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UTILITY DERRICK

2 Sheets-Sheet 1

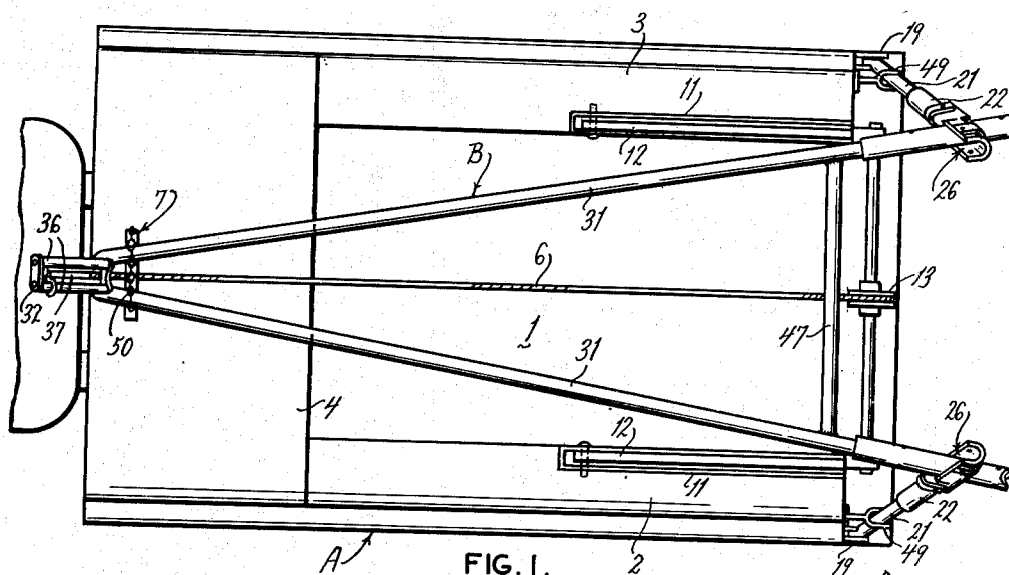


FIG. 1.

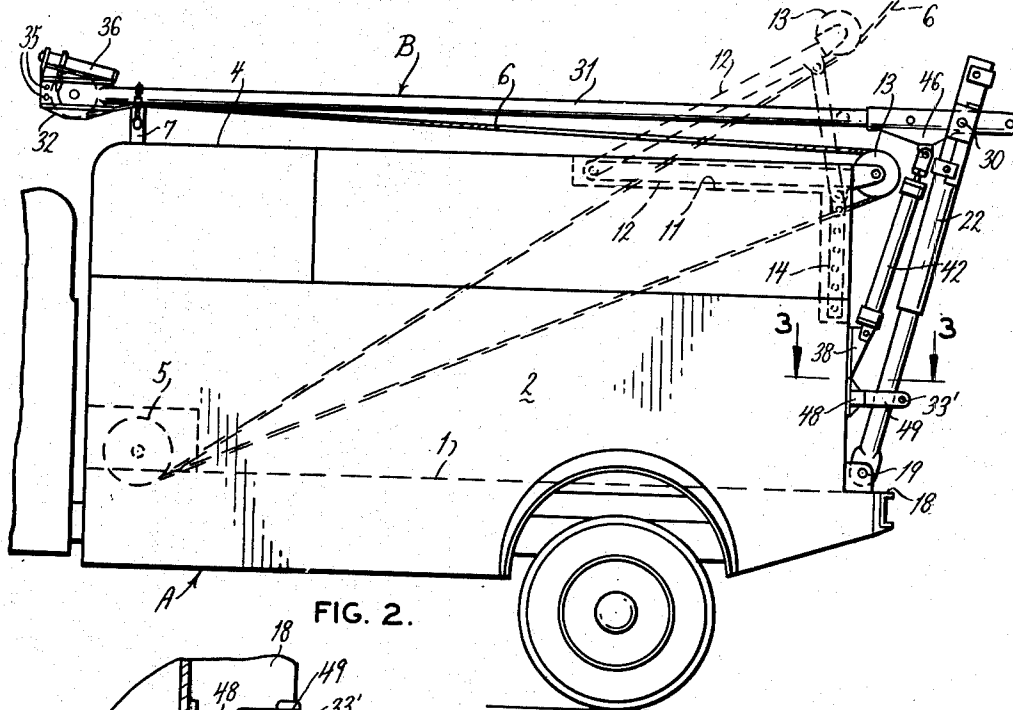


FIG. 2.

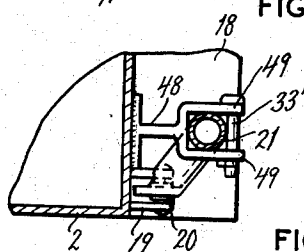


FIG. 3.

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FIG. 7.

FIG. 6.

FIG. 8.

FIG. 9.

FIG. 5.

FIG. 10.

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UTILITY DERRICK

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3 Claims. (Cl. 212-8)

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This invention relates in general to certain new and useful improvements in utility derricks and, more particularly, to a two-legged derrick adapted for use on utility truck bodies to facilitate the servicing of power lines, poles and the like.

Electric light companies, telephone companies, and the like, must maintain an extensive system of poles and elevated structures for carrying transmission lines, switches, transformers and similar equipment and, for such purposes, employ trucks equipped with various types of derricks, which, for safety reasons, must be lowered or dismantled while the truck is moving from one job-site to another. Since maintenance problems usually relate to a series of poles along a particular line, it becomes necessary to set up and dismantle the derrick equipment frequently as the truck is moved along the line from pole to pole.

It is, therefore, the primary object of the present invention to provide a utility derrick which can be conveniently mounted upon a truck or vehicle and can be quickly and simply elevated and lowered with a minimum of manual effort.

It is a further object of the present invention to provide a derrick of the type stated which is simple and economical in construction and, when raised to operative position, provides an unusually rugged, strong derrick structure capable of handling substantial loads with ease and simplicity.

It is also an object of the present invention to provide a derrick of the type stated which is of such shape and configuration that, when in operative position, the derrick-legs can be adjustably positioned within predetermined limits so that the resultant between a vertical load and a corresponding pull will coincide with the longitudinal axis of the derrick-legs.

It is an additional object of the present invention to provide a derrick of the type stated which is extremely compact when in transport position and is adapted to be securely fastened in such position so that it cannot readily become loosened while the truck is being driven from place to place over rough roads or similar terrain.

It is a further object of the present invention to provide a derrick of the type stated which can, when in upright position, be shifted to various positions of angularity within predetermined limits.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

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In the accompanying drawings:

Figure 1 is a fragmentary top plan view of a utility truck equipped with a derrick constructed in accordance with and embodying the present invention, the derrick being shown in inoperative or transport position;

Figure 2 is a fragmentary side elevational view of the utility truck with the derrick shown in inoperative or transport position;

Figure 3 is a fragmentary sectional view taken along line 3-3 of Figure 2;

Figure 4 is a fragmentary rear elevational view of the truck body with the derrick shown in inoperative or transport position;

Figure 5 is a fragmentary side elevational view of the rear portion of the truck body showing the derrick in elevated or operative position;

Figures 6, 7, 8, and 9 are fragmentary sectional views taken along lines 6-6, 7-7, 8-8, and 9-9, respectively, of Figure 5; and

Figure 10 is a diagrammatic view illustrating the vectorial resolution of forces in the derrick of the present invention.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of the present invention, A designates a utility truck body having a floor 1, compartmentalized side walls 2, 3, and a short roof portion 4 extending transversely between the forward ends of the side walls 2, 3. As will be seen by reference to Figure 1, the walls 2, 3, and roof portion 4 are so arranged that the rear end of the truck body A is substantially open topped and open ended. Also mounted in and adjacent to the floor 1 at the forward end of the truck body A is a conventional cable winch 5 having an upwardly and rearwardly extending cable 6. Secured or otherwise rigidly mounted across the forward end of the roof 4 and extending upwardly therefrom is a supporting frame 7 of inverted U-shape and integrally including outwardly diverging legs 8, 9, and a horizontal bight section 10. At their upper rear corners, the side walls 2, 3, are provided with a horizontal open-topped trough 11 for housing a U-shaped cross-frame 12 pivotally connected at its lower ends within the forward portion of the trough 11 and operatively provided midway of its bight with a cable pulley 13. Swingably secured to each of the legs of the frame 11 are adjustable brace bars 14 housed with a rearwardly opening U-shaped channel 15 and having a plurality of spaced apertures 16 for receiving a pin 17 by which the height of the bar 14 can be varied as shown in dotted lines in Figure 2.

The floor 1 extends rearwardly a short distance beyond the rear ends of the side walls 2, 3, in the provision of a shelf-like projection 18 which is, in turn, provided at its outer corners with swivelly mounted hinge-fittings 19. Rockably mounted by means of self-aligning bearings 20 in the hinge-fittings 19 are tubular legs 21 provided at their upper ends with external sleeves 22 welded thereto and extending upward therefrom. At their upper ends, the sleeves 22 are split open to the rear to form an aperture 23 bordered by spaced parallel plate-like wings 24, 25, upwardly of the aperture 23. The sleeves 22 are also split open to the front in the formation of an opening or recess 26 having spaced parallel side walls 27, 28. In the area between the aperture 23 and recess 26, the sleeve 22 is reinforced by lateral plates 29 and provided with transverse pintles 30.

Adapted for removable and swingable disposition upon the legs 21 is a derrick B having the shape or configuration of an inverted V and comprising two tubular derrick legs 31 connected at their upper ends by a head fitting 32 and each being pivotally mounted adjacent its lower end on the pintles 30, the extreme lower portion of each leg 31 extending through the aperture 23 when in transport position, as shown in Figure 4, and will fit embracingly between the wings 24, 25, and side walls 27, 28, when in upright position, as shown in Figure 5, being held in such position by a locking pin 33 of the type more fully described in my copending application Serial No. 331,243, filed January 14, 1953.

The head fitting 32 consists of two spaced parallel plates 34 connected at the top by rivets 35 and provided along their forward edges with elongated guide rollers 36. Operatively mounted between the plates 34 is a sheave 37 over which the cable 6 is trained.

Welded or otherwise rigidly attached to the rear end of each of the side walls 2, 3, and projecting rearwardly therefrom are bracket-plates 38, each of which is transversely apertured and provided with a self-aligning swivel-joint 39 having a transverse swivel pin 40. Rockably mounted on the swivel pin 40 on opposite sides of the swivel-joint 39 are spaced parallel ears 41 integrally formed upon the lower end of a conventional hydraulic cylinder 42 having an upwardly extensible piston rod 43 which is, in turn, provided with an end fitting 44 having spaced parallel ears 45 rockably mounted upon a second swivel-joint 39 forming a part of a second bracket-plate 46 welded to the lower end of and laterally offset from each derrick leg 31 just above the point of engagement with the pintle 30, all as best seen in Figures 2 and 5. The derrick legs 31 are also transversely connected just above the bracket plates 46 by a cross-rod 47 which is preferably welded in place at its ends, thereby, in effect, converting the derrick legs 31 into a rigid, substantially integral A-frame.

The hydraulic cylinders are conventionally connected to an oil-pressure system of the type more fully disclosed in the above-mentioned copending application.

Welded to the lower portion of the side walls 2, 3, and projecting rearwardly therefrom directly below the bracket plates 38 is a bracket 48 having a pair of spaced parallel ears 49 for embraceably engaging the lower portion of the legs 21 which are releasably retained therein by locking pins 33' identical with the previously mentioned locking pins 33.

The derrick B is releasably fastened in transport position, that is to say the horizontal position shown in Figures 1 and 2, by means of a hold-down chain 50 attached at one end to one end of a spring 51 which is, in turn, secured at its other end to a toggle link 52 pivotally mounted at one end on a fulcrum-plate 53 welded to the leg 9 of the supporting frame 7. The toggle link 52 is also eccentrically pivoted at its other end upon a handle lever 54 which is, in turn, pivoted upon the fulcrum-plate 53 upwardly of the toggle link 52, as shown in Figure 4. The other end of the hold-down chain 50 is adjustably retained between a pair of spaced parallel upstanding ears 55 forming integral parts of a chain catch 56. The hold-down chain 50 and associated mechanism operates in the manner more fully described in the above-mentioned copending application.

In erecting the derrick B, that is to say swinging it into operative position, as shown in Figure 4, the hold-down chain 50 is released and, thereupon, oil under pressure is introduced into the cylinders 42, causing the piston rods 43 to extend and swing the derrick legs 31 into substantially upright and rearwardly swung position. During this initial upward movement, the twisting movement induced in the legs 21 is compensated by the shelf-aligning bearings 20 and by the swiveling of the hinge fittings 19. The derrick legs 31 are locked in place within the upper ends of the sleeves 22 by the locking pins 33 and the legs 21 are then released by removal of the pins 33'.

Thereupon, additional oil is admitted to the cylinders 42, thereby swinging the derrick B rearwardly and outwardly to the desired angle of inclination. The cable 6 is trained under the pulley 13 and the cross-frame swung upwardly to such position that the angles b , b' between the cable 6 and derrick legs 31 are equal, so that the resultant of forces is, in substantial effect, in a common plane with the longitudinal axes of the derrick legs 31, as shown in Figure 10. Where the derrick legs 31 are in a low or more nearly horizontal position, the cable 6 is trained over the pulley 13 rather than under it, but, in either case, the pulley 13 is set at such position that the angles b and b' are equal. The derrick legs 31 will, therefore, not tend to deflect upwardly or downwardly. Since this resultant is midway between the legs 31, it would tend to deflect them outwardly in a lateral direction, but this effect is nullified by the cross-rod 47. The cross-rod 47 also serves the additional function of a short-radius elevator for lifting heavy loads directly upwardly for a short distance from the floor 1. This is very useful in easing transformers and similar heavy objects up and over the back end of the truck onto the ground.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the utility derrick may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A live boom derrick adapted for use with a vehicle body or other supporting structure capable of providing a stable platform for the derrick; said derrick comprising a boom having two converging legs rigidly fastened together at their upper ends, a pair of laterally spaced pivots mounted upon the supporting structure and op-

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eratively engaged with the lower ends of said legs, said legs each being provided intermediate its ends with a hinge, each of said hinges dividing the leg with which it is associated into an upper portion and a lower portion whereby the boom can be lowered to a transport position in which the upper portions of the legs extend over the truck body in approximately horizontal position and the lower portions of the legs are in upright position, locking means associated with each hinge for optionally locking the upper and lower portions of each leg together to render the boom rigid throughout its length whereby the boom will assume an operative position in which it may swing to and fro as a unit about said pivots, auxiliary locking means for releasably engaging the lower portions of the legs when the boom is in transport position, and power driven extensible means operatively connected between the supporting structure and the upper portions of said legs for shifting the boom into and out of transport position when the lower portions of the legs are engaged by the auxiliary locking means and also swinging the boom to and fro when said boom is in operative position and the lower portions of the legs are disengaged from the auxiliary locking means.

2. A live boom derrick adapted for use with a vehicle body or other supporting structure capable of providing a stable platform for the derrick; said derrick comprising a boom having two converging legs rigidly fastened together at their upper ends, a pair of laterally spaced pivots mounted upon the supporting structure and operatively engaged with the lower ends of said legs, said legs each being provided intermediate its ends with a hinge, each of said hinges dividing the leg with which it is associated into an upper portion and a lower portion whereby the boom can be lowered to a transport position in which the upper portions of the legs extend over the truck body in approximately horizontal position and the lower portions of the legs are in upright position, locking means associated with each hinge for optionally locking the upper and lower portions of each leg together to render the boom rigid throughout its length whereby the boom will assume an operative position in which it may swing to and fro as a unit about said pivots, auxiliary locking means for releasably engaging the lower portions of the legs when the boom is in transport position, and hydraulic cylinder means operatively connected between the supporting structure and the upper portions of said legs for shifting the boom into and out of

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transport position when the lower portions of the legs are engaged by the auxiliary locking means and also swinging the boom to and fro when said boom is in operative position and the lower portions of the legs are disengaged from the auxiliary locking means.

3. A live boom derrick adapted for use with a vehicle body or other supporting structure capable of providing a stable platform for the derrick; said derrick comprising a boom having two converging legs rigidly fastened together at their upper ends in the formation of an apex, a pair of laterally spaced pivots mounted upon the supporting structure and operatively engaged with the lower ends of said legs, said legs each being provided intermediate its ends with a hinge, each of said hinges dividing the leg with which it is associated into an upper portion extending from the hinge to the apex and a lower portion extending from the hinge to the pivot whereby the boom can be lowered to a transport position in which the upper portions of the legs extend over the truck body in approximately horizontal position and the lower portions of the legs are in upright position, locking means associated with each hinge for optionally locking the upper and lower portions of each leg together to render the boom rigid throughout its length whereby the boom will assume an operative position in which it may swing to and fro as a unit about said pivots, auxiliary locking means for releasably engaging the lower portions of the legs when the boom is in transport position, and a pair of hydraulic cylinders respectively connected between the supporting structure and the upper portions of said legs for shifting the boom into and out of transport position when the lower portions of the legs are engaged by the auxiliary locking means and also swinging the boom to and fro when said boom is in operative position and the lower portions of the legs are disengaged from the auxiliary locking means.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,364,851	Johansen	Dec. 12, 1944
2,383,172	Wagner	Aug. 21, 1945
2,541,970	Pospisil	Feb. 13, 1951
2,557,192	Leister	June 19, 1951
2,557,466	Richards et al.	June 19, 1951
2,598,517	Drott	May 27, 1952
2,611,580	Troche et al.	Sept. 23, 1952
2,616,666	Honey	Nov. 4, 1952
2,649,210	Marchese	Aug. 18, 1953