

Dec. 28, 1943.

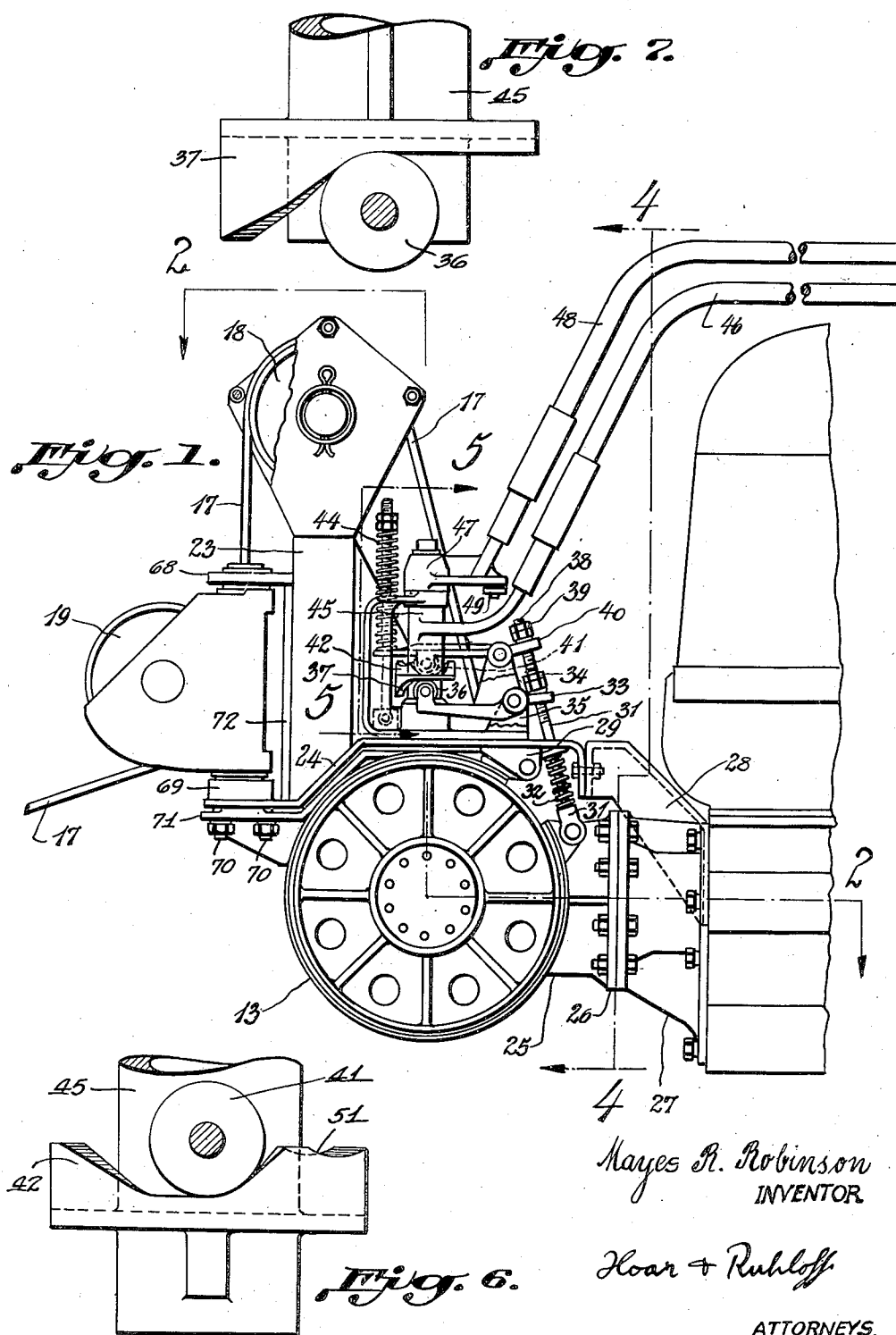
M. R. ROBINSON

2,337,772

WINCH

Filed Oct. 21, 1940

3 Sheets-Sheet 1



Mayes R. Robinson
INVENTOR

Hoar & Ruhloff

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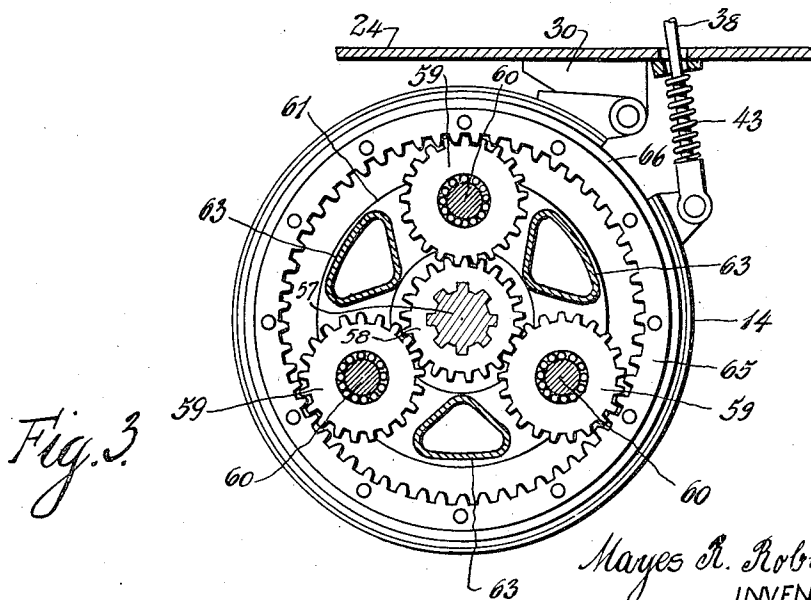
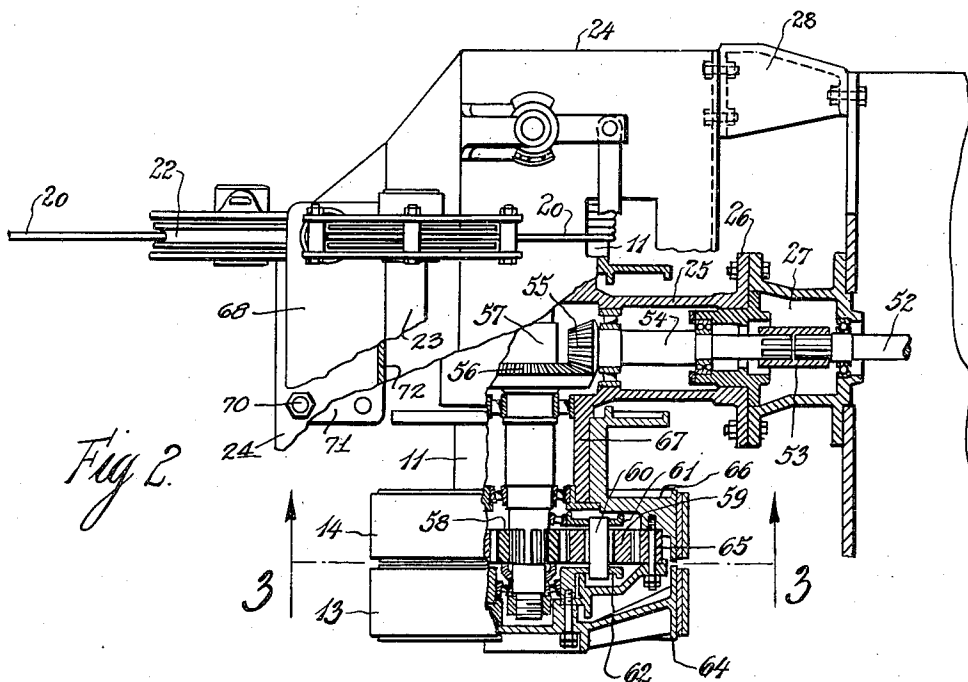
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WINCH

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3 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,337,772

WINCH

Mayes E. Robinson, Burlingame, Calif., assignor,
by means assignments, of one-third to Charles
H. Grant, San Francisco, Calif.; one-third to
Frank P. Lawler, Chicago, Ill.; and one-third
to Paul J. Tyler, Oroville, Calif.

Application October 21, 1940, Serial No. 362,087

1 Claim. (Cl. 254—185)

My invention relates to new and useful improvements in winches, more particularly to winches intended to be attached to the rear ends of tractors, to be driven by the power take-off shaft of the tractor, and still more particularly to two-drum winches for such use.

The principal object of my present invention is to devise a winch wherein each drum is rigidly mounted so as to preserve its alignment.

A further object is to mount rigidly the fairleads, control levers and associated mechanism, on a part rigidly braced to the tractor, and which also serves as a guard for the winch machinery.

A still further object is to provide means for holding either drum released for free wheeling.

In addition to principal objects, above stated, I have worked out a number of novel and useful details, which will be readily evident as the description progresses.

My invention consists in the novel parts and in the combination and arrangement thereof, which are defined in the appended claims, and of which one embodiment is exemplified in the accompanying drawings, which are hereinafter particularly described and explained.

Throughout the description, the same reference number is applied to the same member or to similar members,

Figure 1 is a side elevation of my winch.

Figure 2 is a plan view, partly in section, taken along the line 2—2 of Figure 1.

Figure 3 is a vertical section, taken along the line 3—3 of Figure 2, and illustrating one of the sets of planetary gears of my winch.

Figure 4 is a front elevation, taken along the line 4—4 of Figure 1.

Figure 5 is a rear elevation of a portion of my winch, taken along the line 5—5 of Figure 1.

Figure 6 is an enlarged side elevation of the brake cam assembly of my winch, taken along line 6—6 of Figure 5.

Figure 7 is an enlarged side elevation of the clutch cam assembly of my winch, taken along line 7—7 of Figure 5.

Turning now primarily to Figure 4, we see that my winch consists primarily in two drums 11, 12, each actuated by conventional planetary gearing. Drum 11 is controlled by clutch 13 and brake 14. Drum 12 is similarly controlled by clutch 15 and brake 16.

Rope 17 extends, from drum 11, over fairlead sheave 18, under swivelled fairlead sheave 19, and thence to the work (not shown). Rope 20 similarly extends, from drum 12, over fairlead sheave

21, under swivelled fairlead sheave 22, and thence to the work (not shown).

The upper fairlead sheaves 18 are mounted on two pedestals 23, which in turn are carried by the main deck-plate 24, being preferably welded thereto. The lower fairlead sheaves 19 are swiveled between a plate 68, carried by and preferably welded to, pedestals 23; and a boss 69, carried by and preferably welded to, deck-plate 24. Deck-plate 24 is secured, as by bolts 70, to a projection 71 of the main gear case 25. Pedestals 23 are preferably braced by a plate 72, preferably welded to them.

The main gear case 25 has a circular flange 26 for rigid attachment by bolts to an adaptor 27, which in turn is secured to the rear end of the tractor. The use of an adaptor enables one standard type of winch to be built and then to be fitted to any tractor.

Braces 28 are attached by bolts to deck plate 24 and secured to the rear end of the tractor by bolts. Like the adaptor, they vary according to the tractor.

Each clutch and brake is actuated as will now be described as to the right hand clutch and brake.

The dead end of clutch band 13 is pivoted on a lug 29 secured as by welding to the lower side of deck-plate 24. Brake band 14 is similarly pivoted on lug 30.

The live end of clutch band 13 is pivoted on the lower end of a short rod 31, which passes upwardly through a hole in the deck-plate. Compression spring 32, bearing against the bottom of the deck-plate and the head of rod 31, tends to force the clutch band to unset. The upper end of rod 31 passes through a hole in the short end of lever 33, and carries an adjusting nut 34 which bears on this lever. The lever is pivoted on a lug 35 upstanding from deck-plate 24. The long end of the lever carries a roller 36, which bears on a cylindrical cam surface 37.

Similarly the live end of brake band 14 is pivoted on the lower end of a long rod 38, which has adjusting nut 39, bearing on lever 40, which carries roller 41, riding on cam surface 42. Spring 43 corresponds to spring 32. But this assemblage requires an additional adjustable spring 44, stronger than spring 43, to set the brake whenever permitted by cam surface 42 and roller 41.

The two cam surfaces 37 and 42 are integral with cylinder 45, which in turn is rotated by control-handle 46.

Comparing Figures 6 and 7, we see that the operation of my two-cam control is as follows. Fig-

ure 6 shows the brake control, and Figure 7 shows the clutch control. As shown, the controls are in neutral.

Rotating the cylinder 45 to the right in those figures, first brings cam surface 37 to bear on the clutch roller 36, depressing the roller, and hence (see Figure 1) raising the lever 33, thus pulling up on rod 31, and thus beginning to set clutch 13.

Note that the brake is still set. Thus we have an operating overlap between brake and clutch, and so the load will not drop, as it would if there were an intervening lag between putting the brake off and the clutch on. But, due to the nature of the brake band, it being a one-way brake, it will drag when the clutch is first set, thus only negligibly impeding the rotation of the winch drum.

(The apparent inconsistency between Figure 1 on the one hand and Figures 6 and 7 on the other hand, is due to the fact that in Figure 1 the brake control mechanism is beyond the cylinder 45 [this fact being indicated by the dotted lead-line to reference number 41 in that figure], and hence the brake cam surface 42 in Figure 1 appears reversed from the showing of that surface in Figure 7.)

Further rotation of cylinder 45 to the right completely sets the clutch by completely depressing roller 36. At the same time roller 41 rides up on cam surface 42, against the compression of spring 44 (see Figure 5), thus (see Figure 1) depressing lever 40, thereby slacking-up on rod 38 (see Figure 3) and thus permitting spring 43 to unset brake 14.

This setting the clutch before releasing the brake, and thereafter releasing the brake, is in accordance with, and dominated by, Patent No. 1,563,568, issued December 1, 1925, to Hoar.

Rotation of cylinder 45 to the left in Figures 6 and 7 will not affect clutch roller 36, and thus will leave the clutch still unset, but again brake roller 41 will ride up on cam surface 42, thus releasing the brake as already described. When thus fully released, the roller 41 comes to rest in a notch 51 on cam surface 42, thus enabling the operator to let go the handle 46, and leave the brake locked unset, in spite of brake-setting spring 44.

Pivotaly mounted on the top of cylinder 45 is cap 47, rotated by control-handle 48. By means of rod 49, cylinder 50 on the other side of the winch rotates synchronously with cap 47, and thereby controls clutch 15 and brake 16 in manner identical to the control of clutch 13 and brake 14 already described.

I shall now describe the operation of the planetary system of one winch. The power take-off shaft 52 is connected by a collar 53 to aligned shaft 54, which carries bevel pinion 55. This pinion drives bevel gear 56 on cross shaft 57.

Cross-shaft 57 carries sun gear 58. Planet gears 59 are carried by pins 60 which in turn are supported by spiders 61, 62, appropriately journaled on shaft 57, and joined together by stiffeners 63 between the planet gears. Clutch drum 64 is constrained to rotate with these spiders. An

internal gear 65 is constrained to rotate with brake drum 66 built integral with winch drum 11.

Winch drum 11 is journally supported on a hub extension 67 which forms an integral part (this being a feature of my invention) of gear case 25. In certain of the claims the gear case will be described as "T-shaped," hubs 67 constituting the arms of the T, and the main gear case 25 constituting the stem of the T. See Figure 2.

Let us now turn to Figure 3, and assume that shaft 57 and sun gear 58 impelled thereby are rotating counterclockwise and that spiders 61, 62 are held fast from rotating, by the pressure of clutch band 13 on clutch drum 64. Inasmuch as pins 60 are held stationary by the non-rotation of the spiders, planet gears 59 will be impelled, by the clockwise rotation of sun gear 58, to rotate clockwise, thus rotating internal gear 65 clockwise, and carrying winch drum 11 with it, to wind up the cable.

If now, however, clutch 13 is released and brake 14 is set, brake drum 66, winch drum 11 and internal gear 65 are all constrained against rotation, and the counterclockwise rotation of sun gear 58 will carry planet gears 59 rotating around it, each rotating clockwise but traveling bodily counterclockwise, rolling on the internal teeth of internal gear 65.

If both the clutch and the brake are set simultaneously, the clockwise rotation of brake drum 66 will have sufficient tendency to unset the brake, against the pressure of spring 44, so that the brake will but little impede the hauling-in of rope 17 by winch drum 11.

The deck-plate 24, in addition to supporting the fairleads, the cam cylinders, the pivots for the cam roller levers, and the dead ends of the brake and clutch bands, and being tied securely to the tractor by braces 28, serves as a dirt-guard for the winch drums and planetary machinery.

Having now described and illustrated one form of my invention, I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts herein described and shown, except insofar as specifically covered by my claim.

I claim:

In a winch, the combination of a T-shaped gear casing having the arms of the T integral with its stem, a drive shaft in the stem, a driven shaft in the arms, gears to connect the two shafts operatively, a winch drum journaled about each arm, two planetary transmissions, one being mounted at the end of each arm and operatively connecting the driven shaft to its respective drum to selectively drive, release or hold said drum, a dirt-guarding deck plate firmly attached to and overlying the T-shaped casing, fairleads for the two drums, mounted on the deck plate, clutch bands and brake bands constituting a part of the two planetary systems, dead ends for these bands mounted on the deck plate, controls for these bands mounted on the deck plate, and braces between the deck plate and the tractor to which the winch is to be attached.

MAYES R. ROBINSON.