July 6, 1948. R. G. LE TOURNEAU 2,444,835

POWER-ACTUATED CRANE

Filed Sept. 3, 1946

2 Sheets-Sheet 1

Fig. 1

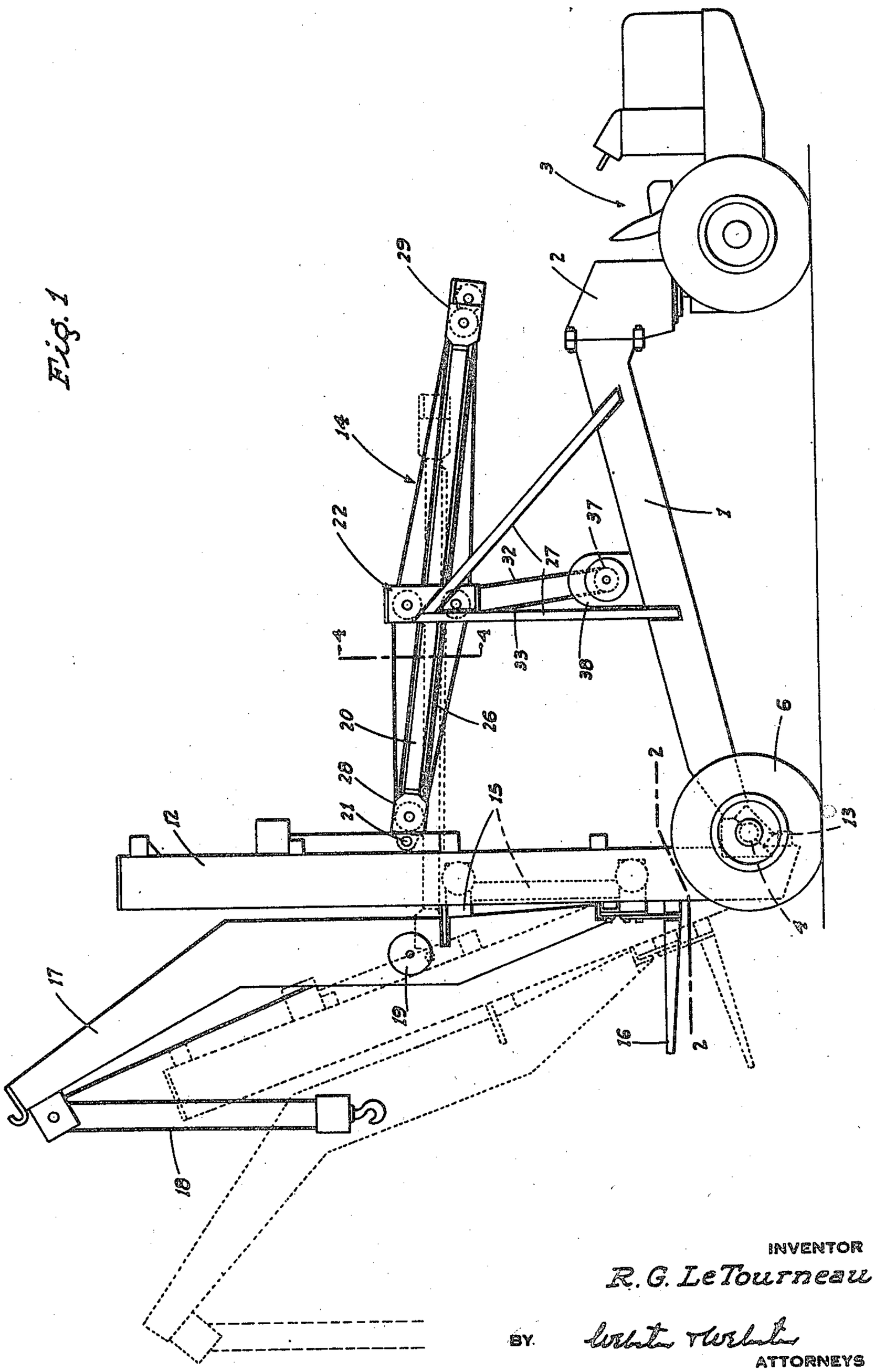

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Fig. 2

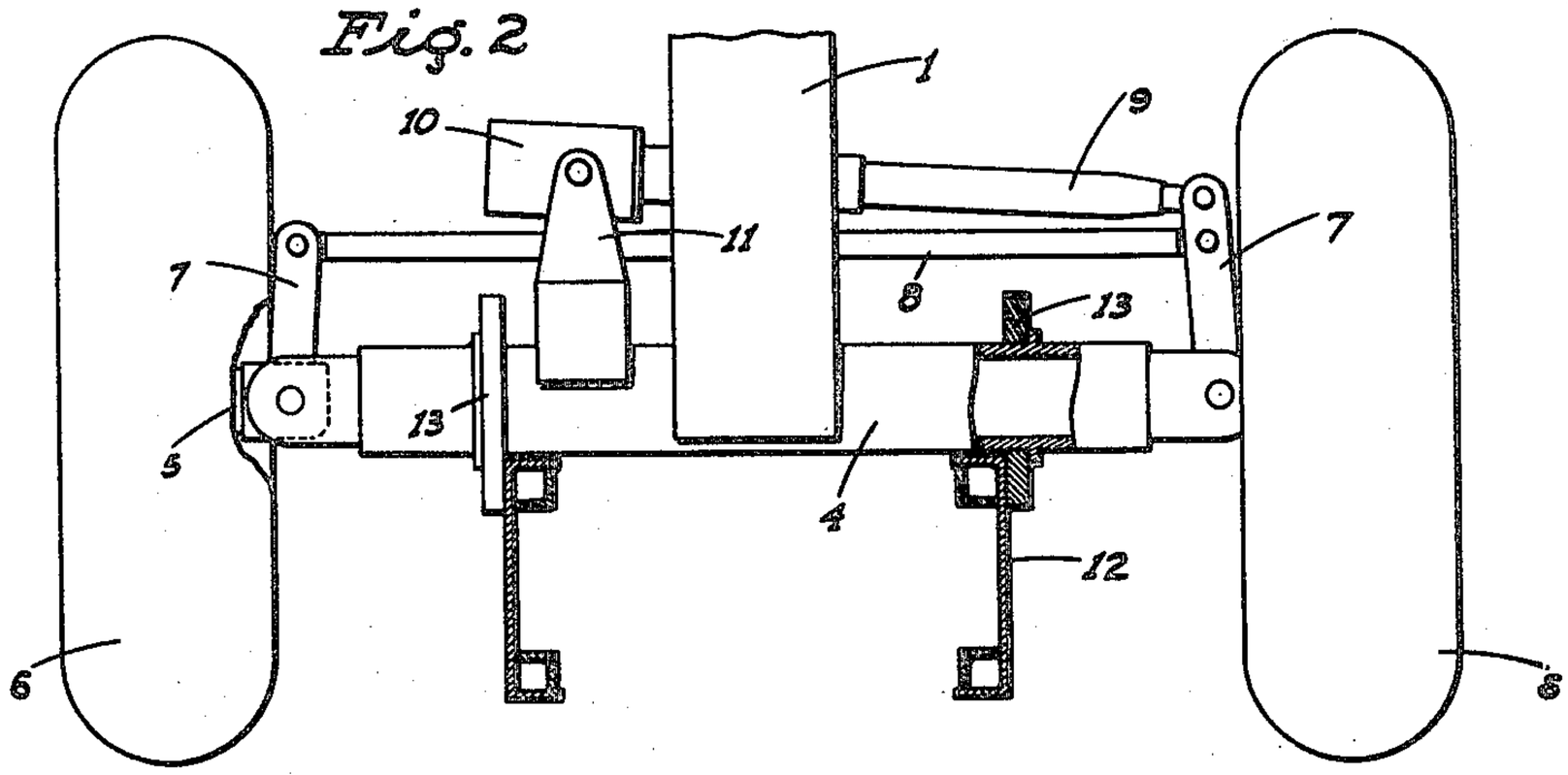


Fig. 3

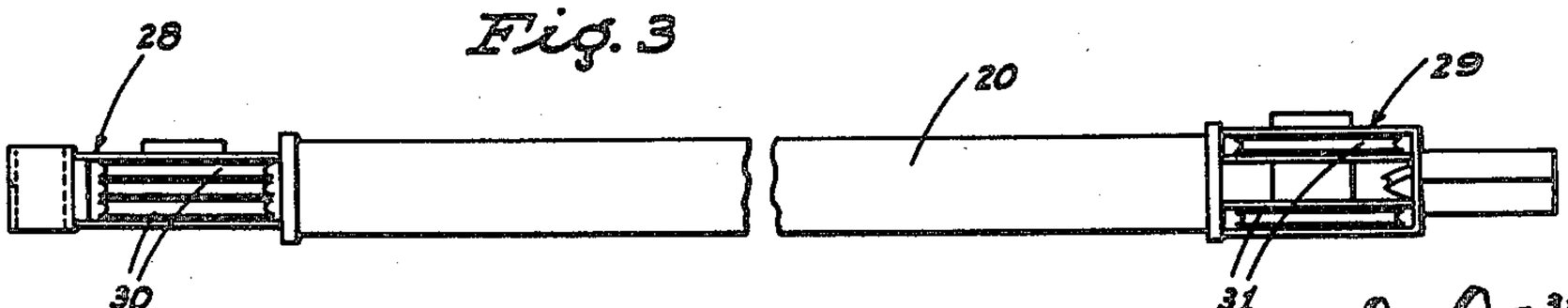


Fig. 4

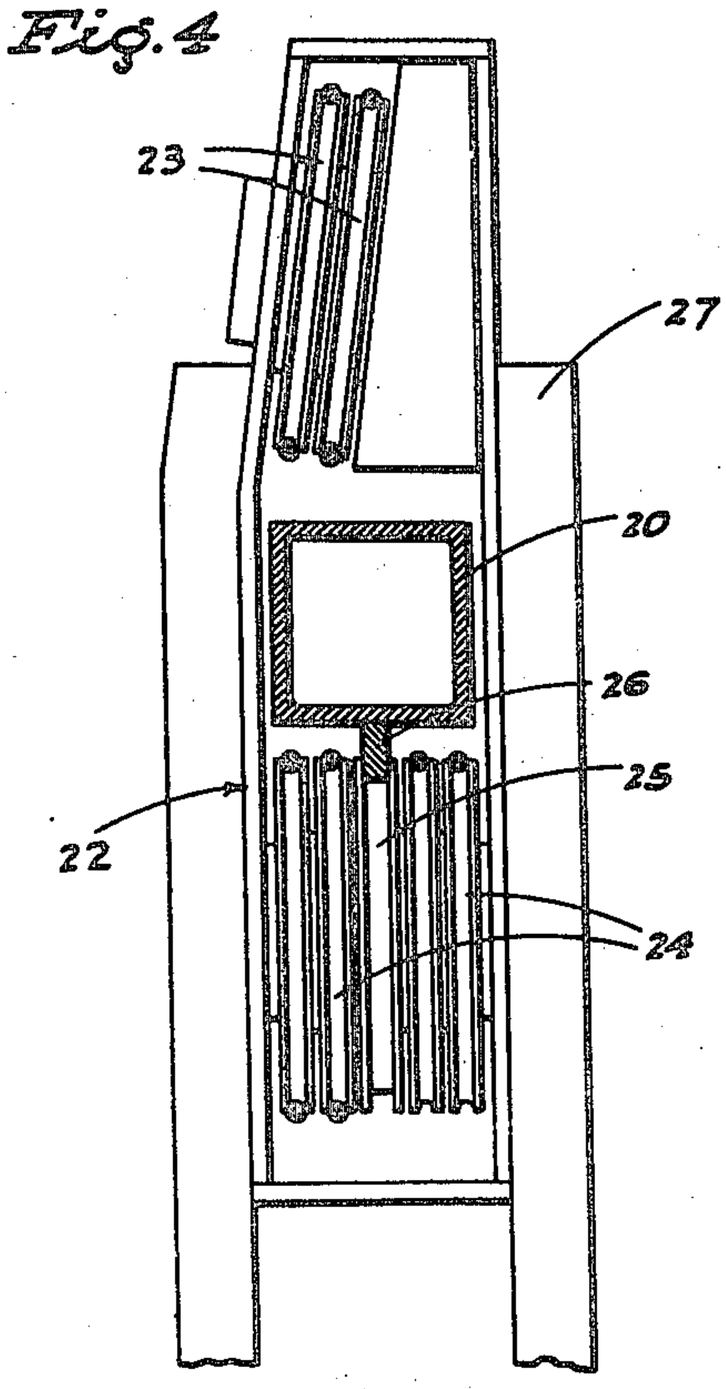
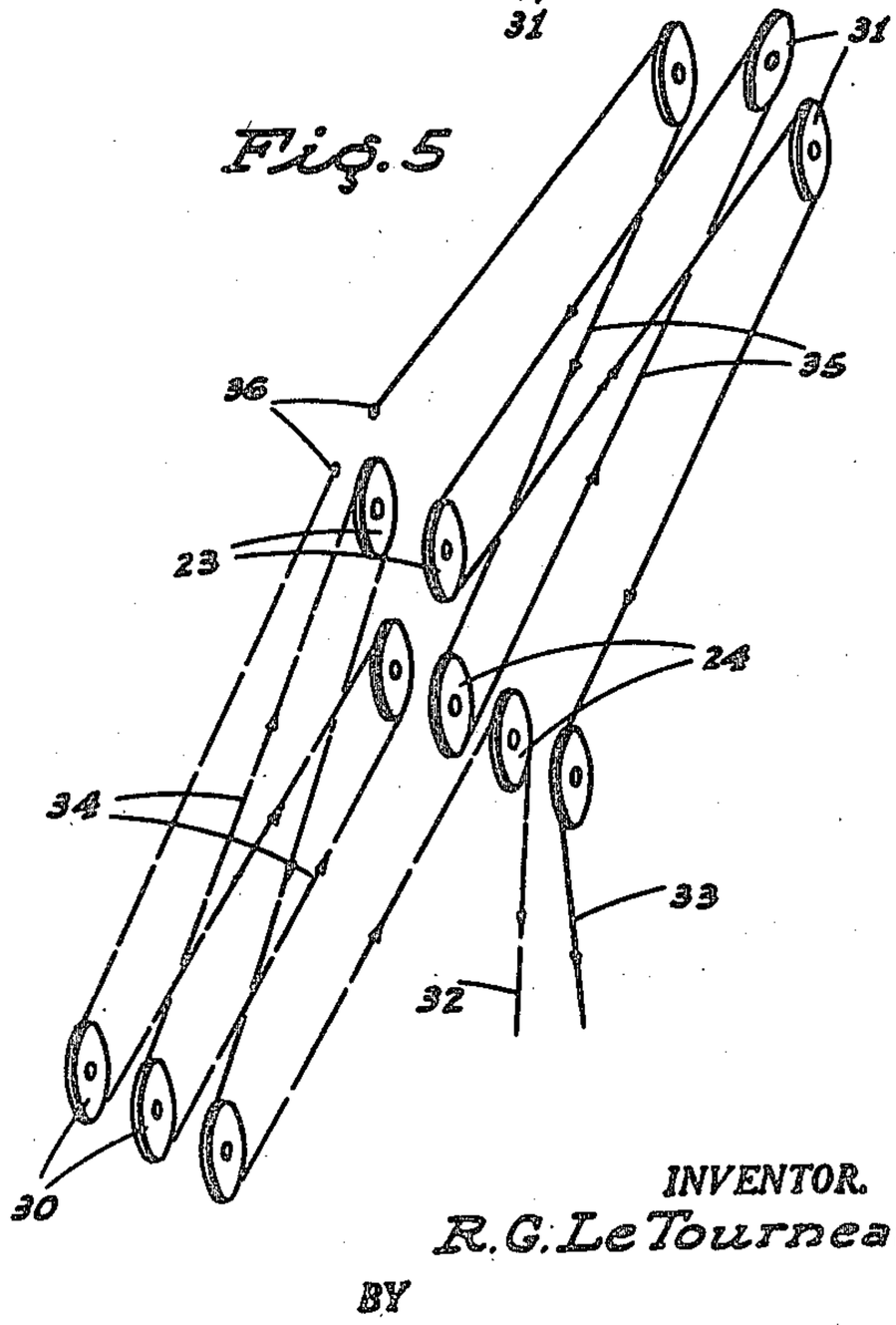


Fig. 5



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POWER-ACTUATED CRANE

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7 Claims. (Cl. 212—8)

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This invention relates to, and it is an object to provide, an improved portable crane of the type including an upstanding elevator frame, a vertically movable elevator carriage on said frame, and a load supporting member mounted on the carriage; the elevator frame being tiltable lengthwise of the implement, and there being a novel cable operated, tilt control assembly connected to such frame to effect adjustment of the latter.

Another object of this invention is to provide a cable operated, tilt control assembly which comprises a tilt control beam extending between the upstanding elevator frame and an upstanding post assembly on the implement ahead of said frame, a tilt control beam secured in connection with the frame and extending forwardly and supported in guided relation by the post assembly, and an opposed block and tackle system connected between opposite ends of the beam and the post assembly.

An additional object of the invention is to provide a portable crane which includes a rigid, longitudinally extending body having a tractor connected at one end thereto in unitary, steering relation, and transversely spaced wheels supporting the body at its other end; said wheels being power steerable relative to the tractor whereby to improve the maneuverability of the implement.

A further object of the invention is to provide a practical power-actuated crane, and one which will be exceedingly effective for the purpose for which it is designed.

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:

Figure 1 is a side elevation of the power-actuated crane embodying the present invention.

Figure 2 is an enlarged fragmentary plan view on line 2—2 of Fig. 1.

Fig. 3 is a plan view of the longitudinally extending, tilt-control beam, detached.

Fig. 4 is an enlarged fragmentary cross section taken on line 4—4 of Fig. 1.

Fig. 5 is a diagrammatic representation of the opposed block and tackle cable system employed in connection with the tilt control beam.

Referring now more particularly to the characters of reference on the drawings, the crane comprises a rigid, longitudinal body 1 disposed at a slight upward and forward incline; the front end of said body being connected by a power steering

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and coupling unit 2 to the rear end of a two-wheel tractor, indicated generally at 3, whereby said tractor is arranged in draft and steering relation to the remainder of the implement.

At its rear end the longitudinal body 1 is fixed to a transverse axle 4 having steering spindle units 5 fixed on opposite ends thereof, each steering spindle unit carrying a wheel 6. The steering spindle units 5 include forwardly projecting knuckle arms 7 connected by a tie rod 8. The steering spindle units 5 are steered, in unison, by a power shifted steering arm 9 which extends from one of the knuckle arms 7 alongside the tie rod 8 to an electric actuator 10 pivotally mounted on a bracket 11. The steering arm 9 is a telescopic arrangement which either extends or contracts upon operation of the electric actuator 10, which is reversible.

By reason of the above described arrangement, the wheels 6 are steerable relative to the body 1, whereby to improve the maneuverability of the implement, i. e. the implement can be steered either by the tractor 3 or by the rear wheels 6, or a combination of both.

An upstanding elevator frame 12 is supported at its lower end by bearings 13 on the axle 4, for tilting adjustment of said elevator frame lengthwise of the implement; such tilting adjustment being accomplished through the medium of a cable-operated tilt control assembly, indicated generally at 14, and hereinafter described in detail.

A roller mounted elevator carriage, indicated generally at 15, is carried in the elevator frame 12, being vertically adjustable by any suitable power operated means (not shown). The elevator carriage 15 is fitted with a rearwardly projecting load supporting member, which may be in the form of a fork 16, or a rearwardly and upwardly projecting boom 17; the fork and the boom being removably mounted in connection with the elevator carriage whereby said parts may be used selectively. The boom 17 is fitted with a hoist cable unit, indicated generally at 18, which hoist cable unit is operated by an electric winch unit 19 mounted on said boom.

The advantage of the tiltable adjustment of the elevator frame 5 resides in the fact that the working angle of the fork 16 or the reach of the boom 17 can be adjusted regardless of the vertical position of the same, which is independently controlled.

The cable-operated, tilt control assembly 14 comprises the following structural arrangement:

A longitudinally extending tilt control beam

20 is pivoted, at its rear end, as at 21, and extends forwardly therefrom; said beam passing, intermediate its ends, through a central sheave block 22 which includes top sheaves 23 and bottom sheaves 24, the beam passing between said top and bottom sheaves. A grooved roller 25 is supported centrally in the bank of bottom sheaves 24, and the beam 20 includes a bottom rail 26 which runs in guided relation on said grooved roller. The beam 20 is thus supported for longitudinal movement relative to a post assembly 27 which upstands from the body 1 ahead of the elevator frame 12, and rigidly supports the central sheave block 22, through which the beam 20 passes, as above described.

The tilt control beam 20 is fitted with a rear end sheave block 28 and a front end sheave block 29; said sheave blocks 28 and 29 carrying rear end sheaves 30 and front end sheaves 31.

A pair of cables, indicated at 32 and 33, respectively, are reeved between the rear end sheaves 30 and front end sheaves 31, and the top and bottom sheaves 23 and 24 of the central sheave block 22, in a manner to provide a pair of opposed block and tackle cable systems, indicated at 34 and 35. At one end the cables 32 and 33 are dead-ended on the central sheave block 22, as at 36, while opposite end reaches of said cable pass downwardly, in the manner shown in Fig. 1, and are wound in opposed relation about the drum 37 of a reversible electric winch unit 38 mounted on the body 1.

By operation of the electric winch unit 38 in one direction, the block and tackle cable system 35 is lengthened and the tilt control beam 20 is forcefully advanced, causing tilting adjustment of the elevator frame 12 in a forward direction. By operation of such winch unit in a reverse direction an opposed action results; i. e. the block and tackle cable system 35 shortens, the system 34 lengthens, and the elevator frame 12 is tilted toward the rear. In this manner a nicety of tilting adjustment of the elevator frame 12 is accomplished.

The electric actuator 10, and the electric winch units 19 and 38, are included in an electric circuit (not shown) which includes control switches accessible to the operator of the tractor 3. Such circuit is energized from a generator on said tractor.

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 claims.

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

1. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending lengthwise of the body, means on the body supporting the beam for guided longitudinal motion, and power means connected to the beam operative to impart reversible longitudinal motion thereto; said power means including opposed block and tackle cable systems connected between opposite end portions of the beam and said supporting means intermediate said end portions of the beam.

2. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending lengthwise of the body, means on the body supporting the beam for guided longitudinal motion, and power means connected to the beam operative to impart reversible longitudinal motion thereto; said power means including opposed block and tackle cable systems connected between opposite end portions of the beam and said supporting means intermediate said end portions of the beam, each block and tackle cable system including a pull reach, and a reversible winch unit having a drum, the pull reaches being connected to the drum in reverse relation.

3. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending lengthwise of the body, a post on the body adjacent the beam, means on the post supporting the beam for guided longitudinal motion, and power means connected to the beam operative to impart reversible longitudinal motion thereto; said power means including sheaves mounted in connection with the post, sheaves mounted on the beam beyond the post in opposite directions, and opposed block and tackle cable systems reeved between the sheaves mounted in connection with the post and the beam mounted sheaves.

4. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending lengthwise of the body, a post on the body adjacent the beam, means on the post supporting the beam for guided longitudinal motion, and power means connected to the beam operative to impart reversible longitudinal motion thereto; said power means including sheaves mounted in connection with the post, sheaves mounted on the beam beyond the post in opposite directions, opposed block and tackle cable systems reeved between the sheaves mounted in connection with the post and the beam mounted sheaves, each block and tackle cable system including a pull reach, and a power winch having a drum, the pull reaches being connected to the drum in reverse relation.

5. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending lengthwise of the body, a post on the body adjacent the beam, a sheave block mounted on the post, said sheave block including a roller, the beam extending through the sheave block and supported by the roller for guided longitudinal motion, other sheave blocks on the beam in opposite directions beyond the sheave block on the post, a pair of opposed block and tackle cable systems reeved between the sheave block on the

post and corresponding ones of said other sheave blocks, and power means operative to actuate said block and tackle cable systems in relation to shorten a selected one and simultaneously and correspondingly lengthen the other.

6. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending lengthwise of the body, a post on the body adjacent the beam, a sheave block mounted on the post, said sheave block including a roller, the beam extending through the sheave block and supported by the roller for guided longitudinal motion, other sheave blocks on the beam in opposite directions beyond the sheave block on the post, a pair of opposed block and tackle cable systems reeved between the sheave block on the post and corresponding ones of said other sheave blocks, and power means operative to actuate said block and tackle cable systems in relation to shorten a selected one and simultaneously and correspondingly lengthen the other; said roller having a circumferential groove therein, and a longitudinal rail on the beam riding in the roller groove.

7. A tilt control assembly for a crane including a longitudinally extending body and an upstanding frame mounted on the body for tilting adjustment in a plane lengthwise thereof; said assembly comprising a tilt control beam connected to the upstanding frame above and extending

lengthwise of the body, a post on the body adjacent the beam, a sheave block mounted on the post, said sheave block including a roller, the beam extending through the sheave block and supported by the roller for guided longitudinal motion, other sheave blocks on the beam in opposite directions beyond the sheave block on the post, a pair of opposed block and tackle cable systems reeved between the sheave block on the post and corresponding ones of said other sheave blocks, and power means operative to actuate said block and tackle cable systems in relation to shorten a selected one and simultaneously and correspondingly lengthen the other; each block and tackle cable system including a pull reach, and said last named means being a reversible winch unit having a drum, the pull reaches being connected to the drum in reverse relation.

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