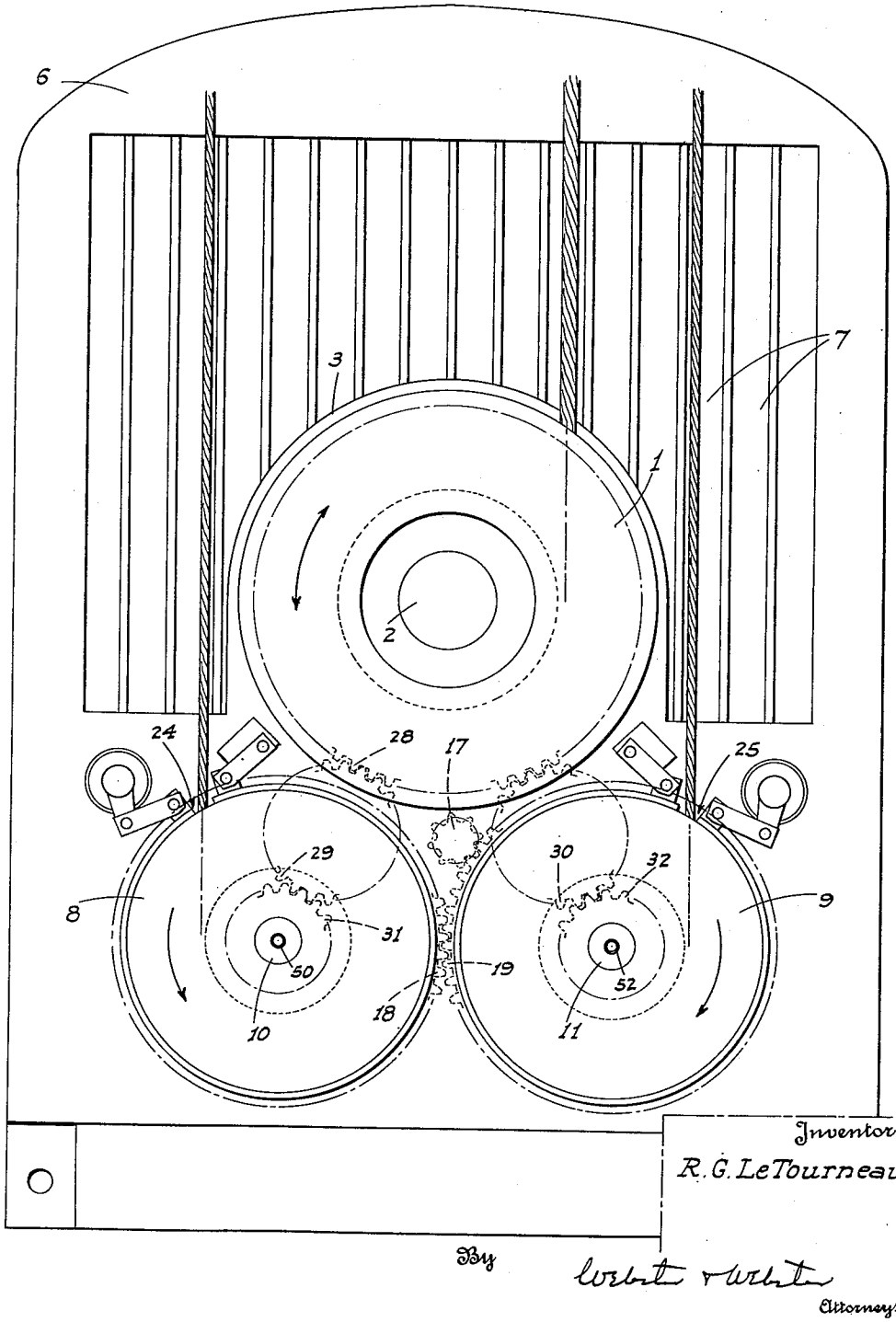
Nov. 7, 1950 R. G. LE TOURNEAU 2,529,299

MULTIPLE DRUM WINCH

Filed Dec. 15, 1944 3 Sheets-Sheet 1

Fig. 1



Inventor
R. G. LeTourneau

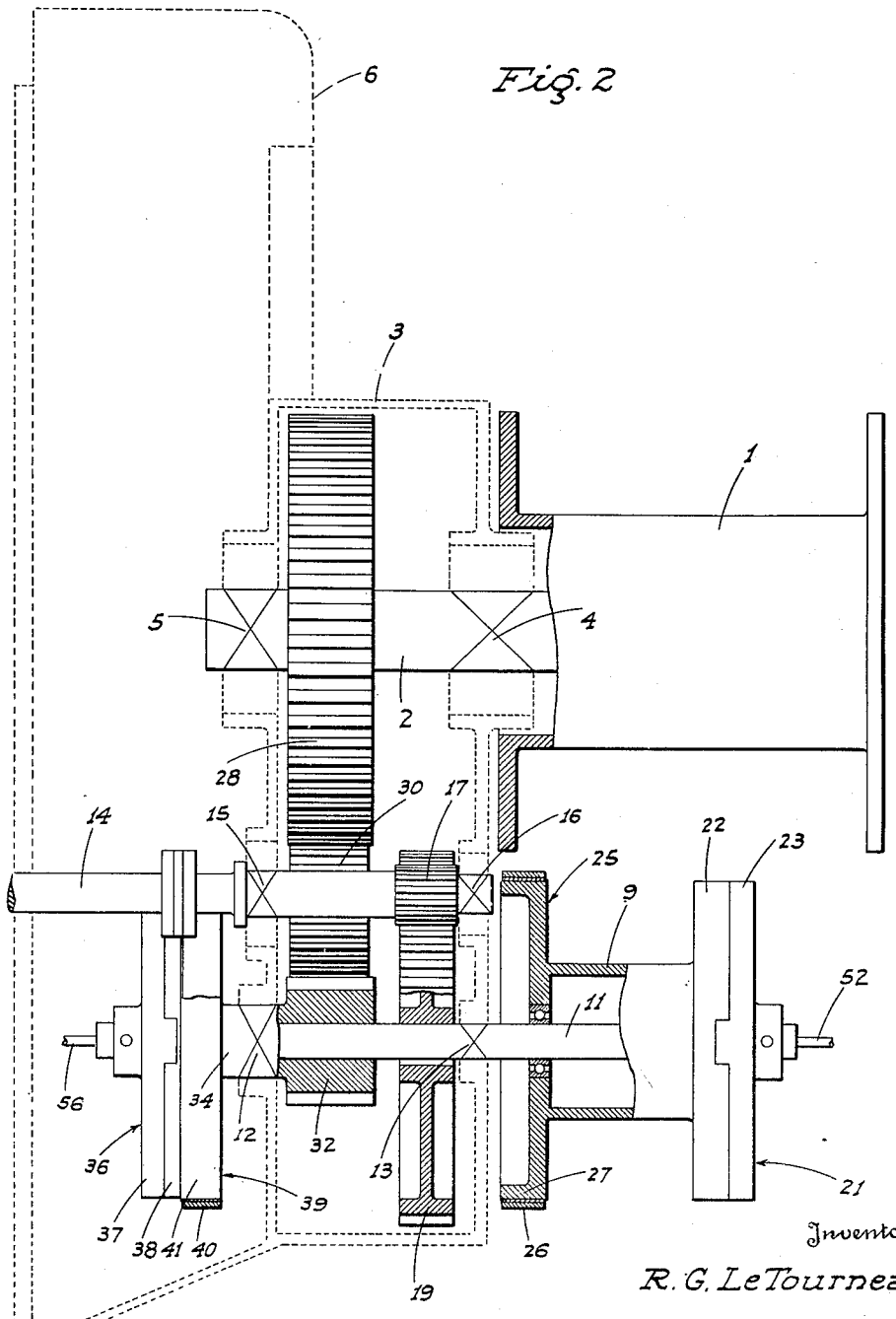
By Worbtu & Worbtu
Attorneys

Nov. 7, 1950 R. G. LE TOURNEAU 2,529,299

MULTIPLE DRUM WINCH

Filed Dec. 15, 1944 3 Sheets-Sheet 2

Fig. 2



Inventor

R. G. LeTourneau

By Webster & Webster

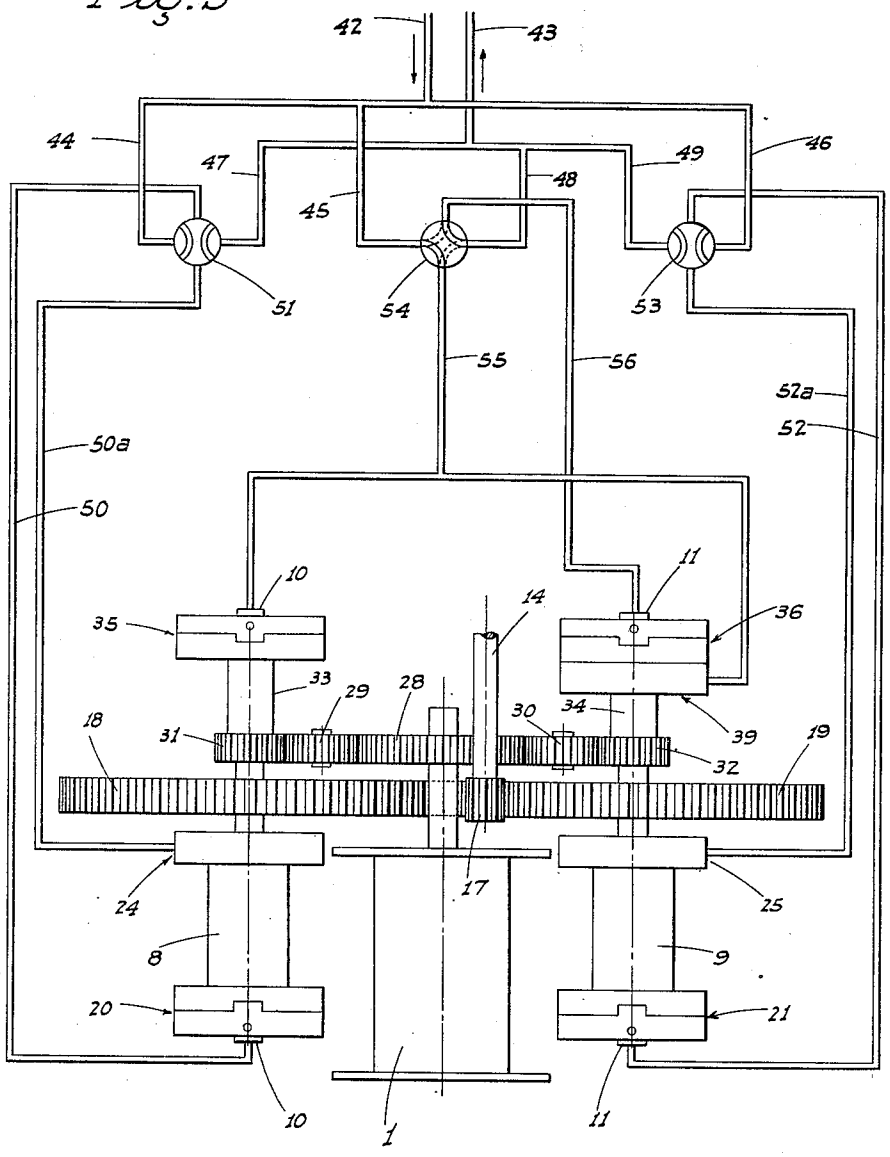
Attorneys

Nov. 7, 1950 R. G. LE TOURNEAU 2,529,299

MULTIPLE DRUM WINCH

Filed Dec. 15, 1944 3 Sheets-Sheet 3

Fig. 3



Inventor

R. G. LeTourneau

By Webster & Webster

Attorneys

Patented Nov. 7, 1950

2,529,299

UNITED STATES PATENT OFFICE

2,529,299

MULTIPLE DRUM WINCH

Robert G. Le Tourneau, Peoria, Ill., assignor to R. G. Le Tourneau, Inc., Stockton, Calif., a corporation of California

Application December 15, 1944, Serial No. 568,290

1 Claim. (Cl. 254—185)

1

This invention relates in general to an improved multiple drum winch, and in particular is directed to and it is an object to provide, a winch of this type adapted to be tractor mounted, preferably at the forward end of the tractor. Winches so mounted are commonly known as front end power control units.

A further object of this invention is to provide a multiple drum winch wherein the cable drums may be driven selectively; one drum being arranged to be reversibly driven.

It is also an object to provide a multiple drum winch as in the preceding paragraph in which the drive means for each drum includes a manually controlled selectively operable fluid pressure clutch.

It is also an object to provide a power winch, of the type described, including normally engaged but fluid pressure releasable brake units associated with the drive means for the cable drums.

An additional object of the invention is to provide a multiple drum winch wherein the separate drum assemblies are normally locked against rotation, in a cable paying-out direction, by a fluid pressure releasable brake as above, and engaged in driven relation with a power source by a normally released fluid pressure actuated clutch; there being a manually controlled fluid pressure system operative to effect release of the brakes and engagement of the clutches when necessary.

Another object is to privide a multiple drum winch which includes a main cable drum assembly, and a pair of secondary cable drum assemblies, the secondary drum assemblies each including a shaft, a normally disengaged clutch between each shaft and the corresponding drum, a pair of meshing driven gears fixed on said shafts, and selectively engageable drive means between each of said meshing driven gears and the main assembly whereby to impart a reversible drive to the latter; said drive means including, for each gear, a normally disengaged clutch.

A still further object of the instant invention is to provide a multiple drive winch in which the several cable drums may be simultaneously or selectively driven as working conditions may require; the control of such cable drums being by means of a fluid pressure system including hand operated valves arranged for ready manipulation by the operator.

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

2

indicate corresponding parts in the several views:

Figure 1 is a front elevation of the multiple drum winch as mounted in connection with and supported by a heavy-duty radiator protecting grille of a tractor.

Figure 2 is a somewhat diagrammatic central elevation, mainly in section.

Figure 3 is a diagrammatic plan view of the multiple drum assemblies, together with the drive and control means therefor, including the fluid pressure control system.

Referring now more particularly to the characters of reference on the drawings, the power winch comprises a main cable drum 1 on a horizontal shaft 2 which projects into and across a housing 3; said shaft being supported in the housing by spaced bearings, indicated diagrammatically at 4 and 5.

In the present embodiment the housing 3, which extends some distance below the shaft 2 and is of substantial width, is mounted on and supported by a heavy-duty radiator protecting grille 6 supported from the frame of a tractor (not shown) at the front end of the latter. The housing 3 is fixed to the front portion of the grille 6 and projects forwardly therefrom; said grille having air passages 7 therethrough above and to the sides of the upper portion of the housing, whereby to permit of air entry to the tractor radiator.

A pair of secondary cable drums, indicated at 8 and 9, respectively, are disposed ahead of the housing 3 below the main cable drum 1 in transversely spaced relation and symmetrical to said drum 1. The secondary cable drums 8 and 9 are turnably but axially immovably supported on shafts 10 and 11, which shafts project rearwardly through the housing 3; the shafts 10 and 11 being supported in said housing 3 by bearings indicated diagrammatically at 12 and 13.

A driven shaft 14, preferably driven from the front end of the crank shaft of the tractor engine, extends forwardly into the grille 6 and through the housing 3, being supported by bearings 15 and 16. Within the housing 3 the drive shaft 14 is fitted with a pinion 17 which meshes in driving relaton with a relatively large-diameter gear 19 fixed on shaft 11; there being another similar gear 18 fixed on shaft 10 and running in constant mesh with the gear 19, whereby upon rotation of the drive shaft 14 the pinion 17 rotates gear 19, and the latter in turn rotates gear 18.

The shafts 10 and 11 are selectively engageable in driving relation to the drums 8 and 9 by means of normally disengaged fluid pressure actuated

clutches arranged with said drums, and indicated generally at 20 and 21. The clutches are shown diagrammatically and each includes a part 22 fixed with the corresponding drum and another part 23 fixed with the corresponding drum supporting shaft; the parts 22 and 23 of each clutch being engaged in driving relation upon introduction of fluid pressure into the clutch in the manner hereinafter described.

The structural details of the fluid pressure actuated clutches 20 and 21 form no part of the present invention.

It will be seen that with engagement of either clutch 20 or 21 the corresponding one of the secondary cable drums will be driven in the direction indicated by the arrows in Fig. 1; the direction of rotation of said secondary cable drums being in opposite directions, as indicated.

The secondary cable drums 8 and 9 are normally locked against rotation in a direction contra to the direction of drive thereof by means of brake units, indicated generally at 24 and 25, respectively; said brake units each including a brake band 26 surrounding a brake drum 27 formed in connection with the rear end of the corresponding cable drum.

The brake units 24 and 25 are self-energized and adapted to be released by fluid pressure. As with the clutches 20 and 21, the structural details of the brake units 24 and 25 form no part of the present invention.

The main cable drum 1 is reversibly driven in the following manner:

A relatively large-diameter gear 28 is fixed on shaft 2 within housing 3 and at circumferentially spaced points adjacent the bottom of said gear it meshes with idler gears 29 and 30, which in turn mesh with pinions 31 and 32 rotatably but axially immovably mounted on shafts 10 and 11, respectively, within said housing 3. The pinions 31 and 32 include hubs 33 and 34 which extend rearwardly through the bearings 12 to a termination adjacent but short of the rear ends of shafts 10 and 11, which likewise project into the grille 6. Normally disengaged fluid pressure actuated clutches, indicated generally at 35 and 36, are coupled between the hubs 33 and 34 and the shafts 10 and 11 within the grille; each of said clutches including a part 37 fixed on the corresponding shaft and a part 38 fixed on the corresponding hub. The clutch 36 has associated therewith a normally engaged fluid releasable brake unit 39 which includes a brake band 40 surrounding a drum 41 formed on the part 38 of clutch 36.

It will be seen that upon engagement of the clutch 35 the main cable drum 1 will be driven in one direction, while engagement of the clutch 36 will cause rotation of said drum in an opposite direction. When the clutches 35 and 36 are released the brake unit 39 maintains the main cable drum 1 against rotation in a cable-paying out direction.

The manually actuated fluid pressure control system for the clutches 20, 21, 35, and 36, together with the brake units 24, 25, and 39, is shown diagrammatically in Fig. 3, and comprises the following arrangement:

A fluid pressure-feed conduit 42 and a fluid pressure return conduit 43 are branched, as shown in Fig. 3, to provide fluid pressure supply leads 44, 45, and 46, respectively, and fluid pressure return leads 47, 48, and 49, respectively. The fluid pressure supply and return leads 44 and 47 are adapted to be selectively connected with conduits 50 and 50*a* by means of a manually actuated four-way valve 51, the conduits 50 and 50*a* leading to the clutch 20 and the brake unit 24, respectively, corresponding to the secondary cable drum 8. Similarly, the fluid pressure supply and return leads 46 and 49 are adapted to be selectively connected with other conduits 52 and 52*a* by means of a manually actuated four-way valve 53; the conduits 52 and 52*a* leading to the clutch 21 and brake unit 25, respectively, corresponding to the secondary drum 9. As the clutches 20 and 21 are formed at the forward ends of the cable drums 8 and 9, and as the conduits 50 and 52 connect with such clutches at the front, it may be desirable to shield such assemblies against damage, and which shielding may take any convenient form.

When it is desired to drive either of the secondary cable drums 8 or 9, the corresponding valve 51 or 53 is turned to a position to introduce pressure into conduit 50 or 52, causing pressure actuation and engagement of the clutch 20 or 21. The brake units 24 and 25 are of the type which over-run when the corresponding cable drums are driven in a cable winding-on direction and normally hold against rotation of said drums in a cable paying-out direction. Thus it is not necessary to positively release the brake units 24 and 25 when the corresponding drums are driven in a cable winding-on direction.

The operator, by proper manipulation of valves 51 or 53, can effect engagement of either clutch 20 or 21 to cause rotation of the corresponding secondary cable drum in a cable winding-on direction, or can effect positive release of either brake unit 24 or 25 so that the corresponding secondary cable drum runs free to permit of cable paying-out from said drum; all selectively.

The fluid pressure control system includes, for control of the main cable drum 1, a four-way valve 54 connected between the fluid pressure supply and return conduits 45 and 48, and other conduits 55 and 56. The conduit 55 is branched with the branches leading to the clutches 35 and brake unit 39. The conduit 56 leads to the clutch 36. When the valve 54 is set to the position shown in full lines in Fig. 3, the clutch 35 is engaged, the clutch 36 is disengaged, and the brake unit 39 is released; the main cable drum 1 then being driven through the medium of pinion 31, idler 29 and gear 28 in a cable paying out direction.

When the four-way valve 54 is set in the position shown in dotted lines in Fig. 3, the clutch 35 is disengaged, and the clutch 36 is engaged, whereby the gear 28 is driven in a reverse or winding-on direction through the medium of pinion 32, idler 30 and gear 28. In this direction of drive the brake unit 39 has no fluid pressure introduced thereinto, and need not be positively released, as such brake unit, which is of the self-energizing type, overruns in this direction of rotation of the gear train of pinion 32, idler 30, and gear 28.

The valves 31, 33, and 54 are preferably assembled in adjacent convenient relation in the operator's compartment of the tractor on which the power winch may be mounted, and by proper manipulation of said valves in the manner heretofore described, the operator can cause rotation, selectively, of the drums 1, 8, or 9, including a reversible drive of said drum 1.

While the above described multiple drum winch is especially designed for front end mounting on a tractor and for use in connection with log-

ging operations, it is evident that the invention is not limited to such a mounting or use.

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 claim.

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

A multiple drum winch unit comprising a support, a pair of substantially parallel shafts mounted in the support, means to drive said shafts simultaneously and in opposite directions a cable drum mounted on each shaft for rotative but not axial movement thereon, means for selectively clutching or declutching each drum to or from its respective shaft, a third shaft mounted in said support in substantial parallelism with said pair of shafts and lying in vertically spaced relation thereto, a drum fixed to the third shaft, a hub mounted for rotative but not axial movement on each shaft of said pair of shafts, means to selectively clutch or declutch each hub to or from its respective shaft, a gear on each hub, a gear on the third shaft and which latter gear is disposed in spaced relation to both

of said first named gears, and an idler gear interposed between each of said first named gears and the gear on the third shaft and meshing therewith; said hub clutching and declutching means including a normally disengaged clutch on each hub and a normally set brake on one hub, and means to selectively simultaneously release the brake on said one hub and engage the clutch on the other hub or engage the clutch on said one hub leaving the clutch on the other hub free, such brake being of the self-energizing type and overrunning with the rotation of its hub when the latter is clutched to its corresponding shaft.

ROBERT G. LE TOURNEAU.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
928,626	Bowles	July 20, 1909
974,410	Mather	Nov. 1, 1910
1,178,693	Williams	Apr. 11, 1916
1,411,830	Atkinson	Apr. 4, 1922
1,912,645	Le Tourneau	June 6, 1933
2,005,523	Moore	June 8, 1935
2,263,064	Allin	Nov. 18, 1941
2,286,547	Hutchins et al.	June 6, 1942
2,326,935	Ferguson	Aug. 17, 1943
2,340,543	Magee	Feb. 1, 1944