Dec. 25, 1934. N. M. ERDAHL 1,985,285

SIDE MOUNTED DERRICK FOR TRACTORS

Filed May 12, 1932 3 Sheets-Sheet 1

Fig 1.

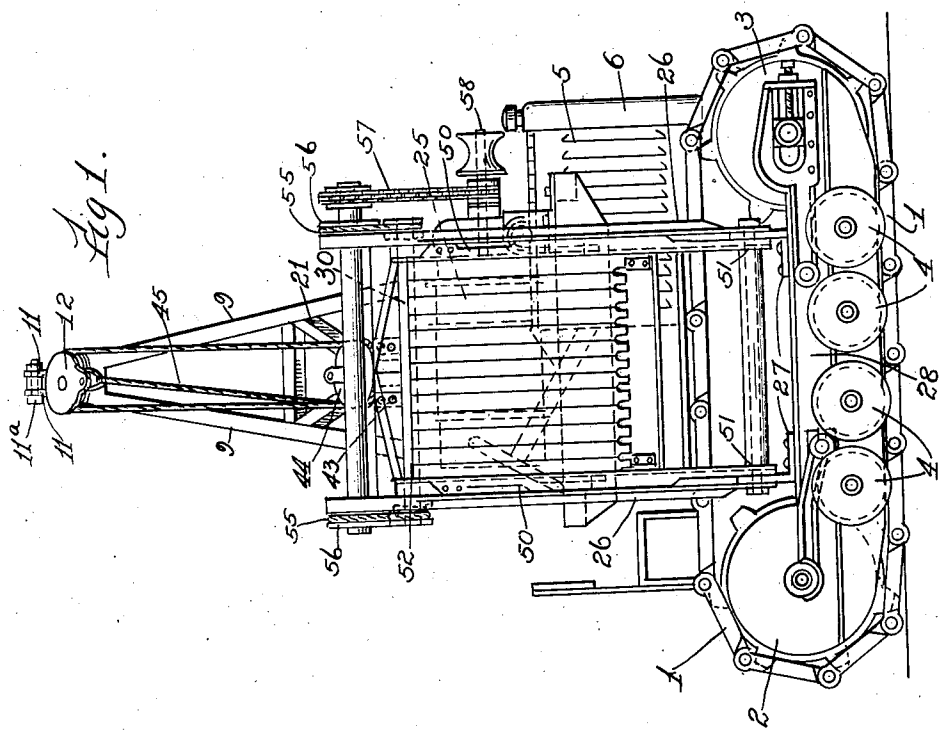
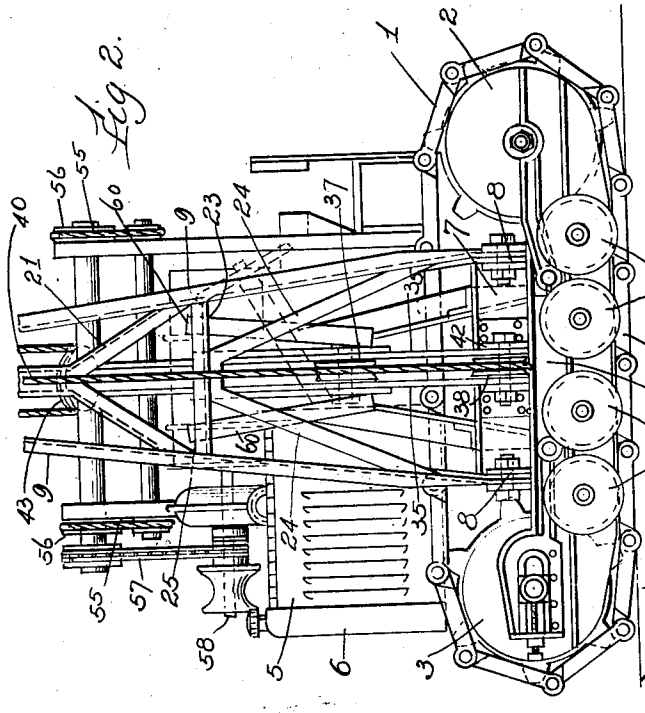


Fig 2.



Inventor.
Nicholai M. Erdahl.
by Bruesch & Bruesch
Its Attorneys.

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SIDE MOUNTED DERRICK FOR TRACTORS

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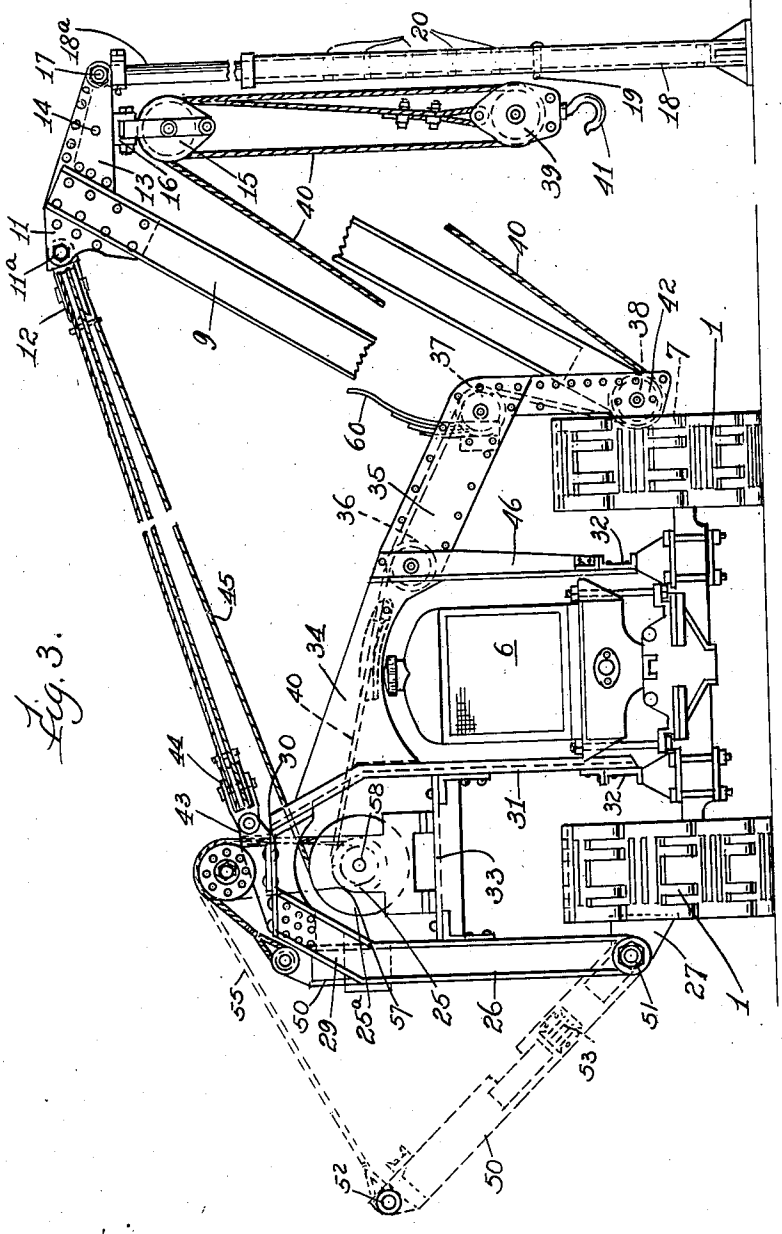

Fig. 3.

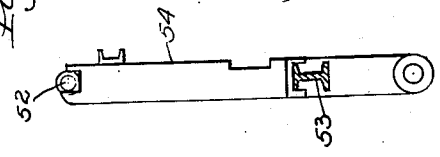

Fig. 6.

Witness.
J. C. McKnight

Inventor.
Nicholai M. Erdahl.
by. Bond & Bond
his Attorneys.

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Fig. 4.

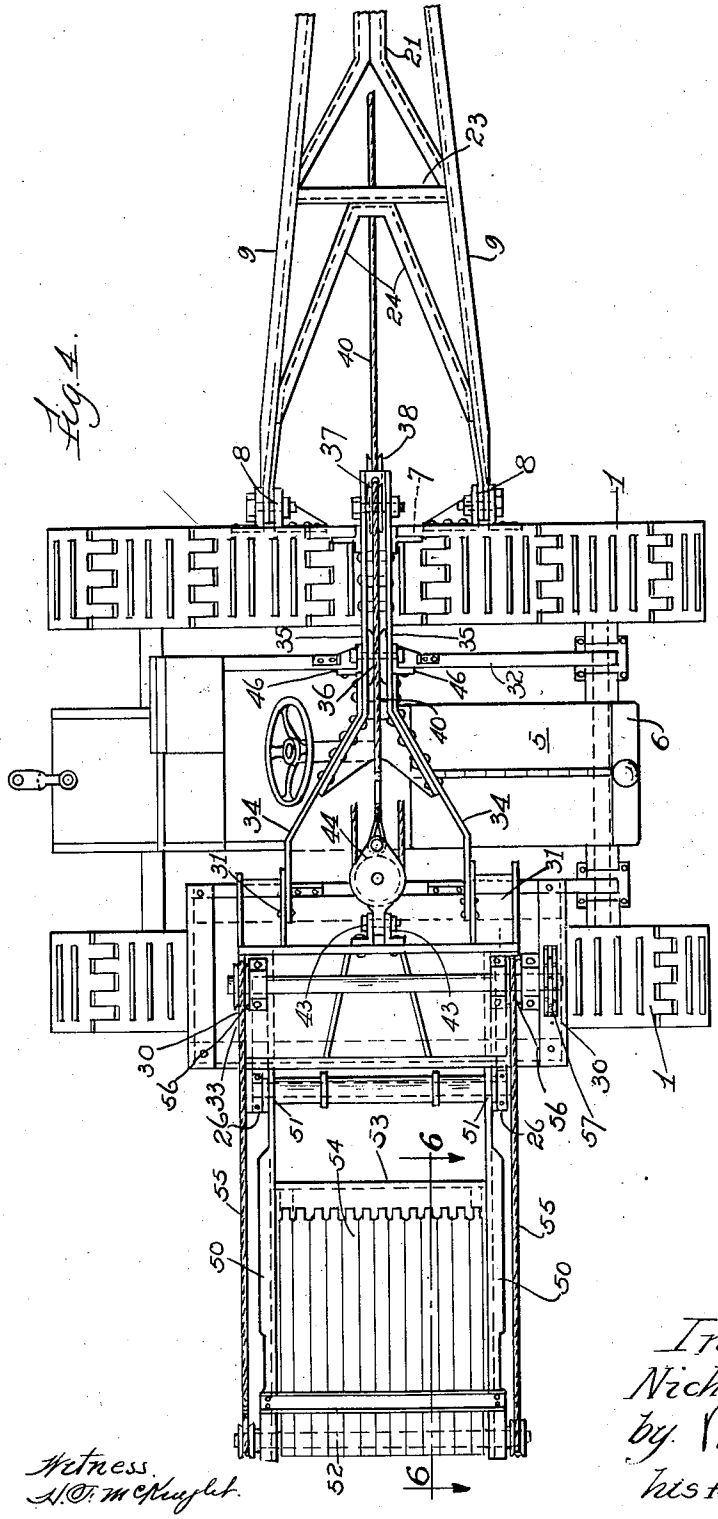
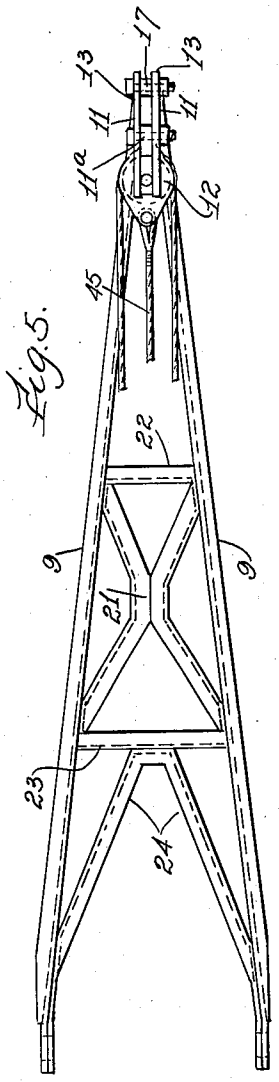


Fig. 5.



Witness.
N. T. McKnight.

Inventor
Nicholai M. Erdahl.
by Brown & Brown
his Attorneys.

Patented Dec. 25, 1934 1,985,285

UNITED STATES PATENT OFFICE

1,985,285

SIDE-MOUNTED DERRICK FOR TRACTORS

Nicholai M. Erdahl, Edgerton, Wis., assignor to Highway Trailer Company, Edgerton, Wis., a corporation of Wisconsin

Application May 12, 1932, Serial No. 610,859

4 Claims. (Cl. 212—49)

This invention relates to portable derricks, and for purposes of illustration the means shown for transporting the derrick is in the form of a crawler tractor, inasmuch as this type of vehicle furnishes a rather stable form of base, and is itself adaptable to various heavy duty jobs which frequently arise in connection with the use of portable derricks and hoisting machinery. One object of the invention is to further increase the stability of the carrying vehicle by providing means for counter-weighting the vehicle on the side opposite to that from which the derrick boom extends. Another object is to arrange such counter-weight means adjustably so that it may be collapsed or folded substantially within the normal outlines of the vehicle for travel. A further object is to provide the derrick boom with an adjustable post or foot-piece which may be employed in some situations for stabilizing the entire apparatus when it is lifting unusually heavy loads. The invention is also directed to improvements in the design and mode of construction of the boom and supporting structure therefor which adapts the tractor for carrying it, and provides for driving the derrick-operating cables by means of the same power plant which propels the tractor for travel. The invention thus consists of various features and elements of construction in combination, as herein shown and described, and as indicated by the claims.

In the drawings:

Figure 1 is a side elevation of a tractor fitted with a derrick in accordance with this invention, and provided with counter-weight means at the side shown in this view.

Figure 2 is an elevation of the other side of a tractor, being the side at which the derrick boom is carried.

Figure 3 is a front elevation showing the apparatus adjusted with the boom extended, and with the auxiliary supporting post in position, and also showing the counter-weight partly extended.

Figure 4 is a top plan view of the tractor showing the counter-weight fully extended, and showing a portion of the boom in extended position.

Figure 5 is a detail plan view of the boom.

Figure 6 is a detail section taken as indicated at line 6—6 on Figure 4 for indicating the construction of the counter-weight units.

The crawler tractor shown in the drawings is of a standard type, including a pair of crawler chains, 1, carried on the usual sprockets, 2 and 3, with idler wheels, 4, adjacent the road-engaging ply of each chain. The engine is located within a hood or housing indicated at 5, with the usual radiator, 6, disposed at one end of such housing, and with suitable gearing not shown in detail, arranged for connecting the engine with the crawler chains, 1, 1, for driving the vehicle. A longitudinal frame member, 10, extending from the wheel, 2, to the wheel, 3, on one side of the vehicle and serving also as a mounting means for the idlers, 4, provides support for a special bracket plate, 7, having lugs, 8, to which the lower ends of the boom structure are pivoted. The boom, as shown in Figure 5, consists of two side channels, 9, 9, disposed in non-parallel relation and converging to a terminal or head block which includes ears, 11, to which the sheave or pulley block, 12, is pivoted at 11^a. A bill or extension consisting of two plate portions, 13, extends transversely of the channels, 9, in the opposite direction from the ears, 11, and supports a cross pin, 14, from which the pulley block, 15, is suspended by a clevis, 16. Said bill at its outer end is provided with a second cross pin at 17 for engagement with the upper end of the auxiliary supporting post or leg, 18, seen in Figure 3. This leg includes a lower portion and an upper portion, 18^a, telescopically engaged in the lower portion and adjustable to different lengths by the insertion of the cross pin, 19, at one of the several holes, 20, provided for this purpose in the lower hollow member of the leg. The boom is strongly reinforced by means of a structural X at 21, cross members, 22 and 23, and a substantially V-shaped bracing member, 24, disposed at the wide end of the boom just below the cross member, 23. All bracing members are electrically welded in position, thus forming the boom into a substantially unitary structure of great rigidity.

For supporting the boom and its operating cables, I provide the tractor with a special framework consisting of an arched structure for supporting the winding drums, 25, directly over one of the crawler chains, 1, and a bracing structure extending from said arched structure across the tractor to an anchorage adjacent the other crawler chain, 1. The arch structure includes a pair of uprights, 26, supported by laterally extending brackets, 27, which rest upon the horizontal frame member, 28, and these uprights are bent inwardly at 29 for connection with cross members, 30, extending transversely over the crawler chain, 1, to the inner uprights, 31, which reach down to the side members 32, of the main frame of the vehicle for their support and anchorage. A platform 33, is carried by and between the uprights, 26 and 31, for mounting the winding drums indicated at 25.

The bracing structure consists of a Y-shaped frame having plate members, 34, 34, extending over the engine hood, 5, from their connection to the uprights, 31, and converging as viewed in plan. These plates are spliced to parallel plate members, 35, 35, secured together with suitable spacers between them, and furnishing support for pulleys, 36, 37 and 38, over which is trained the hoisting cable, 40 extending from one of the drums at 25 to the pulley block 15, and its associated pulley block, 39, which carries the load hook, 41, as seen in Figure 3. The lower end of the bracing frame is riveted to bracket lugs, 42, extending outwardly from the same bracket plate, 7, to which the boom is fulcrumed.

The raising and lowering of the boom itself is accomplished by means of a cable, 45, extending from a second winding drum, 25ª, and trained through the sheave block, 12, and the block, 44, attached respectively to the boom and to suitable lugs, 43, of the arched framework. It will be understood that the movement of the derrick may be controlled by any suitable clutch mechanism for driving the drums, 25 and 25ª, at will, and in either direction, for reeling or unreeling the cables, 40 and 45, respectively, in the usual manner. In view of the strain imposed upon the bracing structure by the operation of the cable, 40, over the pulley, 36, the transversely extending plates, 34, may be reinforced by uprights, 46, having footing upon the longitudinal member of the tractor frame, 32, at that side of the vehicle, and preferably these uprights, 46, diverge from their connection to the plates, 34, to afford a bracing effect in a longitudinal vertical plane.

The counter-weight structure for balancing the lifting effort of the boom consists of a pair of arms, 50, which are hingedly connected to the brackets, 27, at 51, and which stand in vertical position just outside one of the crawler chains, 1, when adjusted for travel of the tractor vehicle. These arms, 50, are transversely connected by cross bars, 52 and 53, between which a series of counter-weight units, 54, of cast iron or steel are removably held. To the ends of the cross bar, 52, a pair of hoisting cables, 55, are attached, and extend over pulleys, 56, which may serve as winding drums for paying out or reeling in the cables, 55, to lower or raise the counter-weight frame so as to extend it and its weights, 54, more or less from the side of the tractor. The pulleys, 56, need only be rather deeply grooved to serve this purpose, since two or three turns will be sufficient for adjusting the counter-weight frame from one limit to the other. Any suitable driving connection may be provided for the winding pulleys, 56; the drawings show a chain drive at 57, extending to a shaft, 58, associated with the drums, 25 and 25ª, but if preferred, a hand-operated worm may be provided for operating the pulleys, 56, and the counter-weight frame. When the boom is raised to its vertical position for travel it may come up rather quickly under the engine power, and to avoid shock to the framing I provide one or more bumper springs shown at 60 in Figure 3 to arrest this movement.

I claim:

1. In combination, a vehicle, a derrick boom mounted thereon and adjustable to extend laterally beyond the ground-engaging base of the vehicle, and a counter-weight fulcrumed on a horizontal axis at one side of the vehicle and extending upwardly therefrom but adapted to swing outwardly about said axis for extension in the opposite direction from the boom, said counter-weight being relatively thin in the direction of its swinging movement, so that when folded up against the side of the vehicle said counter-weight and parts associated directly therewith extend laterally from the vehicle by a relatively small amount.

2. In combination with a crawler tractor comprising a power plant, a supporting frame therefor, and a pair of crawler chains disposed respectively at opposite sides of the power plant with a frame for each of said chains connected to the first mentioned frame, a derrick boom, and means for mounting it comprising a frame structure formed to stand astride the tractor power plant extending closely thereover, and including a footing on each of the crawler frames, fulcrum means for the derrick boom disposed closely adjacent the footing of said structure on one of the crawler frames and below the upper ply of the crawler chain, winch mechanism carried by the frame structure over the other crawler, and guide pulleys journaled in said frame structure arranged for leading a hoisting cable from the winch mechanism over the power plant and thence downwardly adjacent the fulcrum of the boom for extension along said boom to a pulley near its outer end.

3. In combination with a crawler tractor comprising a power plant, a supporting frame therefor, and a pair of crawler chains disposed respectively at opposite sides of the power plant with a frame for each of said chains connected to the first mentioned frame, a derrick boom, and means for mounting it comprising a frame structure formed to stand astride the tractor power plant extending closely thereover, and including a footing on each of the crawler frames, fulcrum means for the derrick boom disposed closely adjacent the footing of said structure on one of the crawler frames and below the upper ply of the crawler chain, winch mechanism carried by the frame structure over the other crawler, said boom comprising a pair of side members spaced apart at the fulcrum of the boom, and said frame structure comprising members widely spaced fore-and-aft of the tractor for their connection to one of the crawler frames and converging in the portion of the structure which extends over the power plant so that said members are closely spaced above and adjacent the other crawler frame, guide pulleys supported between said members and arranged for leading a hoisting cable from the winch mechanism over the power plant, thence downwardly between said closely spaced members to a pulley substantially at the axis of the derrick fulcrum, whereby said cable extends laterally from the tractor at a point near the ground.

4. In combination with a crawler tractor comprising a power plant, a supporting frame therefor, and a pair of crawler chains disposed respectively at opposite sides of the power plant with a frame for each of said chains connected to the first mentioned frame, a derrick boom, and means for mounting it comprising a frame structure formed to stand astride the tractor power plant, and including a footing on each of the crawler frames from which said frame structure extends vertically, fulcrum means for the derrick boom disposed closely adjacent the footing of said structure at one side of the vehicle, and a counterweight fulcrumed on a horizontal axis at the other side of the vehicle adjacent the

footing of said frame structure and between two vertical members of said structure which are spaced apart longitudinally of the vehicle, said counterweight being thus adapted to swing outwardly about its axis for extension laterally of the vehicle and being relatively thin in the direction of its swinging movement so that when folded up in vertical position against the side of the vehicle, its lateral extent is not substantially greater than that of the vertical members of the frame structure between which it stands.

NICHOLAI M. ERDAHL.