May 27, 1952 E. A. DROTT 2,598,517

PORTABLE WINCH

Filed Sept. 19, 1946 3 Sheets-Sheet 1

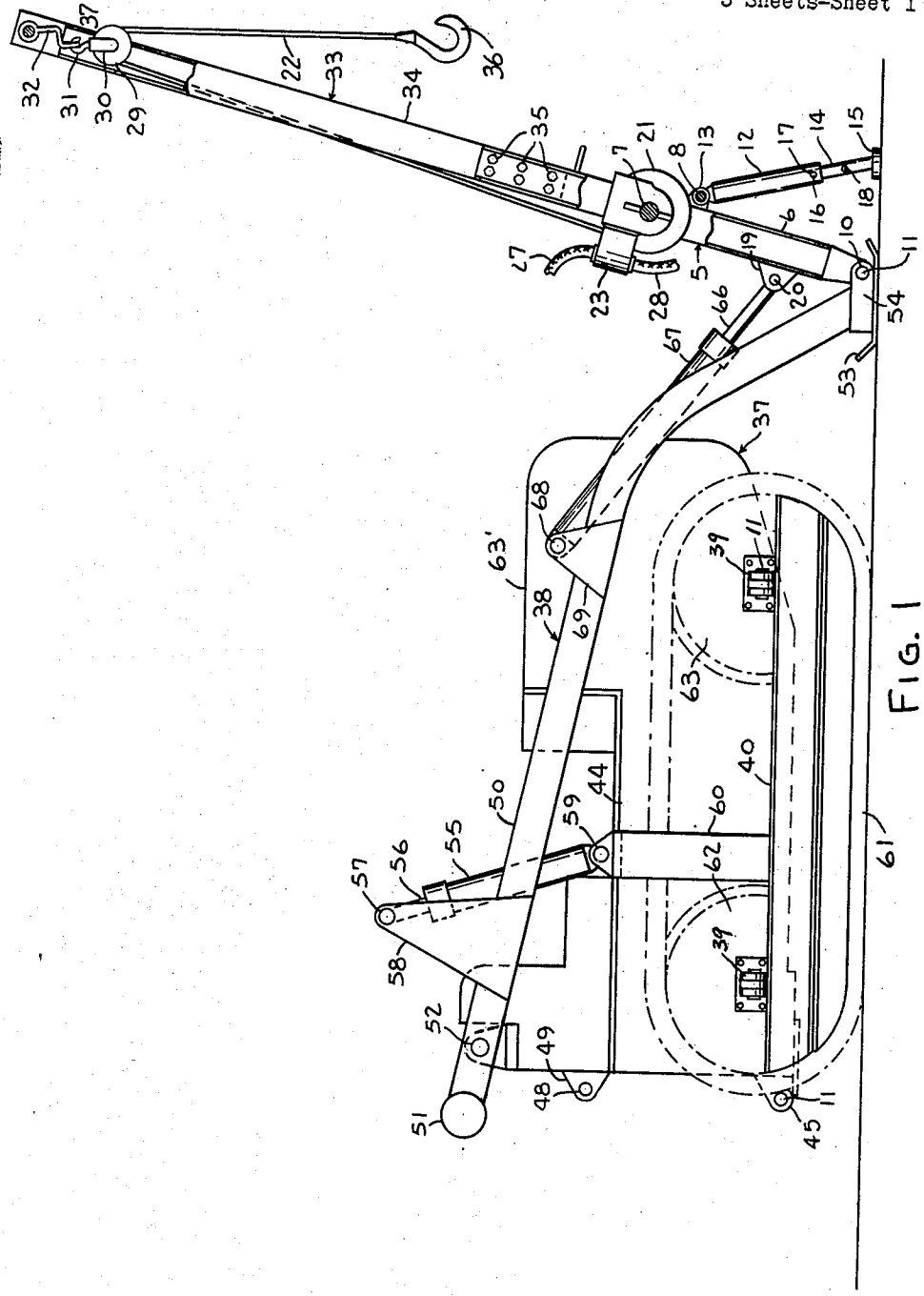


FIG. 1

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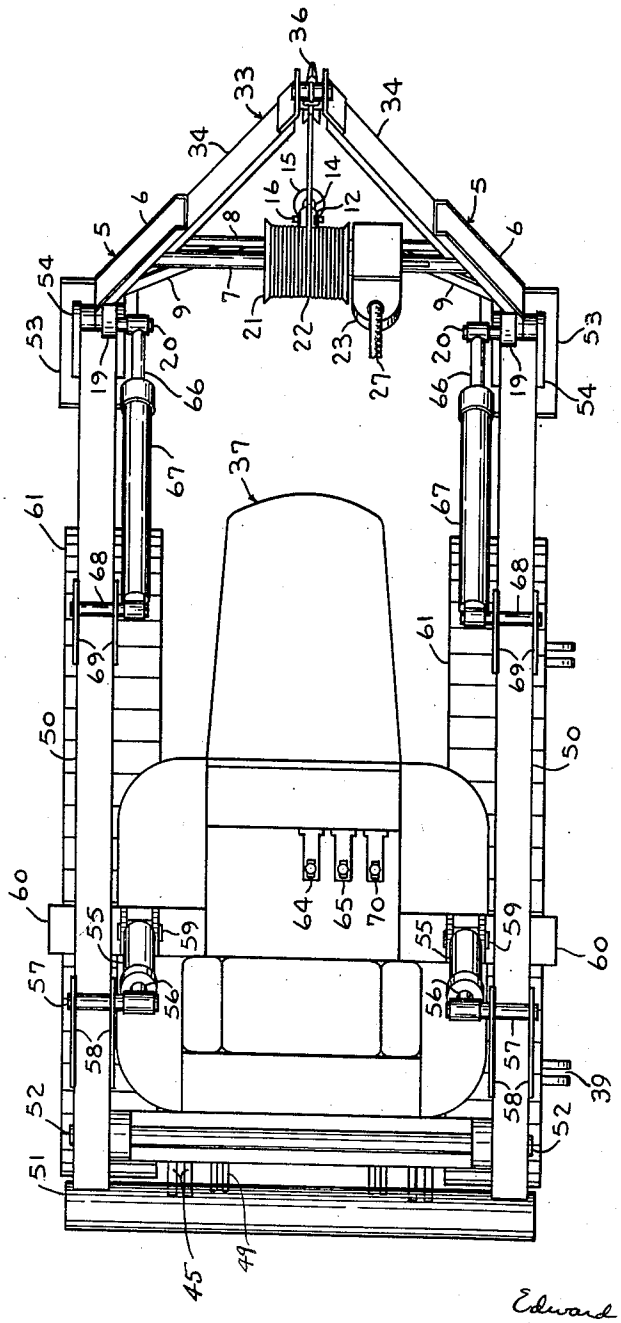


FIG. 2

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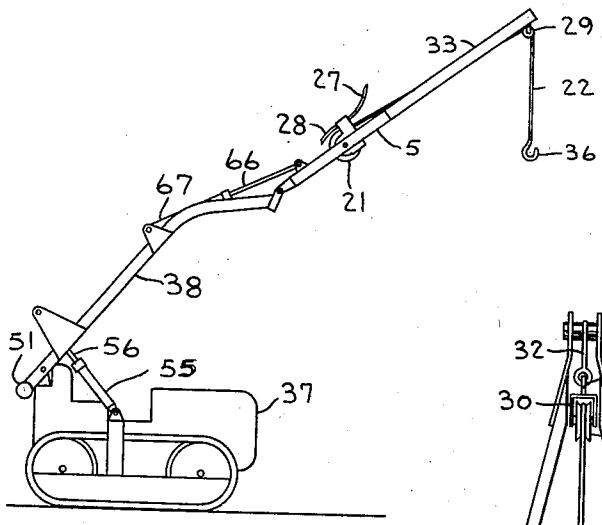


FIG. 4

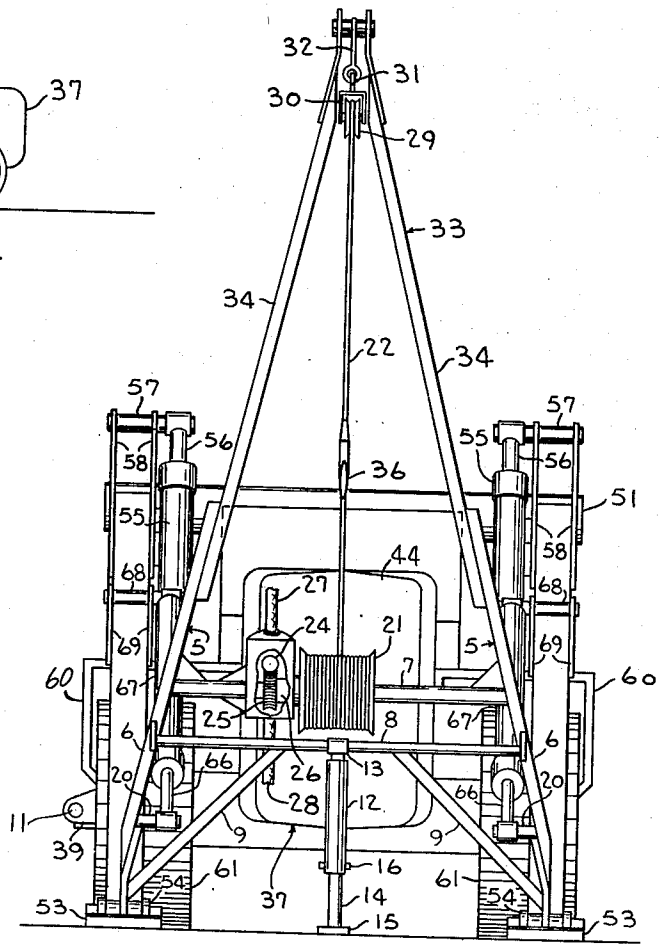


FIG. 3

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PORTABLE WINCH

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7 Claims. (Cl. 212—145)

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The invention relates to a portable winch and boom.

A further object of the invention is to provide in combination with a tractor having a movable push beam, of a winch adapted to be mounted on the projecting front end of said push beam and be movable therewith as an extension thereof.

A further object of the invention is to provide in combination with a tractor having a push beam provided with ground engaging shoes, of a hoist mounted on the push beam so as to be supported in part on said shoes and thus relieve the tractor itself of any load that may be handled by the hoist.

A further object of the invention is to provide in combination with a tractor having a push beam, of a hoist pivotally mounted on said push beam and carried thereby and adapted to be shifted to and held in various angular positions relative to said push beam.

The invention further consists in the several features hereinafter described and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a side elevation view of apparatus embodying the invention;

Fig. 2 is a plan view of the apparatus;

Fig. 3 is a front elevation view of the apparatus;

Fig. 4 is a view similar to Fig. 1 on a reduced scale showing the hoist in an elevated position.

Referring to the drawings, the winch and boom constituting a portable hoist unit will first be described. This unit comprises a base frame 5 having spaced legs 6 connected by cross bars or shafts 7 and 8, diagonal braces 9 connecting the shaft 8 with the lower ends of the legs 6. The lower ends of the legs are apertured at 10 to receive pins 11 by which the legs may be connected to any suitable anchoring support and permit, if desired, tilting of said frame relative to said support. Stabilizers are provided on each side of the frame. One of these stabilizers comprises an adjustable foot formed by a cylinder 12 pivotally mounted at its upper end 13 on the shaft 8 and having the cylindrical shank 14 of an adjustable foot 15 slidably mounted therein and adapted to be anchored in various height positions relative thereto by a pin 16 extending through alined apertures 17 in said cylinder and through any one of the vertically spaced apertures 18 in said shank 14.

The other stabilizer comprises ears or bracket members 19 secured to the legs 6 above the pins

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11 and carrying pins 20 which may be connected to the support either by the hydraulic cylinders or links hereinafter described or by other suitable connections.

A winch or hoist drum 21 is revolubly mounted centrally of the shaft 7 and carries a cable 22. The winch is turned by a rotary hydraulic motor 23 whose shaft carries a reversible worm wheel 24 which meshes with a worm wheel 25 mounted on the shaft 26 carrying the drum 21. The motor 23 is supplied with pressure fluid from a hydraulic pressure system of known construction including a pump and control valves operatively connected with the flexible conduits 27 and 28 whereby the hoist drum may be turned in either direction or may be held against movement. The hoist drum 21 with its cable 22 may be used as an ordinary winch, or it may be used as a boom hoist in which instance the cable 22, for a single reeve hoist, passes over a pulley 29 whose block 30 may have a hook 31 engaged by an eyed hanger member 32 mounted on the outer end of a boom frame 33 whose legs 34 are detachably connected by bolts 35 with the legs 6 of the frame 5, the frames 33 and 5 when so joined forming a boom frame. The cable 22 may have a lifting hook 36 on its free end or any other suitable device for connecting it to its load. Instead of using a single pulley block, the cable may be reeved in multiple to take a traveling block so as to double or further increase the lifting capacity of the hoist.

The hoist above described may be used on a suitable support in any desirable location and connected by its piping with a suitable source of hydraulic pressure, or it may be mounted on a push beam 38 associated with the tractor as shown in full lines.

As shown in Fig. 1, it will be noted that the stabilizer foot 15 may be adjusted to engage the ground, and thus the winch or boom is supported at three points.

The push beam 38 comprises arms 50 connected together at their rear ends by a cross beam 51, forming a counterweight, and pivotally mounted intermediate their ends on pivotal supports 52 carried by the rear portion of the tractor frame. The arms 50 extend forwardly to a position in front of the tractor, and their forward ends are provided with ground engaging shoes 53 and a mounting 54 for the pins 11 of the hoist.

For raising and lowering the push beam 38 a double acting hydraulic cylinder 55 is operatively interposed between each arm 50 and the tractor, and as here shown has its piston 56 pivotally connected by a pin 57 to a bracket 58 on the arm 50

and the closed end of the cylinder pivotally connected by a pin 59 with a bracket structure 60 which is carried by the track frame and straddles the endless propelling tread 61 running over sprockets 62 and 63 carried by the track frame. As usual the sprockets 62 are driven through suitable transmission mechanism, not shown, by the engine mounted under the hood 63' of the tractor, and this engine also drives the pump (not shown) of the hydraulic system that furnishes the driving power for operating the cylinders 55 and the winch drive motor 23. The cylinders 55 are controlled through a suitable valve mechanism 64 which permits introduction of pressure fluid to either end of each said cylinder while exhausting from the other end or the retention of fluid in both ends of the cylinder to hold the piston 56 in any desired set position. The winch motor is controlled through a valve mechanism 65 which controls its direction of rotation and its retention against rotation.

When the hoist is pivotally attached to the shoes 53 as previously described, the stabilizer leg 15 may be let down into the position shown in Fig. 1 and the other side of the hoist frame connected by the pins 20 with the pistons 66 of double acting hydraulic cylinders 67 pivotally carried by the push beam 38. In each instance the cylinder 67 is pivotally connected by a pin 68 to a bracket 69 on its supporting arm 50. The cylinders 67 are controlled through a suitable valve mechanism 70 which permits introduction of pressure fluid to either end of said cylinder while exhausting from the other end or the retention of fluid in both ends of the cylinder to hold the piston 66 in any desired set position, and consequently hold the hoist frame in any desired angular position relative to push beam 38 or the ground level.

When the hoist is mounted as shown in Fig. 1 to transmit the pressure of the load through the shoes 53 to the ground, the load may be lifted the height permitted by the boom frame 33. If, however, the lift required is higher than the length of the boom frame, the entire hoist together with the push beam 38 may be lifted by the cylinders 55, as shown in Fig. 4, and under these conditions the cylinders 67 may be operated to swing the hoist unit forwardly from its position shown in Fig. 1. It will be noted that the cylinders 67 being pivoted at one end to the arms 50 and its rod 66 being pivotally connected to the winch frame forms a link connection between the winch frame and its support.

The winch alone may be used as for example when it is necessary to pull the tractor on which it is located out of the mud or a bad hole. This can be done more successfully with a hydraulically controlled winch than a mechanically controlled winch, as it is just about impossible to find a speed in a mechanical controlled hoist or winch which coincides with the speed of the tractor tracks when pulling out of the mud. Either the tractor is too slow for the winch, or vice-versa, but with a hydraulically controlled winch, the speed can be synchronized, and it is not necessary to set a brake or put on a dog to hold the unit, while using either as a winch or as a hoist any time in reeving in or letting out the cable. When the operator lets go of his controls, the drum automatically stays in its position, eliminating the danger of dropping its load. The winch above described has all the advantages of an electric winch without the disadvantages of extra batteries. All that is necessary are two hydraulic lines running from the motor 23 to a pump either driven by the tractor engine or a separate motor or prime mover.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What I claim as my invention is:

1. The combination, with a tractor, having a vertically movable push beam pivotally supported on said tractor including arms projecting beyond the front end of said tractor, of a winch frame mounted on the projecting ends of said arms, a cable drum mounted to rotate on said frame, a rotary hydraulic motor operatively connected to said drum to rotate the same, and an adjustable stabilizer foot connected to said frame above its mounting on said arms.

2. The combination with a tractor having a vertically movable push beam pivotally supported on said tractor including arms projecting beyond the front end of said tractor, of a winch frame pivotally mounted on the projecting ends of said arms, a cable drum mounted to rotate on said frame, a rotary hydraulic motor operatively connected to said drum to rotate the same, a lengthwise adjustable connection between said frame and arms for varying the inclination of said frame relative to said arms, and an adjustable ground engaging stabilizer connected to said frame above its mounting on said arms.

3. The combination with a tractor having a vertically movable push beam pivotally supported on said tractor including arms projecting beyond the front end of said tractor and provided with ground engaging shoes, of a winch frame pivotally mounted on said shoes, a cable drum mounted to rotate on said frame, a rotary hydraulic motor operatively connected to said drum to rotate the same, and stabilizing means operatively connected to said winch frame above said shoes on opposite sides thereof for engagement with the ground.

4. The combination with a tractor having a vertically movable push beam pivotally supported on said tractor including arms projecting beyond the front end of said tractor and having ground engaging shoes at the outer ends thereof, of a winch frame pivotally mounted on said shoes, a cable drum mounted to rotate on said frame, a rotary hydraulic motor operatively connected to said drum to rotate the same, and hydraulic cylinders operatively connected to said frame above said shoes and to said arms for varying of the angle of said frame relative to the ground.

5. The combination with a tractor having a vertically movable push beam pivotally supported on said tractor including arms projecting from the front end of said tractor and provided with ground engaging shoes, of a winch frame pivotally mounted on said shoes, a cable drum mounted to rotate on said frame, means for rotating said drum, and means for holding said frame either at an acute angle relative to said arms or in a position forming a lengthwise extension of said arms.

6. The combination with a tractor having a vertically movable push beam pivotally supported on said tractor including arms projecting from the front end of said tractor and provided with ground engaging shoes, of a winch frame pivotally mounted on said shoes, a load supporting means mounted on said winch frame, and a lockable extension link connection between said arms and said frame above the pivot of said frame on

said shoes to hold said frame in a position forming a lengthwise extension of said arms.

7. The combination with a tractor having a push beam mounted thereon for vertical swinging movement and provided with arms projecting from the front end of the tractor and having ground engaging shoes, and means for raising and lowering said push beam, of a winch frame pivotally mounted on said shoes, load supporting means mounted on said winch frame, and means for angularly adjusting said winch frame relative to said arms.

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