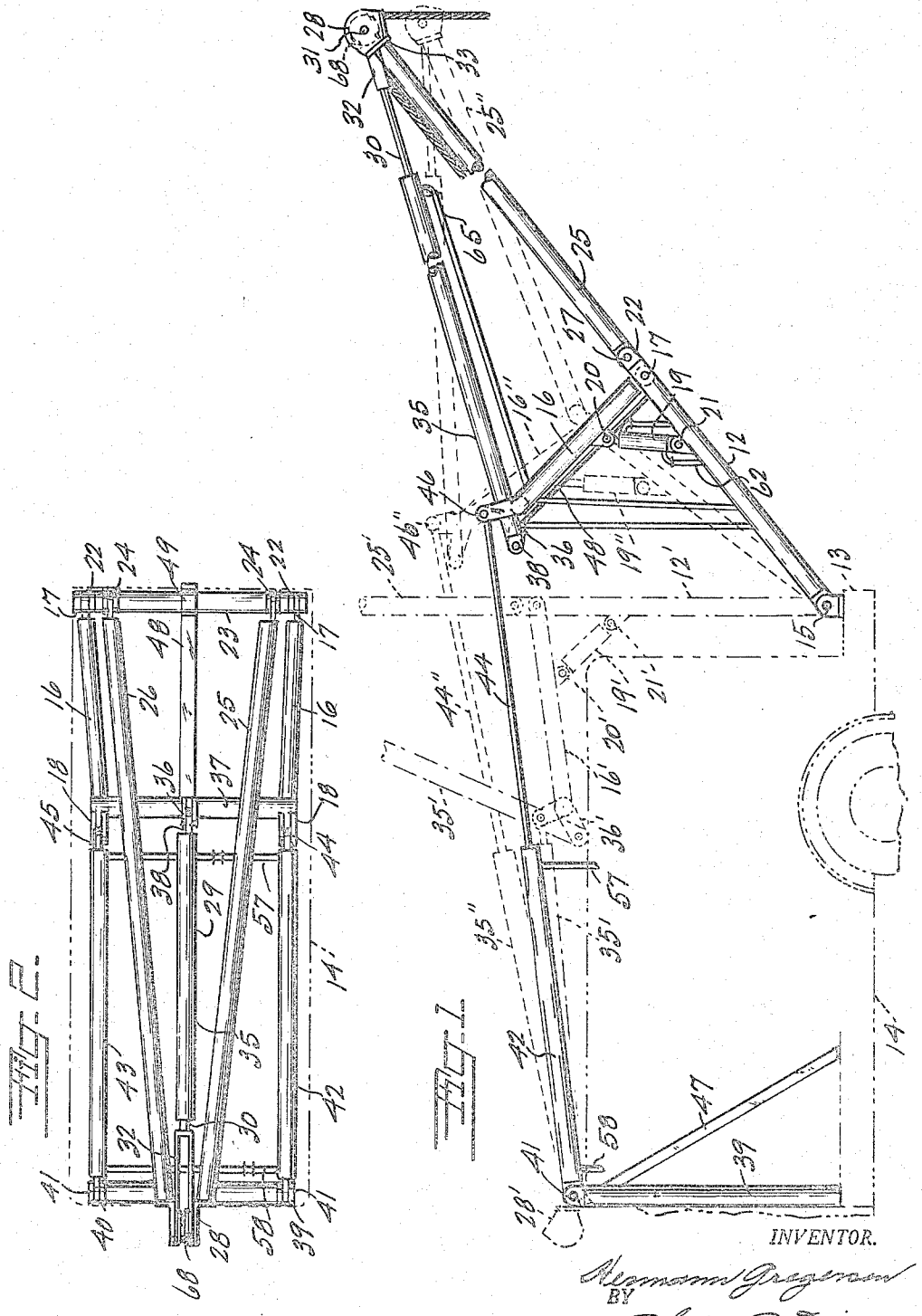
Feb. 7, 1956 H. GREGERSEN 2,733,818

TRANSMISSION LINE MAINTENANCE DERRICK

Filed Feb. 14, 1955 3 Sheets-Sheet 1



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TRANSMISSION LINE MAINTENANCE DERRICK

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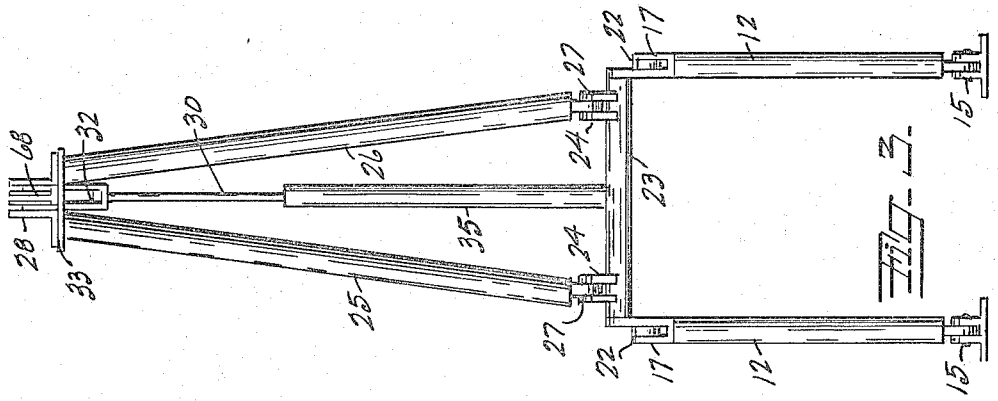


Fig. 3.

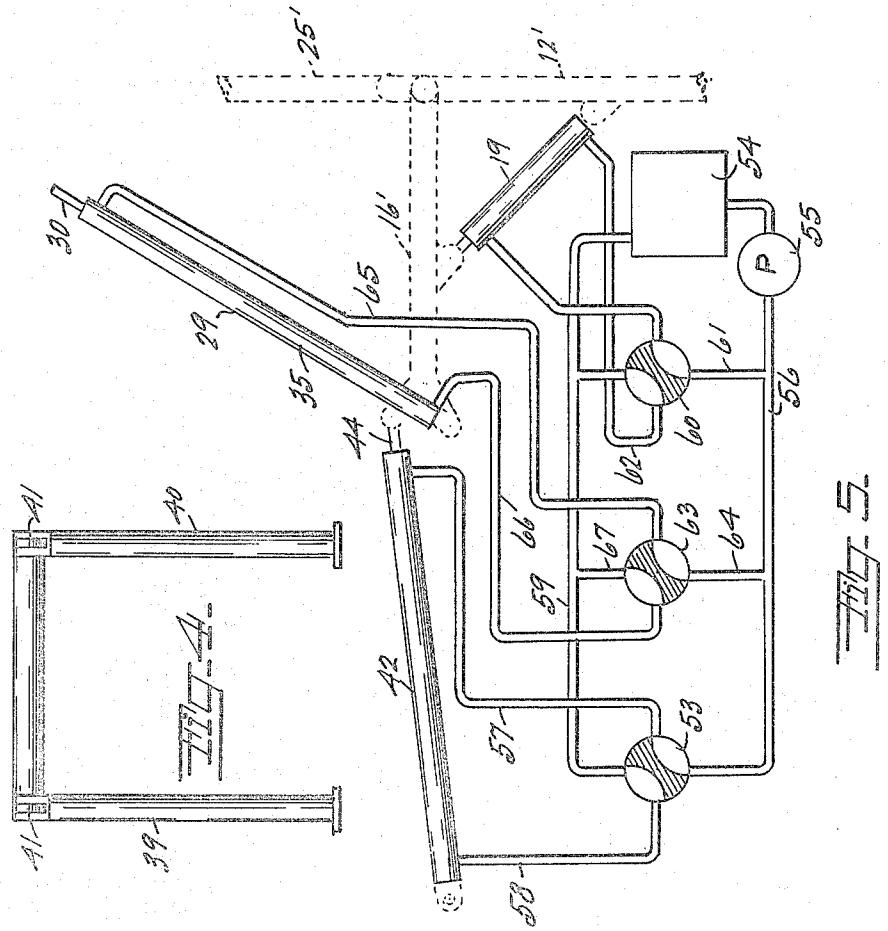


Fig. 5.

Fig. 4.

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TRANSMISSION LINE MAINTENANCE DERRICK

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Fig. 6.

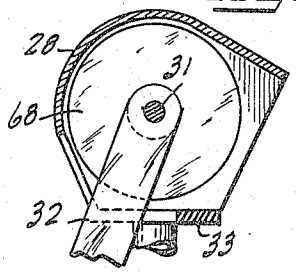
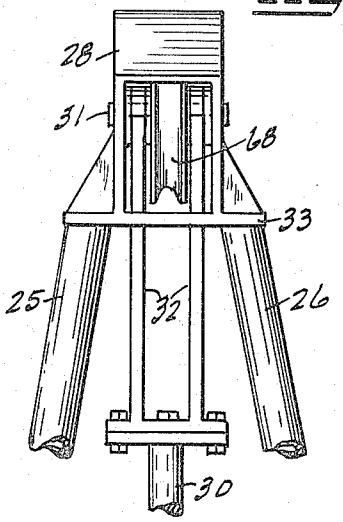


Fig. 7.



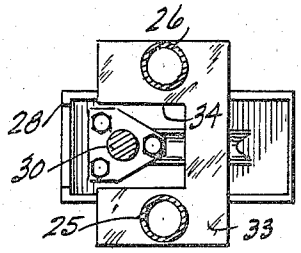


Fig. 8.

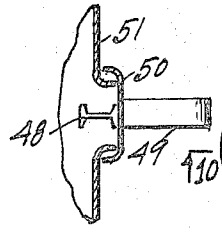


Fig. 11.

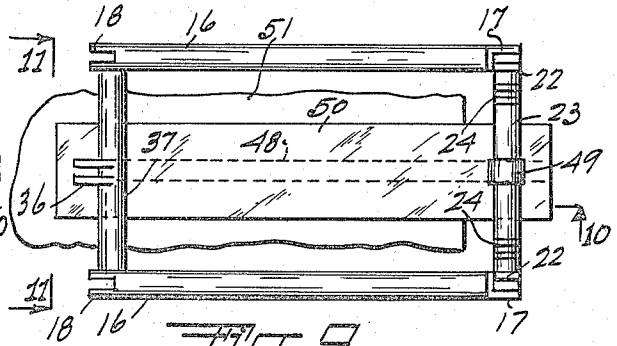


Fig. 9.

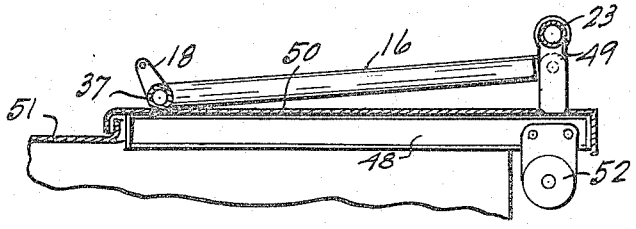


Fig. 10.

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2,733,818

TRANSMISSION LINE MAINTENANCE DERRICK

Hermann Gregersen, San Francisco, Calif.

Application February 14, 1955, Serial No. 487,875

10 Claims. (Cl. 212—8)

This invention relates to improvements in derricks specifically for folding on the top of a transmission or telephone line maintenance truck and provides a derrick which is supported directly by the frame of the truck and which folds compactly on the top when not in use, and is raised to operative position or lowered to the folded or collapsed position entirely through manual control of power elements, thereby being quickly manipulated and operated at will.

This derrick has a power controlled strut which is under tension, with a normally fixed convergence between the boom and strut during operation, both being supported by a base frame, with the base frame operated and controlled for manipulation of the boom, the included angle between the boom and the strut remaining constant through all raising and lowering movements of the boom during operation with the strut retracting for collapse of the derrick on the top of the truck.

This derrick is also well adapted for installation of a chain hoist for transfer of heavy equipment to and from a position within the truck for direct access to or from the derrick, thereby providing a derrick of maximum convenience and usefulness and resulting in a minimum of manual effort and reducing the time and labor of handling such equipment.

The objects and advantages of the invention are as follows:

First, to provide a derrick which is specifically designed for operation from and folding onto the top of a truck.

Second, to provide a derrick as outlined in which the boom is supported directly from the bed structure of the truck.

Third, to provide a derrick as outlined in which the boom and its strut are maintained at a predetermined included angle during all phases of operation with the strut retracting for folding of the derrick on the top of the truck.

Fourth, to provide a derrick as outlined with a chain hoist with removable roof section for transfer of heavy equipment between the interior of the truck and the rear end of the truck bed for access by the derrick, to eliminate difficult and hazardous labor and reduce the time and expense of transfer.

Fifth, to provide a derrick as outlined with the boom and its strut mounted on a tilting frame with the tilting frame pivotally supported on the rear extension of the bed of the truck.

In describing the invention reference will be had to the accompanying drawings, in which:

Fig. 1 is a side elevation of my invention.

Fig. 2 is a top plan view showing the derrick in reclined position on top of a truck.

Fig. 3 is a rear elevation of the derrick.

Fig. 4 is a front elevation of the fluid motor anchors.

Fig. 5 is a circuit diagram shown in its simplest form for control of the fluid motors.

Fig. 6 is a diametric sectional elevation through the sheave housing showing the fluid motor connection.

Fig. 7 is a rear elevation of Fig. 6.

Fig. 8 is a bottom plan view of Fig. 6.

Fig. 9 is a top plan view showing the hoist rail and removable roof section.

Fig. 10 is a sectional elevation taken on a line 10—10 of Fig. 9.

Fig. 11 is a transverse sectional elevation taken on a line 11—11 of Fig. 9.

The invention includes a normally substantially horizontal boom support or base having a depending portion hinged at its lower end to a support and is shown as consisting of an inverted L-frame having spaced depending legs 12, the lower ends of which are hingedly connected to the rear extension 13 of the bed of a truck 14 as indicated at 15, with the boom support 16 normally projecting forwardly over the top of the truck when the derrick is in any position from reclined to vertical, and has one end connected to the depending legs at 17 and having a lever arm 18 formed forwardly and diagonally upward from the other end to form the boom operating fluid motor connection. The one end may be fixed to the legs where excessive drop of the boom is not required but is shown as hinged to the upper ends of the legs with a boom support tilting motor 19 cooperating between the boom support and the leg as indicated at 20 and 21 for increased lowering of the boom through tilting of the boom support at will.

The depending legs each are shown with an upward extension 22 in which the boom support rear cross member 23 is fixed, this cross member having ears 24 fixed thereon in which the legs 25 and 26 of the boom are hinged as indicated at 27, the upper end of the boom terminating in a sheave housing 28.

A fluid motor 29 functions principally as a rear leg or tension strut for the boom and has its plunger 30 pivotally connected to the sheave housing through the sheave shaft 31 through a yoke 32 which spans the sheave, the bottom plate 33 of the sheave housing being suitably recessed as indicated at 34 for free movement of the yoke, the lower end of the cylinder 35 being shown as hingedly connected to ears 36 which are fixed to the cross member 37, the respective ends of which are fixed to the other ends of the respective arms 16 of the boom support, the ears 36 being downwardly and forwardly inclined with the lower end of the boom operating motor cylinder hingedly supported as indicated at 38. The arms 16 and cross members 23 and 37 form the boom support.

The boom control motor support consists of spaced legs 39 and 40 the lower ends of which are fixed to the main frame at the forward end of the truck body, and provided with ears 41 at their upper ends for pivotal connection of the lower ends of the cylinders 42 and 43 of the boom control motors, the plungers 44 and 45 being pivotally connected to the arms 18 of the boom support as indicated at 46. Suitable bracing 47 is provided for the legs 39 and 40.

A hoist rail 48 is supported by the cross members 23 and 37 of the boom support, such as by a drop bearing 49 from the cross member 23, and includes a roof section 50 which is fixed thereto and closes over the opening in the main roof 51 when the boom is folded forward or in its vertical position, permitting a chain hoist 52 to be used for transferring heavy equipment into and out of the truck when the boom is in any position ranging from reclined to vertical.

The boom control motors, the boom strut motor, and the boom support tilting motors are shown as separately controlled as indicated in the circuit diagram Fig. 5, though not so limited. The valve 53 in the position

shown retracts the boom support to bring the boom to its vertical position indicated at 25', the pump delivering fluid from the supply tank 54 through the pump 55, conduit 56, valve 53, and conduit 57 to the head end of the cylinders 42 and 43, the fluid from the other ends draining back through the conduit 58 through valve 53 and conduit 59 to the tank 54. When this valve is moved to its other position, the fluid passes through the conduit 58 to the lower end of the cylinders, forcing the boom support rearwardly to the position shown in Fig. 1 in solid lines, the raising and lowering of the boom being under control of this valve to the limit of its stroke. For further lowering of the boom, the valve 60 is positioned oppositely from that shown, the fluid passing from the pump 55 through conduit 56, conduit 61, valve 60, conduit 62 to the lower ends of the cylinders 19, forcing the boom support angularly upward as indicated at 16'' in Fig. 1, increasing the angle between the depending legs 12 and arms 16, lowering the boom as indicated at 25'', and which shows only a portion of the additional lowering possible. This control causes almost vertical movement of the sheave.

The valve 63 operates the boom strut motor for raising, lowering and folding, the pump 55 delivering fluid through the conduit 56 and 64, thence through the valve 63, and in the position shown, through the conduit 65 to the head end of the motor 29 for retracting the boom to the folded position shown in Fig. 2, with the drainback through the conduit 66, valve 63 and conduit 67 to the supply tank 54.

For operation of the derrick, valve 63 is turned to the other position from that shown, raising the boom to its vertical position indicated at 25' in Fig. 1 and also in Fig. 3. This motor, through all phases of operation of the derrick except folding, is under constant tension, never being subjected to compressional stresses.

With the boom in its vertical position, further manipulation of the boom is controlled by the boom control motors 42 and 43 through the valve 53, to the limit of stroke of the motors. When further lowering is desired, with the boom control motors advanced to the limits of their stroke, the boom support motors 19 are operated through control by the valve 60 to increase the divergence between the depending legs 12 and arms 16, bringing the arms eventually to a practically vertical position which causes considerable further lowering of the boom from the position shown at 25''.

When heavy material or equipment is to be transferred into or out of the truck, the boom can be retracted substantially to its vertical position to deposit or remove the material to or from the rear extension 13, to or from which point it can be handled by the hoist 52.

When all operations are completed, the valve 60 is first operated to retract the boom support to its normal position. Next, the valve 53 is operated to bring the boom to its vertical position, followed by the valve 63 for retracting the boom through the boom strut motor, the derrick folding down on top of the truck body as indicated in Fig. 2, with the roof portion 50 closing the opening in the roof.

I claim:

1. A vehicle having a bed and a top, a front end and a rear end, laterally spaced legs having their lower ends hingedly connected to the rear end of said bed, a boom support having one end connected to the upper ends of said legs with the other end projecting forwardly over said top and having a boom strut cross member at said other end, a boom support cross member connecting the upper ends of said legs and a boom having its lower end hingedly connected to said boom support cross member and having a cable sheave at its other end and a shaft therefor, a boom strut fluid motor cooperating between said boom strut cross member and said shaft, motor anchors fixed at the front end of said top, and boom control motors cooperating between said anchors and said other end of said boom support, and a supply of fluid under pressure and control means therefor for said motors.

2. A structure as defined in claim 1, said boom support being hingedly connected to said legs, and boom support tilting motors cooperating between said boom support and said legs for increasing the angle of divergence between said boom support and said legs for increased lowering of the boom beyond the limits of operation of said boom control motors, and control means for said boom support tilting motors.

3. A vehicle having a bed and a top, a front end and a rear end, a boom support having its lower end hingedly mounted on said bed and its upper end projecting forwardly substantially horizontally over said top, a boom having its lower end hingedly mounted on the rear end of said boom support and having a sheave at its other end, a boom strut fluid motor cooperating between the front end of said support and said boom for raising said boom to operative position and for lowering said boom forwardly to recline on said top, and boom control motors cooperating between the front end of said top and the front end of said boom support for operation of said boom following raising thereof by said boom strut fluid motor, and a supply of fluid under pressure and control means therefor for controlling operation of said fluid motors.

4. A structure as defined in claim 3, said boom support comprising depending legs spaced laterally, and arms projecting forwardly over said top and connected to the upper ends of said legs, a rear cross member having its respective ends fixed to the upper ends of the respective legs and having said boom hingedly connected thereto, and a front cross member having its respective ends fixed to the front portions of said arms with said boom strut motor hingedly connected thereto, and with said boom control motors hingedly connected at one end to said front end of said arms for operation and control of said boom.

5. A structure as defined in claim 4, said arms having their rearward ends hingedly connected to the upper ends of said legs, boom support tilting motors cooperating between said legs and said arms and forming supports for said arms when said motors are fully retracted, said boom support tilting motors including said supply of fluid and control means, for increasing the divergent angle between the legs and arms for increasing the degree of lowering of the bom without change in the angularity between the boom and its strut.

6. A derrick comprising, a derrick support, a depending member hingedly connected at its lower end to said derrick support, a boom support connected at one end to the upper end of said depending member and projecting substantially at right angles thereto, a boom having its lower end hingedly supported at one end of said boom support, a boom strut motor cooperating between the other end of said boom support and the upper end of said boom for operating said boom respectively to and from vertical and reclined positions and for supporting said boom under tension during operation of the derrick, and a boom control motor cooperating between said boom support and said derrick support for operation of said derrick, and a supply of fluid under pressure and control means therefor for said motors.

7. A structure as defined in claim 6, said boom support including a cross member at each end, a hoist rail suspended from said cross members for operation of a manually operable hoist thereon for transfer of heavy elements to and from positions inaccessible to accessible positions for said derrick.

8. A vehicle having a body and a bed having a front end and a rear end, and an extension from the rear end of said bed, an inverted L-shaped boom support having depending legs with the lower ends hingedly supported by said extension in laterally spaced relation and hav-

ing each an arm projecting forwardly over said top and having the rearward ends connected to the upper portions of said legs, a boom support cross member having its respective ends connected to the upper ends of said legs, and a boom having its lower end hingedly connected to said boom support cross member, a boom strut cross member having its respective ends fixed to the forward portions of the respective arms, and a boom strut motor having its respective ends hingedly connected to said boom and to said boom strut cross member, spaced supports at the front end of said body, a boom operating motor hingedly connected between the forward end of each arm and the respective spaced supports, and a supply of fluid under pressure and control means therefor for operating said boom strut motor for raising said boom to a vertical position and lowering to a reclined position on said top, and for operating said boom control motors for operating said boom through operation of said boom support about the hinged supports at the lower ends of the legs.

9. A structure as defined in claim 7, a sheave housing at the upper end of said boom, a sheave rotatable in said housing and having a shaft, said boom strut motor having a plunger terminating in a yoke spanning said sheave and having bearings on said shaft for efficient support of the boom.

10. A structure as defined in claim 7, the rearward ends of said arms being hingedly connected to said legs, a boom support tilting fluid motor cooperating between each leg and its hingedly connected arm for supporting the arms substantially at right angles to the legs when the boom support tilting motors are fully retracted, and including said supply of fluid under pressure, and control means for operation of said boom support tilting motors for increasing the divergent angularity between the arms and the legs for increasing the degree of lowering of the boom beyond the limits of the strokes of the boom control motors.

No references cited.