

Oct. 10, 1961

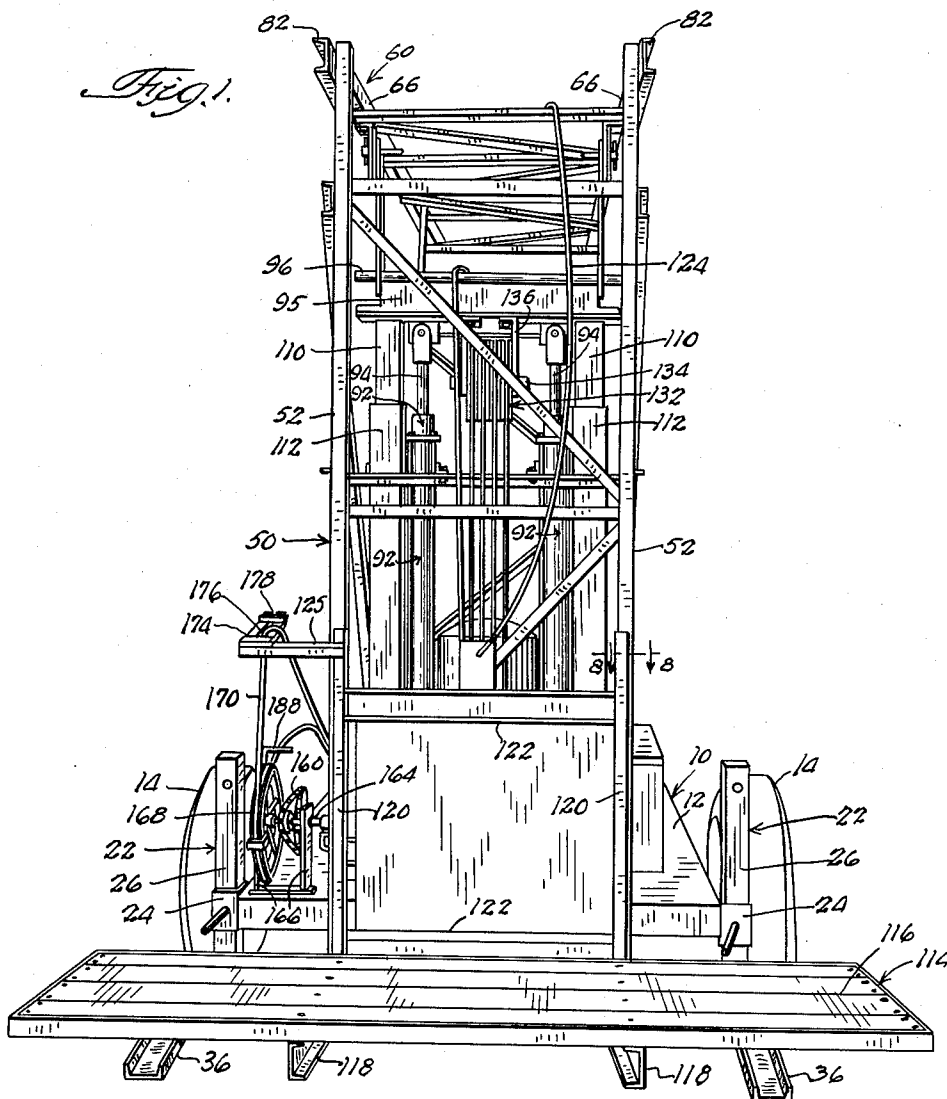
J. E. WIEGAND ET AL

3,003,584

HYDRAULIC LIFT

Filed March 20, 1959

4 Sheets-Sheet 1



INVENTORS
John E. Wiegand
BY John F. Holmberg
Olson, Mecklenburg, von Holst,
Pundtler & Newman. Attys

Oct. 10, 1961

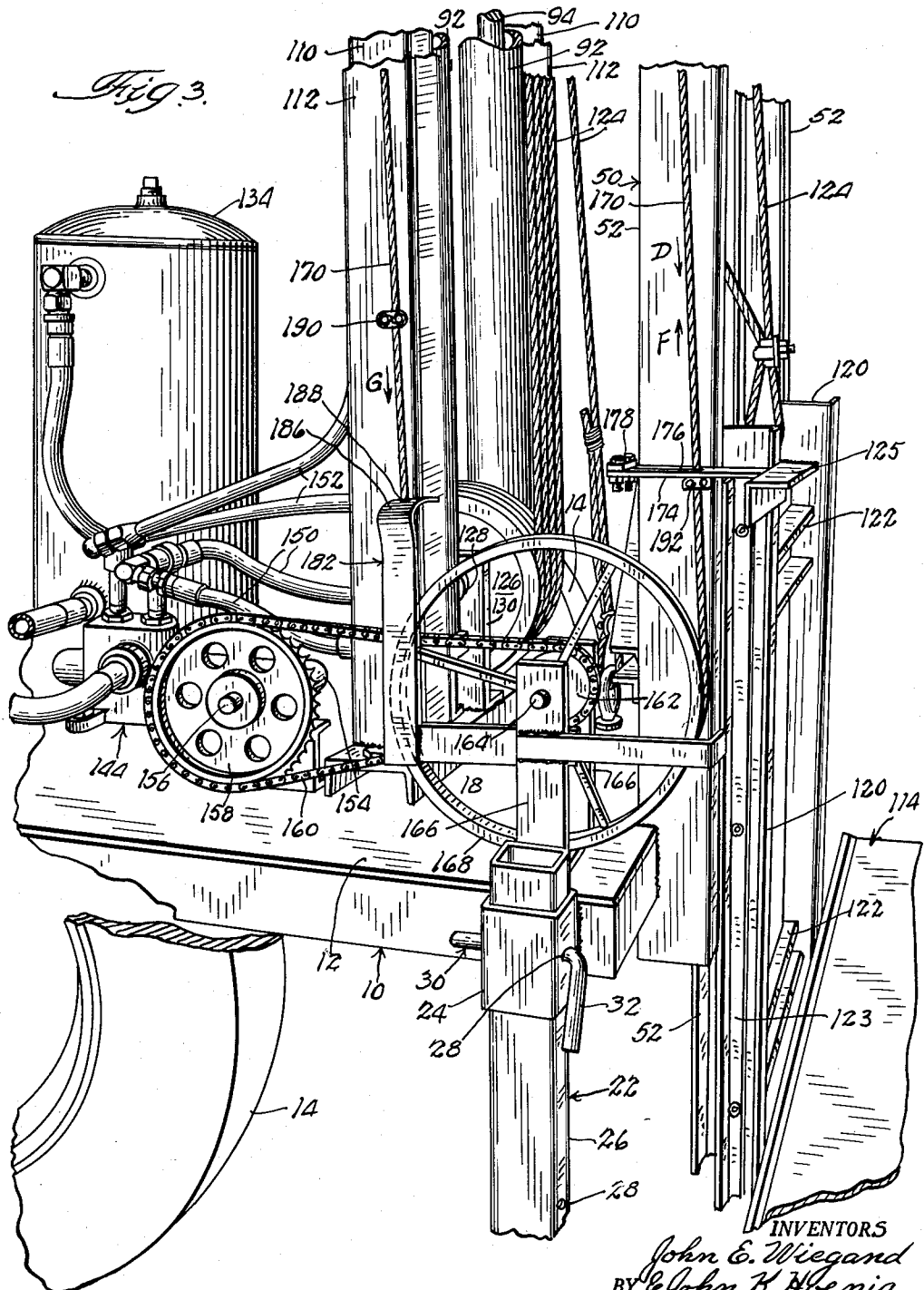
J. E. WIEGAND ET AL

3,003,584

HYDRAULIC LIFT

Filed March 20, 1959

4 Sheets-Sheet 3



INVENTORS
John E. Wiegand
BY John H. Henig
Chas. Mackelburger, van Arlet,
Pendleton & Newman. Attys.

Oct. 10, 1961

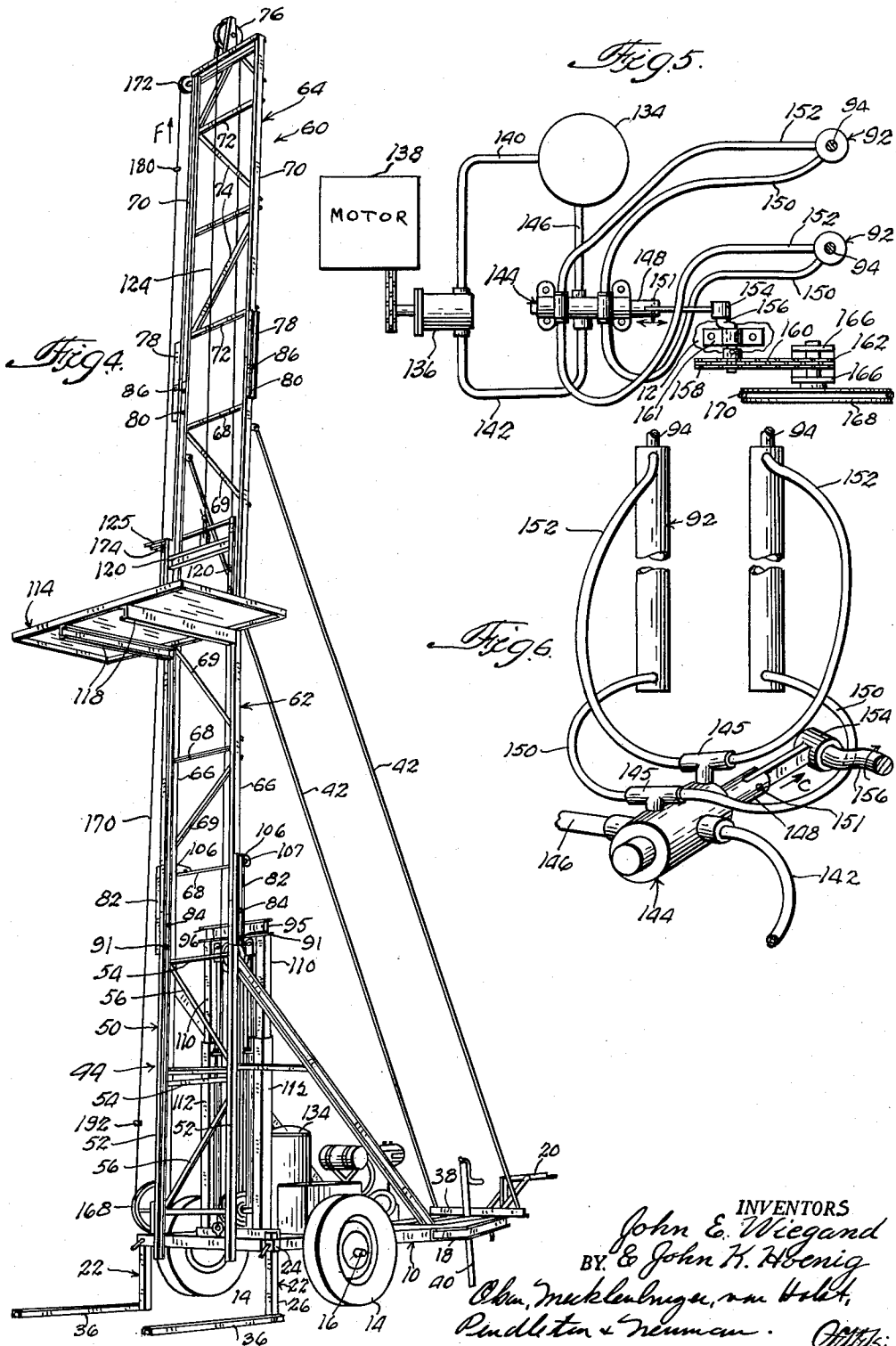
J. E. WIEGAND ET AL

3,003,584

HYDRAULIC LIFT

Filed March 20, 1959

4 Sheets-Sheet 4



INVENTORS
John E. Wiegand
BY: John H. Henig
Chas. Muehlbauer, att. in fact,
Rudolph & Neumann. *Oct 10 1961*

1

3,003,584

HYDRAULIC LIFT

John E. Wiegand, 6848 W. Madison St., Niles 31, Ill.,
and John K. Hoenig, 1747 Linneman St., Glenview, Ill.

Filed Mar. 20, 1959, Ser. No. 800,777

5 Claims. (Cl. 187-2)

This invention relates to an apparatus for lifting objects of considerably weight, and it is an object of this invention to provide an improved hydraulic lift of that character.

Industrial lifts are very well known and widely used in handling materials of many kinds in factories, warehouses, and on outdoor building construction projects. The use of such machines has resulted in greater efficiency in transporting, raising and storing heavy objects and has substantially reduced the time and cost of manual labor, and it is another object of this invention to provide improved hydraulic lifts of this character.

Since such devices are frequently used to raise material to a high level and since it is desirable that the device so used be of a sufficiently low over-all height to permit passage through passageways lower in height than the height to which materials and objects are to be raised, it is a further object of this invention to provide a hydraulic lift which is collapsible to a degree sufficient to meet the foregoing requirements.

It is another object of this invention to provide a hydraulic lift which may be operated by a person supported on a movable platform in any position of the platform.

It is another object of this invention to provide a lift in which one hydraulic means is employed both to raise, align and lower collapsible sections and to raise and lower a load-supporting platform along the mast sections after alignment thereof.

It is still another object of this invention to provide an improved hydraulic lift which is portable and readily movable from one site of operation to another.

It is still a further object of this invention to provide a hydraulic lift which is both sturdy in construction and easily and safely operated.

According to one embodiment of this invention, there is provided a portable hydraulic lift comprising a chassis, a collapsible mast mounted on said chassis, a load-supporting platform movable along said mast, said mast comprising a lower section perpendicularly secured to said chassis and an upper section pivotally secured to said lower section, hydraulic means for pivoting said upper section into alignment with said lower section and for moving said platform along said mast, means connecting said hydraulic means with said upper section to permit said upper section to be pivoted by said hydraulic means, said connecting means being disengageable from said hydraulic means when said upper section is aligned with said lower section to permit said platform to be moved along said mast by said hydraulic means, and control means extending along said mast for actuating said hydraulic means, said control means being operable by an operator supported on said platform at any position of said platform along said mast.

This invention, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawings, and the scope thereof will be pointed out in the appended claims.

In the drawings in which like parts are designated by like numerals:

FIGURE 1 is a rear elevational view of the invention showing certain elements thereof in collapsed condition;

FIG. 2 is a perspective elevational view of the apparatus shown in FIG. 1;

2

FIG. 3 is an enlarged fragmentary view showing certain elements of the invention in perspective;

FIG. 4 is a perspective elevational view of the invention showing certain elements thereof in load-raising position;

FIG. 5 is a plan view of certain other elements of the invention;

FIG. 6 is a perspective view of certain elements of the invention shown in FIG. 5;

FIG. 7 is an elevational view taken in the direction of the arrows 7-7 in FIG. 2; and

FIG. 8 is a sectional view taken in the direction of arrows 8-8 in FIG. 2.

In accordance with the illustrated embodiment of the invention, there is provided a chassis 10 having a floor 12 over the rearward portion thereof. The chassis 12 is mounted on a pair of wheels 14, supported on an axle 16 secured on the underside of the chassis. A pair of channel members 18 (FIG. 2) is secured to the sides of the chassis forwardly of the floor 12 thereof and are bent to converge inwardly and come together forwardly of the chassis for supporting a hitch 20 by means of which the lift apparatus may be towed by a truck or other vehicle (not shown).

In order that the apparatus may be safely secured during the lifting operation, a pair of leg members 22 are attached to the rear end of the chassis 10 by means of sleeve brackets 24 (FIGS. 2 and 3) welded to the sides of the chassis. Each of the leg members 22 comprises a vertical, rectangular member 26 which is received in the bracket 24. Opposed pairs of holes 28 are provided near the top and bottom of the vertical members 26, whereby the vertical members may be supported in raised or lowered positions in brackets 24 by means of pins 30 having handle portions 32 (FIG. 3), the pins 30 being insertable through opposed aligned holes in the brackets 24 and either the upper or lower opposed holes 28 in the vertical member 26. A horizontal channel member 36 (FIG. 4) is attached to the bottom of each vertical member 26 to provide additional support on the ground when the lift apparatus is in load-raising condition. When the lift apparatus is in collapsed position, the legs 22 are raised and secured in their uppermost position, as shown in FIG. 2 to permit free-rolling of the apparatus.

At the forward end of the apparatus, a horizontal angle member 38 is supported transversely on the converging channel members 18 and a third supporting leg 40 is similarly securable in upper and lower positions on the member 38 to provide additional support when the lift apparatus is in load-raising condition. As seen in FIG. 4, a pair of rigid members 42 may, if desired, be employed to furnish additional support to the upper mast section after the upper mast section has been raised to the load-raising position thereof, as will be hereinafter described. The lower ends of the members 42 are removably secured to the outer ends of the angle member 38 and the upper ends of the members 42 are removably secured to the upper mast section so that the members 42 may be removed to lower the upper mast section.

As shown in FIGS. 2 and 4, there is provided a mast or track 44 consisting of a lower section 50 and an upper section 60, the upper section 60 comprising two pivotally connected sections 62 and 64. The upper mast section 60 is pivotally connected at its lower or rear end to the lower mast section 50, as will be hereinafter described.

As shown in FIG. 1, the lower mast section 50 comprises a pair of inwardly-facing, parallel opposed channels 52 perpendicularly secured at their lower ends to the chassis 10. Suitable horizontal bars 54 and diagonal bars 56 are secured between the channels 52 to maintain the parallel relationship thereof. Further support for the

channels 52 is provided by the inclined channels 57 which extend from the upper portions of channels 52 to the forward end of the chassis and by the connecting horizontal bars 59. The lower section 62 of the upper mast section 60 likewise comprises an opposed pair of parallel, inwardly-facing channels 66, similarly braced by horizontal members 68 and diagonal members 69. The upper section 64 of the upper mast section 60 similarly comprises a pair of opposed, parallel, inwardly-facing channels 70 similarly braced by horizontal members 72 and diagonal members 74.

As shown in FIG. 4, a sheave 76 is mounted on the top of the upper section 64 of the upper mast 60. In FIG. 2 the mast or track 44 is shown in collapsed position to reduce the over-all height of the apparatus for transportation thereof. When in this collapsed position, the top of the upper section 64 of the upper mast 60, including the sheave 76, extends into the open area between the converging channel members 18 on the chassis 10.

The respective pairs of channels 66 and 70 of the upper mast sections 62 and 64 are pivotally connected by a pair of channel members 78 (FIG. 2) which are welded to ends of the channels 70 near the channel 66, the channels 78 being pivotally connected to the channels 60 by means of fixed pins 80. The respective pairs of channels 66 and 52 are similarly connected by means of a pair of channel members 82 which are welded to the rear ends of channels 66, the channels 82 being pivotally connected to the upper ends of channels 52 by fixed pins 84. By thus connecting the opposed parallel channels of the several mast sections, the respective pairs of channels being equally spaced apart, the respective channels of the several mast sections may be pivoted, as will be hereinafter described, into abutting alignment to form a continuous channel track as shown in FIG. 4.

For some uses of the apparatus, it may be desirable that the upper mast section 60 be formed in one permanently aligned section, in which case the upper mast section in collapsed position could extend over the top of a towing vehicle. In the embodiment shown in FIG. 2, however, in which the upper mast section 60 comprises pivotally-connected sections 62 and 64, the apparatus is shown to be collapsible to a more compact over-all dimension. In this embodiment the uppermost section 64 may be readily moved manually in the direction of arrow A (FIG. 2) into abutting alignment with the mast section 62, and a pair of locking pins 86 (FIG. 4) may be inserted when the pairs of holes 87 (FIG. 2) in the connecting channels 78 come into alignment with the holes 88 in the upper ends of the channels 66.

After the two sections 62 and 64 of the upper mast section 60 have thus been manually aligned and secured, the upper mast section 60 is pivoted on pins 84 (FIG. 2) in the direction of the arrow B until channels 66 are vertically aligned with the channels 52 of the lower mast section 50. When the holes 89 (FIG. 2) in the connecting channels 82 come into alignment with the holes 90 in the upper ends of the channels 52, another pair of locking pins 91 (FIG. 4) is inserted through the aligned holes to secure the aligned sections of the track in upright position.

Raising and lowering of the upper mast section 60 by pivotal movement thereof is effected hydraulically by means of a vertically disposed cooperating pair of hydraulic cylinders 92 (FIG. 1), the lower ends of which are secured to the floor of the chassis 10. A pair of piston rods 94 which extend vertically from the upper ends of the cylinders 92 are connected at their uppermost ends to an inverted T-frame 95 positioned beneath section 62 of upper mast section 60. A horizontal rod 96 is welded across the top of the inverted T-frame 95.

A pair of removable connecting members 98 (FIGS. 2 and 7) are employed to connect the frame 95 with opposed channels 66 of the upper mast section 62. The connecting members 98 are provided with holes 99 (FIG.

7) near their lower ends for receiving therethrough the ends of the horizontal rod 96. Pairs of plates 100 and 102 are integrally secured together and to the upper portions of the connecting members 98, and horizontal aligned holes 103 are provided in the upper portions of the members 98 and 100. A pair of brackets 104, welded to the lower flanges of the channel members 66, have downwardly depending portions 106 which are received in the spaces between the members 98 and 100. Holes 107 are provided in the portions 106 of the brackets 104 and these holes are alignable with the holes in the members 98 and 100 in order to receive therethrough the pins 108.

Thus it will be seen that when the connecting members 98 are supported at their lower ends on the bar 96 and at their upper ends by means of the locking pins 108 to the mast section 62, raising and lowering of the pistons 94 secured to the frame 95 will cause the entire upper mast section 60 to pivot into and out of alignment with the lower mast section 50. It should also be noted that after the mast sections are thus aligned and locked in place by means of the pins 91, as hereinbefore described, the connecting members 98, together with the attached members 100 and 102, may be disengaged and removed from the apparatus by removing the pins 108, swinging the members 98 away from the flange 106 and then sliding each of the members 98 outwardly and off the horizontal rod 96.

As shown in FIG. 1, greater stability may be attained by providing a pair of vertical rectangular members 110 which are secured at their upper ends to the under side of the T-frame 95. The lower ends of the members 110 are received in a co-operating pair of hollow rectangular sleeve members 112, the lower ends of which are rigidly secured to the chassis 10. Thus when the frame 95 is raised and lowered by the pistons 94, the members 110 are guided and supported within the sleeve members 112.

As seen in FIGS. 1, 2 and 4, there is provided a lift member or load-supporting platform 114. This platform comprises a load-supporting floor 116 supported upon a pair of channel members 118, the rear ends of which are rigidly attached to a pair of parallel upright outwardly-facing channel members 120 secured in spaced-apart relationship by cross members 122. As seen best in FIG. 8, each of the outwardly-facing upright channel members 120 of the platform 114 has bolted thereto an upright angle member 123 to provide a slot for engaging and receiving the rear flange of one of the opposed channel members 52 of the lower mast section 50, and likewise, when the platform is raised, the opposed channel members of the upper aligned mast sections. Platform 114 may thus be raised and lowered, as will be hereinafter described, by means of a cable 124 which is secured to the platform 114 and which runs over the sheave 76 at the top of the upper mast section 60 (FIG. 4).

As shown in FIGS. 1, 3 and 7, two sets of coaxially-mounted sheaves are provided over which the cable 124 runs. A lower set of sheaves 126 (FIG. 3) is rotatably supported on a shaft 128 mounted between a pair of brackets 130 on the chassis 10. An upper set of sheaves 132 (FIGS. 1 and 7) is rotatably mounted on a horizontal shaft 134 supported between a pair of brackets 136 secured to the under side of the T-frame 95 between the pistons 94.

As shown in FIGS. 1, 3 and 4, the cable 124 after passing over the mast sheave 76, alternately engages the upper and lower sheaves of sets 126 and 132 so that as the pistons 94 and T-frame 95 are raised or lowered hydraulically, cable 124 is caused to be wound or unwound on the sets of sheaves 126 and 132, thereby raising or lowering the load-supporting platform 114. It should be noted that this winding and unwinding of the cable 124 on the sets of sheaves 126 and 132 is effected after the connecting members 98 have been disengaged and removed from the frame member 95, as hereinbefore de-

scribed. It will thus be seen that a small movement of the pistons 94 within the double-acting hydraulic cylinders 92 produces a substantially greater corresponding movement of the load-supporting platform 114. It should also be noted that the same pair of cylinders 92 which is used to raise and lower the upper mast section 60, when the connecting members 98 are in engagement with the upper mast section and the T-frame 95, is employed to raise and lower the platform 114 when the connecting members 98 are disengaged.

For operating the hydraulic cylinders 92, there is provided, as seen in FIG. 5, a supply tank 134 and a hydraulic pump 136 driven by a motor 138. By means of the pump 136, hydraulic fluid is pumped at the desired pressure through conduit 140 leading from the tank to the pump and from the pump through a conduit 142 which carries the fluid to a control valve 144. Hydraulic fluid returns under pressure from the control valve through the return duct 146 to the supply tank.

The construction of the control valve 140 (details not shown) is such that when the valve stem 148 is caused to move in the direction of the arrow C (FIG. 6), the hydraulic fluid is forced under pressure through the pair of ducts 150 to the bottom of the cylinders 92, whereby to raise the pistons 94 therein. When the valve stem 148 is caused to move in the opposite direction, hydraulic fluid is forced under pressure through the ducts 152 to the top of the cylinders 92, whereby the pistons 94 are lowered. Preferably the control valve 144 is self-centering so that, as will be hereinafter described, when the lift platform reaches predetermined upper and lower positions in its travel along the mast, the valve automatically returns to a neutral or hold position. Also, equalizer valves 145 (FIG. 6) may be provided between each pair of ducts leading to cooperating cylinder ends to insure simultaneous and smooth operation thereof.

As shown in FIG. 6, the valve stem 148 is pivotally connected by means of a clevis 151 to a crank 154 which is journaled on one end to a bent shaft 156 which serves as an eccentric. Shaft 156 is rotatably supported in a mounting bracket 161. As shown in FIG. 3, a sprocket wheel 158 is keyed to the opposite end of the bent shaft 156, whereby rotation of the sprocket wheel 158 causes the valve stem 148 to move axially within the control valve 144.

A sprocket chain 160 engages the sprocket wheel 158 and also a second sprocket wheel 162 keyed to shaft 164 which is horizontally supported in a pair of upright brackets 166. Also keyed to the shaft 164 is a sheave 168. A cable 170 runs between the sheave 168 and another sheave 172 (FIG. 4) mounted at the top of the upper mast section 60. It should be noted that the cable 170, when the mast sections are in vertical alignment, is disposed within easy reach of an operator (not shown) supported on the platform 114 no matter in what position the platform may be along the mast.

By manually moving the cable 170 a short distance in the direction of the arrow D (FIG. 3) the sheave 168 is caused to move clockwise, which in turn causes the sprocket wheel 158 and bent shaft 156 to move clockwise (arrow E, FIG. 6). This clockwise movement of the bent shaft 156 produces a corresponding movement of the connecting crank 154 which causes the valve stem 148 to move in the direction of the arrow C, thus raising the pistons 94, as above indicated. Similarly, by manually moving the cable 170 a short distance in the opposite direction, the pistons 94 may be lowered, whereby to lower the platform or upper mast section. By reason of the eccentricity provided by the bent shaft 156, it is not necessary for the operator to keep his hand on the cable 170, since the valve stem 148 will remain in the position to which it is moved until the cable 170 is caused to be moved a short distance in the opposite direction by means which will be described hereinafter.

In order to avoid raising the platform beyond a safe height on the mast, or to stop the platform at any pre-

determined height, means are provided to interrupt the flow of fluid to the lower ends of the cylinders 92. As shown in FIG. 3, a horizontal plate 174 is attached to the platform by means of a connecting member 125 secured to one of the platform upright channels 120. Plate 174 is provided with an elongated slot 176 therein for receiving the cable 170. After insertion of the cable in the slot 176, the open end of the slot is closed off by means of a clamp 178. As shown in FIG. 4, a stop clamp 180 is secured to the cable 170 at a safe distance, or at a predetermined position, below the sheave 172. When the platform 114 and attached slotted plate 174 are raised to a point where the top of the plate 174 contacts the clamp 180, the cable 170 is caused to be moved sufficiently in the direction of the arrow F to permit the valve stem 148 to be moved oppositely to the arrow C (FIG. 6) and be maintained in a neutral or hold position by the self-centering features of the valve.

As shown in FIG. 3, another stop clamp 192 is secured to the cable 170 a short distance above the sheave 168 in order to stop the downward movement of the platform as it approaches the bottom of the mast. When the under side of the plate 174 in its downward movement contacts the stop clamp 192, the cable 170 is caused to be moved sufficiently in the direction of the arrow D to permit the valve stem 148 to be moved in the direction of the arrow C (FIG. 6) and be maintained again in a neutral or hold position. While it is apparent that the movement of the platform along the mast may be stopped, or the direction thereof changed, by manually moving the cable 170 in the appropriate direction, the aforementioned automatic means for stopping the platform is an added safety feature of this invention.

Another safety feature is provided to prevent the platform from being lowered at an excessive speed. An upright member 182 (FIG. 3) is secured to an arm 184 attached to one of the upright brackets 166. The upright member 182 has a horizontal portion 186 which has a hole 188 therein through which the cable 170 passes. A clamp 190 is secured to the cable 170 a predetermined short distance above member 182. When cable 170 is moved manually in the direction of the arrow G to lower the platform 114 as above described, movement of the cable 170 in this direction will be stopped when the clamp 190 contacts the member 182, thereby limiting the movement of the valve stem 148 which controls the flow of hydraulic fluid to the upper ends of the hydraulic cylinders.

After use of the hydraulic lift for raising and lowering loads on the platform 114, the platform may be lowered as hereinbefore described to the position shown in FIG. 1. The upper mast section 60 may then be hydraulically lowered after re-engaging the connecting members 98 and removing the locking pins 91. Then the mast section 64 may be similarly unlocked by removing the pins 86 and manually pivoted to the position shown in FIG. 2, in which condition the apparatus is ready for convenient towing.

It will now be seen that a hydraulic lift apparatus has been disclosed which is more efficient and more practical than any which have heretofore been known, and, while particular embodiments of the invention have been shown, it will be understood, of course, that the invention is not limited thereto since many modifications may be made, and it is therefore contemplated to cover by the appended claims any such modifications as fall within the true spirit and scope of the invention.

The invention having thus been described, what is claimed and desired to be secured by Letters Patent is:

1. A portable hydraulic lift comprising a chassis, a collapsible mast mounted on said chassis, a load-supporting platform movable along said mast, said mast comprising a lower section perpendicularly secured to said chassis and an upper section pivotally connected to said lower section, hydraulic means for pivoting said upper sec-

tion into and out of alignment with said lower section, for lowering said upper section and for moving said platform along said mast, means connecting said hydraulic means with said upper section to permit said upper section to be pivoted by said hydraulic means, said connecting means being disengageable from said hydraulic means when said upper section is aligned with said lower section to permit said platform to be moved along said mast by said hydraulic means, and control means for actuating said hydraulic means.

2. A portable hydraulic lift comprising a chassis, a collapsible mast mounted on said chassis, a load-supporting platform movable along said mast, said mast comprising a lower section perpendicularly secured to said chassis and an upper section pivotally connected to said lower section, hydraulic means for pivoting said upper section into and out of alignment with said lower section, for lowering said upper section and for moving said platform along said mast, means connecting said hydraulic means with said upper section to permit said upper section to be pivoted by said hydraulic means, said connecting means being disengageable from said hydraulic means when said upper section is aligned with said lower section to permit said platform to be moved along said mast by said hydraulic means, and control means extending along said mast for actuating said hydraulic means, said control means being operable by an operator supported on said platform at any position of said platform along said mast.

3. A portable hydraulic lift comprising a chassis, a collapsible mast mounted on said chassis, a load-supporting platform movable along said mast, said mast comprising a fixed lower section secured perpendicularly to said chassis, and an upper section pivotally connected to said lower section, hydraulic means for pivoting said upper mast section into and out of alignment with said lower mast section, for lowering said upper mast section and for raising and lowering said platform, said hydraulic means comprising a pair of cylinders secured to said chassis and a pair of pistons having their lower ends operable in said cylinders and having their upper ends secured to a reciprocable frame disposed beneath said upper mast section, means connecting said reciprocable frame and said upper mast section to permit said upper mast section to be pivoted by said hydraulic means, said connecting means being disengageable from said reciprocable frame when said upper mast section is aligned with said lower mast section, a sheave secured near the top of said upper mast section, a first shaft secured to said chassis for rotatably supporting a first group of coaxial sheaves thereon, a second shaft on said reciprocable frame for rotatably supporting a second group of coaxial sheaves thereon in parallel spaced-apart relation to said first group, a cable secured at one end to said chassis and at the other end to said platform, said cable engaging therebetween said mast sheave and alternately sheaves of said first and second group, said hydraulic means being operable when said connecting means is disengaged from said reciprocable frame to adjust the spaced-apart distance between said shafts whereby to raise and lower said platform, and control means for actuating said hydraulic means.

4. A portable hydraulic lift comprising a chassis, a collapsible mast mounted on said chassis, a load-supporting platform movable along said mast, said mast comprising a fixed lower section secured perpendicularly to said chassis, and an upper section pivotally connected to said lower section, hydraulic means for pivoting said upper mast section into and out of alignment with said lower mast section, for lowering said upper mast section and for raising and lowering said platform, said hydraulic means comprising a pair of cylinders secured to said chassis and a pair of pistons having their lower ends operable in said cylinders and having their upper ends secured to a reciprocable frame disposed beneath said upper

mast section, means connecting said reciprocable frame and said upper mast section to permit said upper mast section to be pivoted by said hydraulic means, said connecting means being disengageable from said reciprocable frame when said upper mast section is aligned with said lower mast section, a sheave secured near the top of said upper mast section, a first shaft secured to said chassis for rotatably supporting a first group of coaxial sheaves thereon, a second shaft on said reciprocable frame for rotatably supporting a second group of coaxial sheaves thereon in parallel spaced-apart relation to said first group, a cable secured at one end to said chassis and at the other end to said platform, said cable engaging therebetween said mast sheaves and alternately sheaves of said first and second group, said hydraulic means being operable when said connecting means is disengaged from said reciprocable frame to adjust the spaced-apart distance between said shafts whereby to raise and lower said platform, and control means for actuating said hydraulic means, said control means being operable by an operator supported on said platform at any position of said platform along said mast.

5. A portable hydraulic lift comprising a chassis, a collapsible mast mounted on said chassis, a load-supporting platform movable along said mast, said mast comprising a fixed lower section secured perpendicularly to said chassis, and an upper section pivotally connected to said lower section, hydraulic means for pivoting said upper mast section into and out of alignment with said lower mast section, said hydraulic means comprising a pair of cylinders secured to said chassis and a pair of pistons having their lower ends operable in said cylinders and having their upper ends secured to a reciprocable frame disposed beneath said upper mast section, means connecting said reciprocable frame and said upper mast section to permit said upper mast section to be pivoted by said hydraulic means, said connecting means being disengageable from said reciprocable frame when said upper mast section is aligned with said lower mast section, a first sheave secured near the top of said upper mast section, a first shaft secured to said chassis for rotatably supporting a first group of coaxial sheaves thereon, a second shaft on said reciprocable frame for rotatably supporting a second group of coaxial sheaves thereon in parallel spaced-apart relation to said first group, a first cable secured at one end to said chassis and at the other end to said platform, said first cable engaging therebetween said first mast sheave and alternately sheaves of said first and second group, said hydraulic means being operable when said connecting means is disengaged from said reciprocable frame to adjust the spaced-apart distance between said shafts whereby to raise and lower said platform along said upper and lower mast sections, and control means for actuating said cylinders, said control means comprising a valve including a valve stem for directing hydraulic fluid to said cylinders, valve actuating means operable from any position of said platform along said mast, said valve actuating means comprising a second sheave at the top of said mast, a lower sheave near the bottom of said mast, a second cable running between said second mast sheave and said lower sheave and alongside said mast, and means connecting said lower sheave and said valve stem whereby rotational movement of said second cable effects axial movement of said valve stem.

References Cited in the file of this patent

UNITED STATES PATENTS

2,156,204	Stolze	Apr. 25, 1939
2,364,851	Johansen	Dec. 12, 1944
2,423,167	Aune	July 1, 1947
2,653,685	Buck	Sept. 29, 1953
2,797,009	Cutler	June 25, 1957

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,003,584

October 10, 1961

John E. Wiegand et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 9, for "considerably" read -- considerable --; line 33, after "collapsible" insert -- mast --; column 8, line 14, for "sheaves" read -- sheave --.

Signed and sealed this 3rd day of April 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents