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2,567,526

CABLE WINCH

Filed July 9, 1948

3 Sheets-Sheet 1

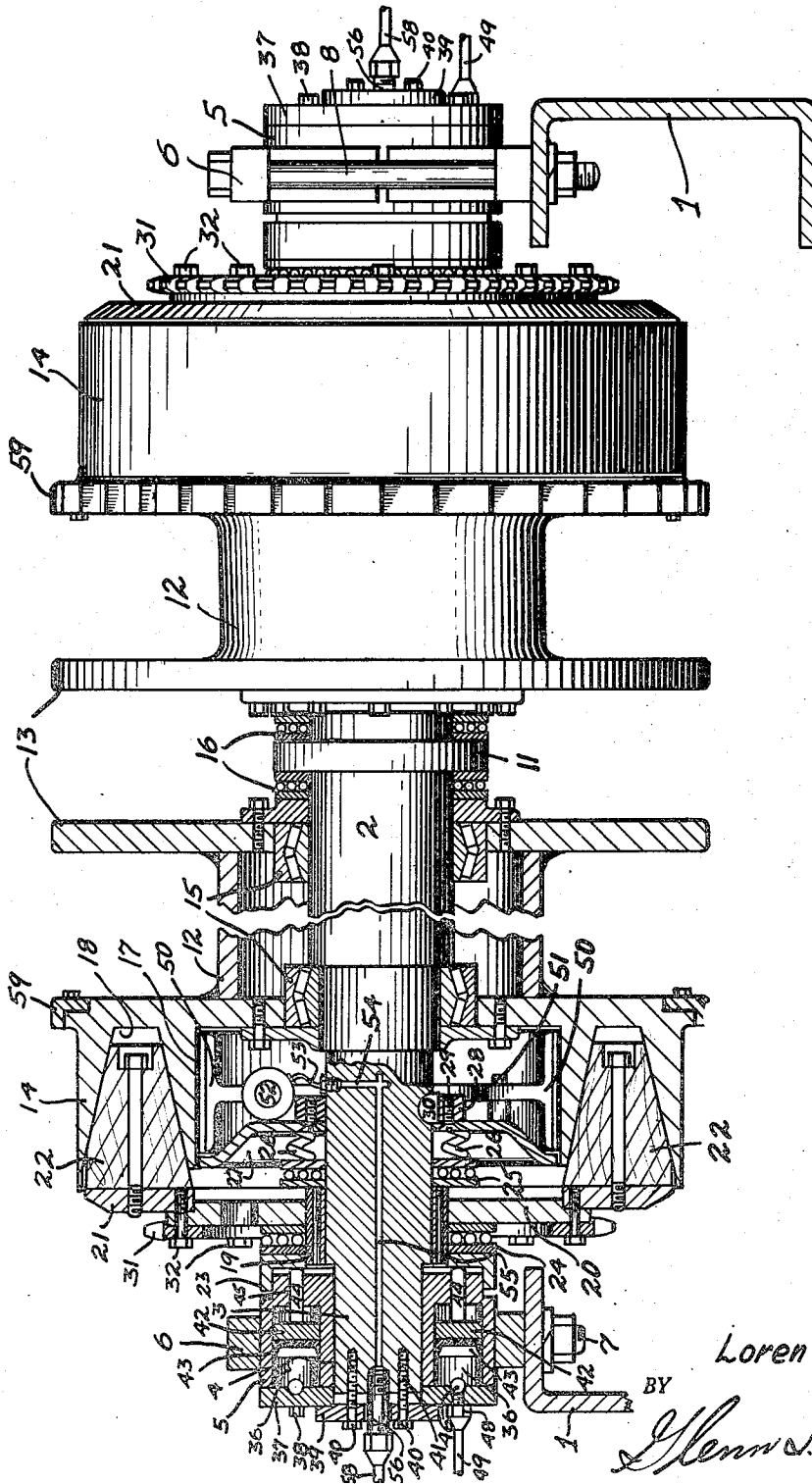


Fig. 1

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3 Sheets-Sheet 2

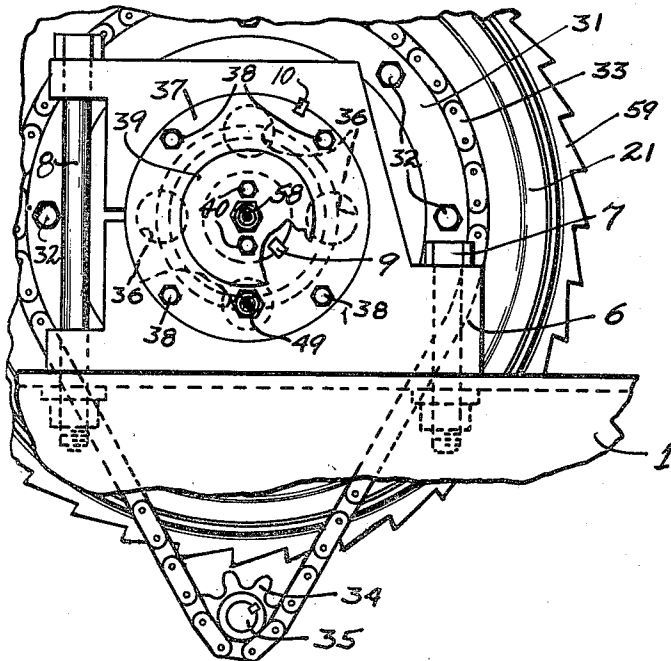


Fig. 2

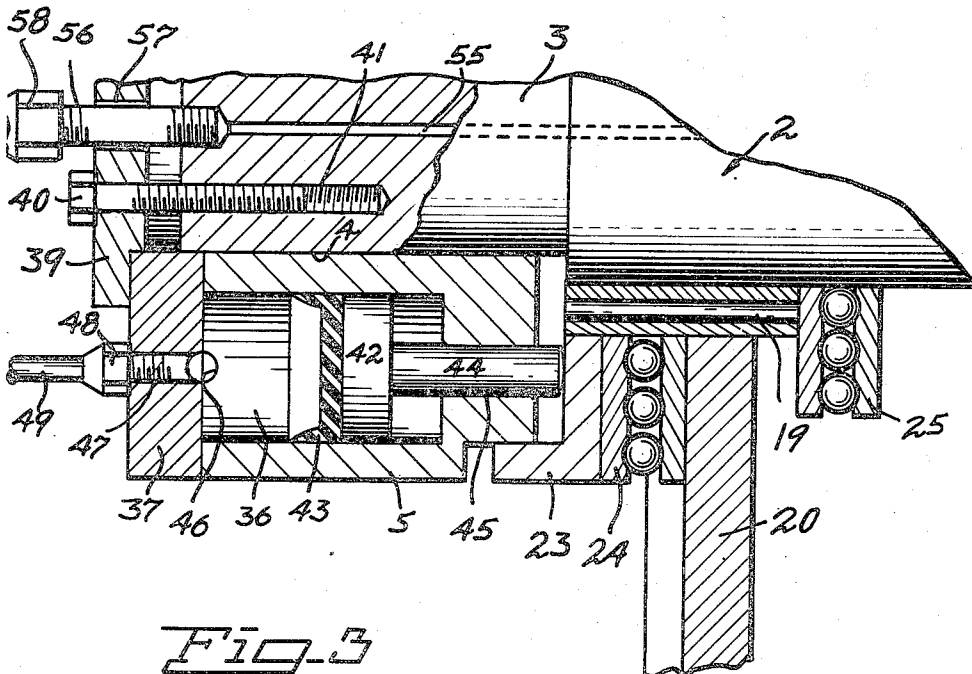


Fig. 3

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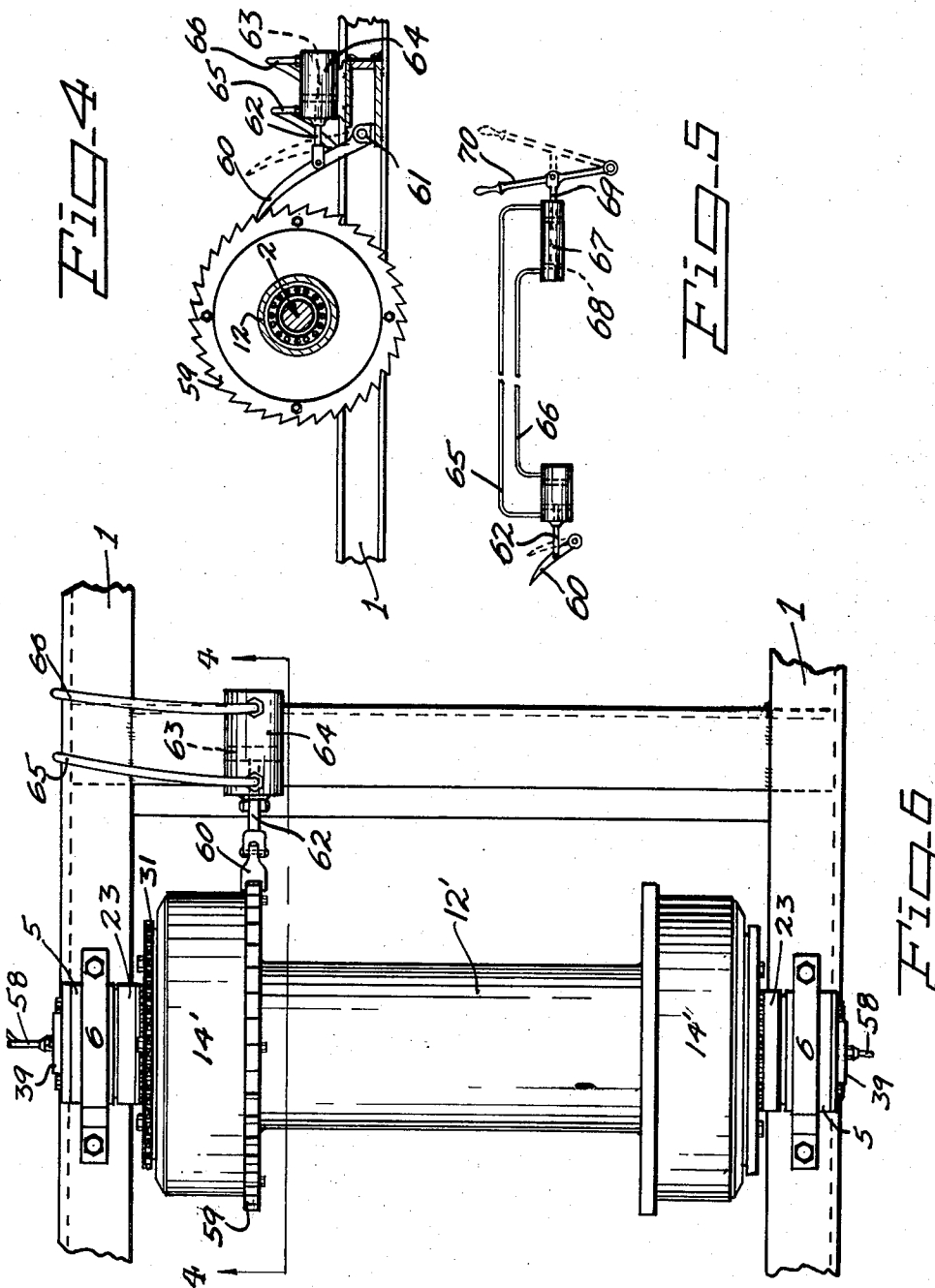
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3 Sheets-Sheet 3



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CABLE WINCH

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4 Claims. (Cl. 254—187)

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This invention relates to a cable winch and it is one object of the invention to provide a winch which is hydraulically controlled, thus allowing a workman operating the winch to stand at such distance from the winch that he will not be liable to be injured in case a cable is broken or mechanism forming parts of the winch are broken or otherwise damaged.

Another object of the invention is to provide a winch having a drum or drums rotatably mounted upon an axle and having associated therewith clutch mechanism which is hydraulically controlled and also hydraulic brakes.

Another object of the invention is to provide a winch wherein the clutch mechanism is normally held in an inoperative position by springs and moved to an operative position by hydraulic pressure, retrograde rotation of the drum being prevented by a pawl which is moved into and out of engagement with a ratchet wheel on the drum by hydraulic means.

Another object of the invention is to provide a hydraulically controlled winch which is easy to control and very efficient in operation.

With these and other objects the invention consists of a special construction and arrangement of parts illustrated in the accompanying drawings wherein:

Fig. 1 is a view showing a double drum winch partially in elevation and partially in longitudinal section.

Fig. 2 is an end view of the winch.

Fig. 3 is a fragmentary view upon an enlarged scale showing a portion of the winch principally in section and partially in elevation.

Fig. 4 is a sectional view showing a pawl for preventing retrograde rotation of the drums.

Fig. 5 is a diagrammatic view of the control mechanism for the pawl.

Fig. 6 is a top plan view of a winch having a single drum.

This improved winch is mounted upon a support which may be of any suitable construction and in the present illustration consists of channel bars 1 constituting the chassis bars or other portions of the frame of a motor truck. An axle 2 extends across the frame and has reduced end portions 3 which fit into center openings 4 of heads 5. These heads are mounted in clamps 6 which are split, as shown in Figure 2, and are secured upon the bars 1 by bolts 7 and 8. The axle is keyed to the heads as shown at 9 and the heads keyed to the clamps as shown at 10, and when the bolts 7 and 8 are tightened the heads will be held against turning in the clamps and

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the axle also prevented from having turning movement. A collar or ring 11 surrounds the axle midway its length and at opposite sides of this collar are drums 12 having heads 13 and 14 at their inner and outer ends. Roller bearings 15 mount the drums for rotary movement about the shaft and between the collar 11 and inner ends of the drums are thrust bearings 16. The heads 14 are of greater dimensions than the heads 13 and each is formed with a centrally located brake chamber or pocket 17 and with an annular groove or recess 18 which surrounds the chamber 17 and is in concentric relation thereto.

The drums and their operating means are of duplicate construction and the operating means for the single drum 12' shown in Figure 6 is also of the same construction provided for the double drums. This single drum extends the full width of the frame and at its ends has heads 14' corresponding to the outer heads of the double drums. Therefore the operating and controlling means now described will be understood to apply to all of the drums.

Referring to Figure 1 it will be seen that a roller bearing 19 fits about the axle between the head 5 and the outer head of the drum and about this bearing is a clutch plate 20 carrying a ring 21 to which are secured tapered plugs 22 which fit into the tapered groove or recess 18. A cap 23 fits loosely about the reduced inner end portion of the head 5 between this cap and the plate 20 is a thrust bearing 24, the cap and the bearing 24 fitting about the roller bearing 19 as shown clearly in Figure 3. A thrust bearing 25 engages the inner end of the bearing 19 and at its inner side the bearing 25 has engagement with coiled springs 26 carried by a concavo-convexed plate 27 which fits into the outer end of the chamber 17 and is secured to a collar 28 by screws 29. This collar fits about the axle and secured thereto by a key 30 so that it is held stationary. The springs 26 urge the clutch plate 20 outwardly and this causes the clutch to be normally inoperative and the clutch plate may turn without the drum turning with it. When, however, the clutch plate is shifted towards the drum the plugs 22 will be forced tightly into the groove or recess 18 and the drum will be turned with the clutch plate. A sprocket wheel 31 is secured against the peripheral edge portion of the clutch plate by screws 32 and about the sprocket wheel is trained a sprocket chain 33 which extends downwardly and is engaged about a smaller sprocket wheel 34 carried by a drive shaft 35.

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The head or housing 5 is formed with circumferentially spaced cylinders 36 which are closed at their outer ends by a ring or annular closure plate 37 secured to the housing by screws 38 and this closure plate has its center opening registering with the center opening 4 of the housing and normally closed by a disk 39 secured by screws 40 which pass through the disk and into threaded sockets 41 formed in the axle longitudinally thereof. Within each cylinder is a piston 42 carrying a sealing cup 43 and from the piston extends a piston rod 44 which slidably passes through an opening 45 leading from the inner end of the cylinder and bears against the cap 23. When the pistons are forced towards inner ends of the cylinders their rods apply pressure to the cap and the clutch plate will then be shifted towards the head 14 in opposition to action of the springs 26 and the plugs 22 will have clutching engagement with walls of the groove 18 to cause turning of the drum with the clutch plate. Fluid under pressure is to be admitted simultaneously to the upper ends of the cylinders and in order to do so the confronting faces of the housing and the ring or plate 37 are formed with annular recesses which register, as shown in Figure 3 and form an annular passage 46 having communication with all of the cylinders. A port 47 formed through the plate 37 communicates with this annular passage and into the outer end of this port is screwed a nipple 48 to which is attached a tube 49 leading from a suitable source of fluid under pressure. As long as fluid pressure is allowed from the tube or pipe the clutch will be held in its operative position and the drum will turn but when fluid pressure through the tube is released, the springs will return the clutch ring or plate to its inoperative position and rotation of the drum in a direction to wind cable thereon will cease.

In order to control the speed at which the drum rotates and bring it to a stop after the clutch has been rendered inoperative there have been provided brakes 50 which are disposed within the chamber 17 and pivoted to the plate by pins 51. These brakes are of a conventional hydraulic construction and include the usual cylinder 52 to which fluid under pressure is admitted through a tube 53 leading from a side extension 54 at the inner end of a port 55 formed longitudinally of the axle and leading from the end thereof. A nipple 56 which is screwed into the outer end of the port 55 passes through an opening 57 in the plate 39 and to this nipple is attached a tube 58 leading from a conventional brake applying pump and it will be readily understood that when pressure is applied to the fluid the brakes will be actuated and their shoes brought into gripping engagement with the annular wall of the chamber 17 to stop rotation of the drum.

It is desired to permit the drum to be positively held against rotation in a retrograde rotation after a cable has been wound thereon as much as desired and in order to do so there has been provided a ratchet wheel 59 carried by the head 14 and engaged by a pawl 60. The pawl is pivoted to a bracket 61 mounted upon the frame and to the pawl is pivotally connected the outer end of the rod 62 of a piston 63 which is slidable longitudinally in a cylinder 64. This cylinder is mounted over the bracket carrying the pawl and to its opposite ends are connected pipes or tubes 65 and 66 leading to opposite ends of a cylinder 67. A piston 68 is slidable longitudinally in the cylinder 67 with its rod 69 projecting from one end thereof and attached to a lever 70, and from

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an inspection of Figure 5 it will be seen that when an attendant moves the lever in a direction to shift piston 68 forwardly fluid will be forced through the tube 66 and the pawl moved into engagement with the ratchet wheel 59 whereas when the lever is moved in an opposite direction and shifts the piston rearwardly in the cylinder 67 the fluid will be forced through the tube 65 and the pawl will be moved to its inoperative position.

I have therefore perfected an improved winch in which its drum or drums rotate about a stationary shaft and in which rotation of the drum or drums is controlled by hydraulic mechanism adapted to be operated by an attendant standing at sufficient distance from the winch to eliminate danger of injury to the attendant.

Having thus described the invention, what is claimed is:

1. In a cable winch, a stationary shaft, housings into which ends of said shaft fit, means for mounting said housings upon a support, a drum rotatable about said shaft and having heads at its ends, one head constituting a clutch member and being formed with a chamber constituting a brake chamber, an adjustable clutch member adapted to have rotary motion imparted to it and being shiftable along the shaft into and out of an operative position for clutching engagement with the clutch member of the drum, a fluid operated brake in said brake chamber, means for delivering fluid under pressure to the brake structure including a passage formed in the shaft and a tube extending from said passage outwardly from the shaft to the brake, spring means yieldably holding the adjustable clutch in an inoperative position, fluid operated means carried by one housing for moving the adjustable clutch to its operative position, a ratchet wheel carried by said drum, a pawl for engaging said ratchet wheel and preventing retrograde rotation of the drum, and fluid operated means for moving the pawl into and out of operative engagement with the ratchet wheel.

2. In a cable winch, a stationary shaft, housings into which ends of said shaft fit, means for mounting said housings upon a support, a drum rotatable about said shaft and having heads at its ends, one head constituting a clutch member and being formed with a chamber constituting a brake chamber, an adjustable clutch member adapted to have rotary motion imparted to it and being shiftable along the shaft into and out of an operative position for clutching engagement with the clutch member of the drum, a fluid operated brake in said brake chamber, means for delivering fluid under pressure to the brake structure, one housing having cylinders therein and a fluid inlet passage communicating with all of its cylinders, pistons in said cylinders having stems projecting from the cylinders and bearing against the movable clutch, and spring means urging the movable clutch member towards an inoperative position.

3. In a cable winch, a stationary shaft, housings into which ends of said shaft fit, means for mounting said housings upon a support, a drum rotatable about said shaft and having heads at its ends, one head constituting a clutch member and being formed with a chamber constituting a brake chamber, an adjustable clutch member adapted to have rotary motion imparted to it and being shiftable along the shaft into and out of an operative position for clutching engagement with the clutch member of the drum, a fluid operated brake in said brake chamber,

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one housing having cylinders therein extending longitudinally of the shaft and means for delivering fluid under pressure to the cylinders, pistons in said cylinders having rods projecting from the inner ends of the cylinders and engaging the movable clutch member for simultaneously imparting pressure to the said movable clutch member at circumferentially spaced points and forcing the movable clutch member into gripping engagement with the clutch member of the drum, and spring means urging the movable clutch member towards an inoperative position.

4. In a cable winch, a stationary shaft, housings into which ends of said shaft fit, means for mounting said housings upon a support, a drum 15 rotatable about said shaft and having heads at its ends, one head constituting a clutch member and being formed with a chamber constituting a brake chamber, an adjustable clutch member adapted to have rotary motion imparted to it 20 and being shiftable along the shaft into and out of an operative position for clutching engagement with the clutch member of the drum, a fluid operated brake in said brake chamber, means for delivering fluid under pressure to the brake, a disk in the brake chamber carrying the

brake, a bearing for the movable clutch member, springs between the disk and the bearing urging the movable clutch member towards an inoperative position, pistons slidable longitudinally in cylinders formed in the adjoining housing and having rods projecting from the inner end of the housing for operative engagement with the movable clutch member, and means for delivering fluid under pressure to the cylinders and 10 simultaneously imparting movement to the pistons for forcing the movable clutch into gripping engagement with the clutch member of the drum.

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