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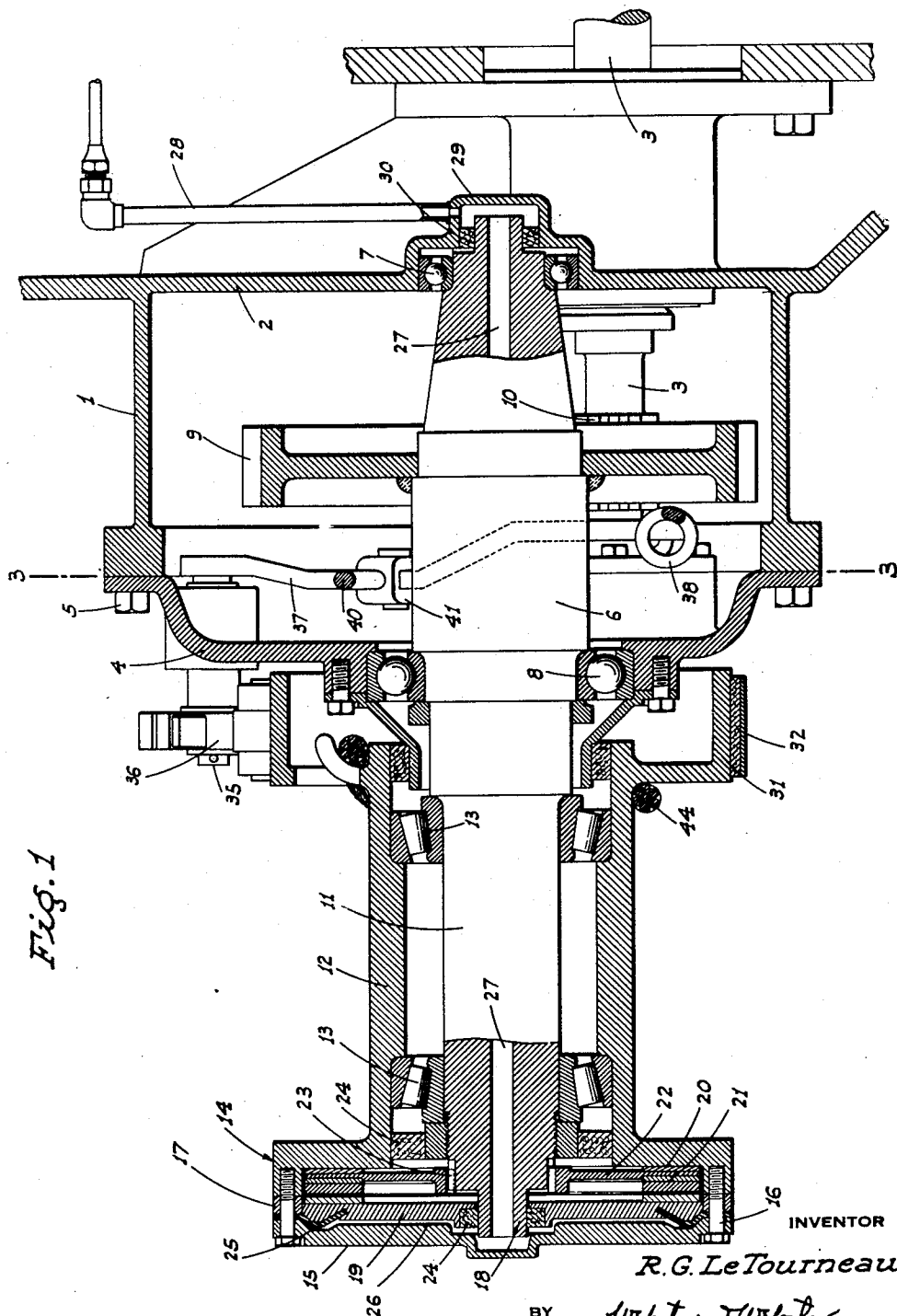
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2,495,463

POWER WINCH

Filed March 13, 1945

2 Sheets-Sheet 1



Jan. 24, 1950

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2 Sheets-Sheet 2

Fig. 2

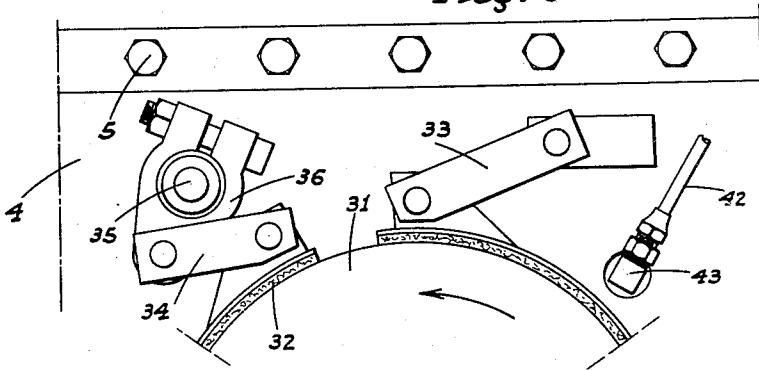


Fig. 3

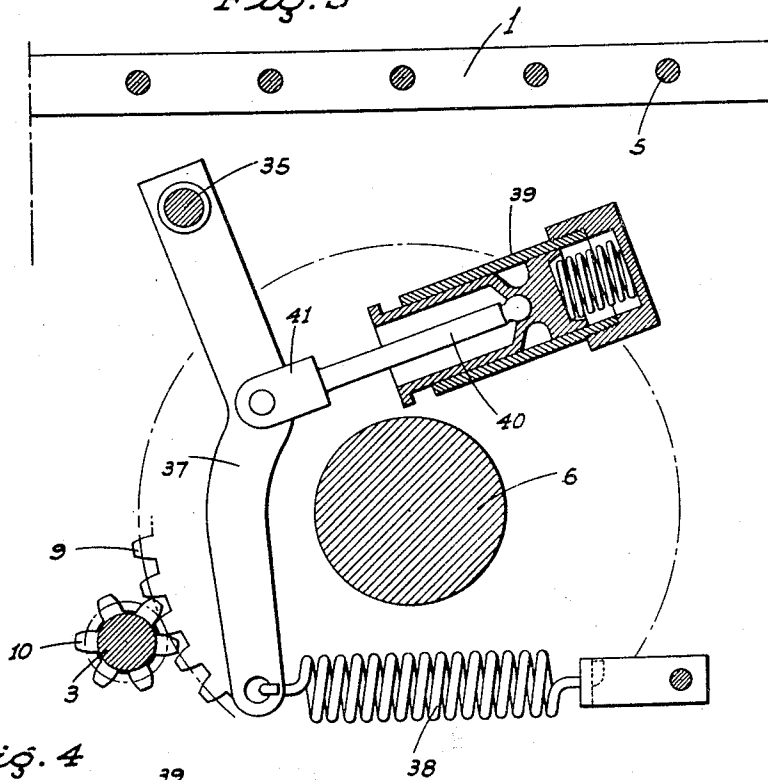
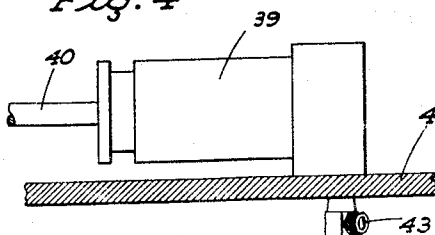


Fig. 4



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POWER WINCH

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3 Claims. (Cl. 254—187)

1

This invention has for an object the provision of an improved power winch, and in particular a power winch adapted to be tractor mounted and actuated; tractor-mounted power winches being commonly known to the trade as power control units.

Another object of this invention is to provide a power winch which comprises a cable drum turnably mounted on a driven shaft; there being a novel clutch unit incorporated in one end of the drum and operative to couple the shaft to said drum in driving relation to the latter, such clutch, in the present embodiment, being fluid pressure actuated.

A further object of the instant invention is to provide a power winch, as in the preceding paragraph, in which the drum is formed at its outer end with an enlarged cylindrical housing in which the clutch unit is mounted; such housing including a removable outer end plate which permits of easy access to the clutch unit for ready maintenance or repair.

An additional object is to provide a power winch comprising a driven shaft projecting outwardly from a supporting case and having a cable drum turnably mounted on the projecting part of said shaft, the outer end of the cable drum being formed as a cylindrical clutch housing in which a clutch unit is mounted, said clutch unit being operative to couple the shaft to the drum in driving relation to the latter; the inner end of the cable drum being formed as a brake drum, and a brake assembly surrounding said brake drum in cooperative relation, the brake assembly being controlled through the medium of a fluid pressure actuated power cylinder mounted in protected relation within said supporting case.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a longitudinal sectional elevation of the power winch.

Figure 2 is a fragmentary end elevation of the

2

brake drum and brake assembly associated therewith.

Figure 3 is a fragmentary cross section on line 3—3 of Fig. 1.

Figure 4 is a fragmentary plan view showing the mounting of the brake assembly control cylinder.

Referring now more particularly to the characters of reference on the drawings, the power winch comprises an outwardly projecting case 1 adapted to be formed in connection with an up-standing wall 2 of a tractor frame or housing, and through which wall 2 a power take-off shaft 3 projects, and which shaft is adapted to be selectively and reversibly driven from the tractor engine in conventional manner.

The case 1 includes a removable front plate 4 held in place about its perimeter by means of cap screws 5. A heavy-duty shaft 6 extends through the case 1 in spaced but parallel relation to the power take-off shaft 3; said shaft 6 being journaled in the wall 2, as at 7, and journaled in the front plate 4, as at 8.

Within the case 1 the shaft 6 is fitted with a drive gear 9 which runs in mesh with a pinion 10 on the power take-off shaft 3. The gear 9 is disposed some distance rearwardly of front plate 4 in order to provide room for the mounting of a brake assembly control power cylinder, as will hereinafter appear in detail.

The shaft 6 projects outwardly of the front plate 4 a substantial distance, as at 11, and a cable drum 12 is turnably mounted on said projecting part 11 of the shaft by means of axially spaced, combination annular and thrust bearings 13.

At its outer end the cable drum 12 is formed with an enlarged cylindrical clutch housing 14 which includes a circular outer end plate 15 removably attached by means of a peripheral row of cap screws 16, there being a spacer ring 17 directly beneath the peripheral portion of the outer end plate 15. A fluid pressure actuated clutch unit is mounted in the cylindrical housing 14 and functions to couple the shaft 6 in driving relation to the cable drum 12, in the following manner:

The projecting part 11 of shaft 6 is reduced in diameter at its outer end to form a neck 18 on which a radially extending piston plate 19 is

3

slidably mounted; the neck being turnable in the plate. Between the piston plate 19 and the bottom of the cylindrical housing 14, which is formed as a clutch face 20, there is interposed a disc clutch mechanism 21 which includes a disc 22 splined on the shaft part 11, as at 23, for sliding movement therealong. Suitable seals 24 are disposed between the neck 18 and the piston plate 19, and between the shaft part 11 and the inner wall of the cable drum 12, while a further seal 25 of generally diaphragm type is connected between the piston plate 19 and the clutch housing 14, being engaged between the outer end plate 15 and the ring 17. The space between the outer end plate 15 and the piston plate 19 provides a pressure chamber 26, to which fluid under pressure is adapted to be fed from a longitudinal bore 27 which extends through the shaft 6 from end to end thereof.

Upon introduction of pressure into the chamber 26 from the bore 27, the piston plate 19 is urged inwardly, clamping the disc clutch mechanism 21 between said piston plate 19 and clutch face 20, thereby coupling the disc 22 in driving relation to the clutch housing 14. In this manner the shaft 6 is coupled in driving relation to the cable drum 12.

Fluid pressure is introduced into the shaft bore 27 from within the entire mechanism by means of a fluid pressure conduit 28 behind the wall 2, and which conduit leads to a cap 29 formed with said wall 2 in communication with the rear end of shaft 6. A seal 30 prevents leakage from the cap 29. Fluid under pressure is adapted to be fed through conduit 28 from a valve controlled pressure system on the tractor, and which system includes a hand valve adjacent the operator's station.

At its rear end the cable drum 12 is formed with an enlarged brake drum 31 about which a lined brake band assembly 32 engages, said brake band assembly being supported from the case 1 by opposed pivotally mounted links 33 and 34; the brake band assembly being of self-energized type but arranged to permit overrunning in the direction of drive of the drum to wind cable thereon, and which direction is indicated by the arrow in Fig. 2.

Release of the brake band assembly is accomplished by outward movement of the link 34, and said link is adapted to be so moved by means of a turntable shaft 35 which extends through the front plate 4 and carries an adjustable lever 35 pivotally connected to the outer end of said link 34. Within the case 1 the shaft 35 is fitted with an elongated dependent lever 37, to the lower end of which a tension spring 38 is connected, said tension spring normally urging the lever 37 in a direction to apply the brake. A fluid pressure actuated power cylinder 39 is mounted on the back of front plate 4 of case 1 with the piston rod 40 of said cylinder connected by a clevis 41 to the lever 37 intermediate the ends of the latter. The power cylinder 39 is positioned so that upon introduction of fluid pressure therein and resultant advance of the piston rod 40 the lever 37 is swung in a direction to release the brake. Fluid pressure is fed to the power cylinder 39 through the medium of a conduit 42 which connects with a fitting 43 extending through the front plate 4 into said cylinder. The fluid pressure in conduit 42 is controlled by a valve adjacent the operator's station on the tractor.

A cable 44 is connected to the cable drum 12 in any suitable manner, as for example by means of

4

the cable anchor shown in co-pending application, Serial No. 566,132, filed December 1, 1944, now Patent No. 2,374,111, dated April 17, 1945.

From the cable drum 12 the cable 44 leads to the implement or the like, which is to be cable actuated from the power winch. Normally, in the described structure, the brake is set and the clutch is released. To wind cable onto the cable drum 12 the clutch is engaged, in the manner previously described, causing rotation of said cable drum in the direction of the arrow in Fig. 2, and at which time the brake drum 31 over-runs the brake assembly.

When the cable has been wound onto the cable drum 12 to the desired extent, the clutch is released and immediately the brake locks the cable drum 12 against rotation in an unwinding direction. To unwind the cable from the cable drum 12 by a pull on the cable, or drive of shaft 6 in the corresponding direction, the brake is first released by energizing the power cylinder 39.

While the present invention may conveniently be embodied in a multiple-drum power winch, it is here described, for the purpose of clarity and simplicity, as incorporated in a single-drum power winch.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent is desired:

1. A winch comprising an enclosed housing, a shaft journaled in the housing and projecting exteriorly beyond one wall thereof, means to drive said shaft, a cable drum mounted for rotation on said shaft outside said housing, means to respectively clutch or declutch the drum into and out of driving relation with the shaft at a point outside the housing, a brake on the cable drum at a point outside the housing, and means enclosed within the housing and operatively connected with said brake to control the functioning thereof, such brake including a brake drum, a split brake band on the drum, a pair of opposed links, one end of each link being pivotally connected to one free end of the band, respectively, one link at its other end being pivotally mounted on the housing, a lever pivotally connected to the other end of the other link, a shaft fixed to the lever and projecting into the housing, the brake operating means within the housing being connected to the last named shaft and operable to turn the same.

2. A winch comprising an enclosed housing, a shaft journaled in the housing and projecting exteriorly beyond one wall thereof, means to drive said shaft, a cable drum mounted for rotation on said shaft outside of said housing, means to respectively clutch or declutch the drum into and out of driving relation with the shaft at a point outside the housing, a brake drum on the cable drum at a point outside the housing, a split brake band on the brake drum, a pair of opposed links, one end of each link being pivotally connected to one free end of the band, respectively, one link at its other end being pivotally mounted on the housing, a lever on the other end of the other link, a shaft on the lever projecting into the hous-

5

ing, an elongated dependent lever fixed to the last named shaft within the housing, and means within the housing to operate said dependent lever to effect turning of such last named shaft.

3. A device as in claim 2 in which the last named means includes a means to positively push the elongated lever in one direction and a spring to pull it in the opposite direction.

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