the overhauling motor is also conditioned for operation, and consequently any slack that may occur in the cable is immediately taken up before the winch is actuated to pay out cable. It is also seen that the cable overhauling device is automatically disconnected when the winch is conditioned to wind in cable. This device is especially

desirable in cases where a small light hook is employed which is incapable of maintaining the cable taut.

The novel means associated with this device for retaining the locking elements in inoperative position during movement of the control wheel also insures proper operation of the winch under all conditions of operation.

While the embodiment herein shown is admirably adapted to fulfill the objects primarily stated, it is to be understood that the invention is not to be limited thereto since it may be embodied in other forms, all coming within the scope of the claims which follow.

What is claimed is:

1. In a device of the class described, the combination of a winch, means for actuating said winch to wind in or pay out cable, control means for controlling the direction of operation of said winch, a cable overhauling device adapted to maintain the cable unwound by said winch taut, said overhauling device comprising a pair of sheaves through which the cable extends, means operable on one of said sheaves for urging the same into frictional engagement with said cable, means for simultaneously operating said sheaves to pay out cable, said last mentioned means including an electric motor, gearing disposed between said sheaves and said motor, clutch means for disconnecting said sheaves from said motor, means including a solenoid for engaging said clutch, and resilient means for disengaging said clutch upon deenergization of said solenoid.

2. In a device of the class described, the combination of a winch, means for actuating said winch to wind in or pay out cable, control means for controlling the direction of operation of said winch, a cable overhauling device adapted to maintain the cable unwound by said winch taut, said overhauling device comprising a pair of sheaves through which the cable extends, means operable on one of said sheaves for urging the same into frictional engagement with said cable, means for simultaneously operating said sheaves to pay out cable, said last mentioned means including an electric motor, gearing disposed between said sheaves and said motor, clutch means for disconnecting said sheaves from said motor, means including a solenoid for engaging said clutch, resilient means for disengaging said clutch upon deenergization of said solenoid, a normally closed switch for controlling the operation of the said motor and solenoid associated with said overhauling device, a starting switch for said motor, and means operated by the said control mechanism for said winch for opening said normally closed switch when the said control mechanism has been so adjusted as to cause said winch to wind in cable.

3. In a device of the class described, the combination of a winch, means for actuating said winch to wind in or pay out cable, control means for controlling the direction of operation of said winch, a cable overhauling device adapted to maintain the cable unwound by said winch taut, said overhauling device comprising a pair of sheaves through which the cable extends, means operable on one of said sheaves for urging the same into frictional engagement with said cable, means for simultaneously operating said sheaves to pay out cable, said last mentioned means including an electric motor, gearing disposed between said sheaves and said motor, clutch means for disconnecting said sheaves from said motor, means including a solenoid for engaging said clutch, resilient means for disengaging said clutch upon deenergization of said solenoid, a normally closed switch for controlling the operation of the said motor and solenoid associated with said overhauling device, a starting switch for said motor, means operated by the said control mechanism for said winch for opening said normally closed switch when the said control mechanism has been so adjusted as to cause said winch to wind in cable, said last mentioned means including a cam, and lever means operatively connecting said cam and said switch.

4. In a device of the class described, the combination of a cable overhauling device, comprising a pair of sheaves through which said cable extends, resilient means for urging one of said sheaves toward the other to establish a frictional connection between said sheaves and cable, a motor, gearing disposed between said motor and said sheaves whereby simultaneous movement is imparted to said sheaves causing the latter to pay out cable, clutch means for connecting or disconnecting said motor from said sheaves, electrical means comprising a solenoid for engaging said clutch, resilient means for disengaging said clutch upon deenergization of said solenoid, switch means for controlling the operation of said motor and solenoid, and cam means for actuating said switch to open and closed position.

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