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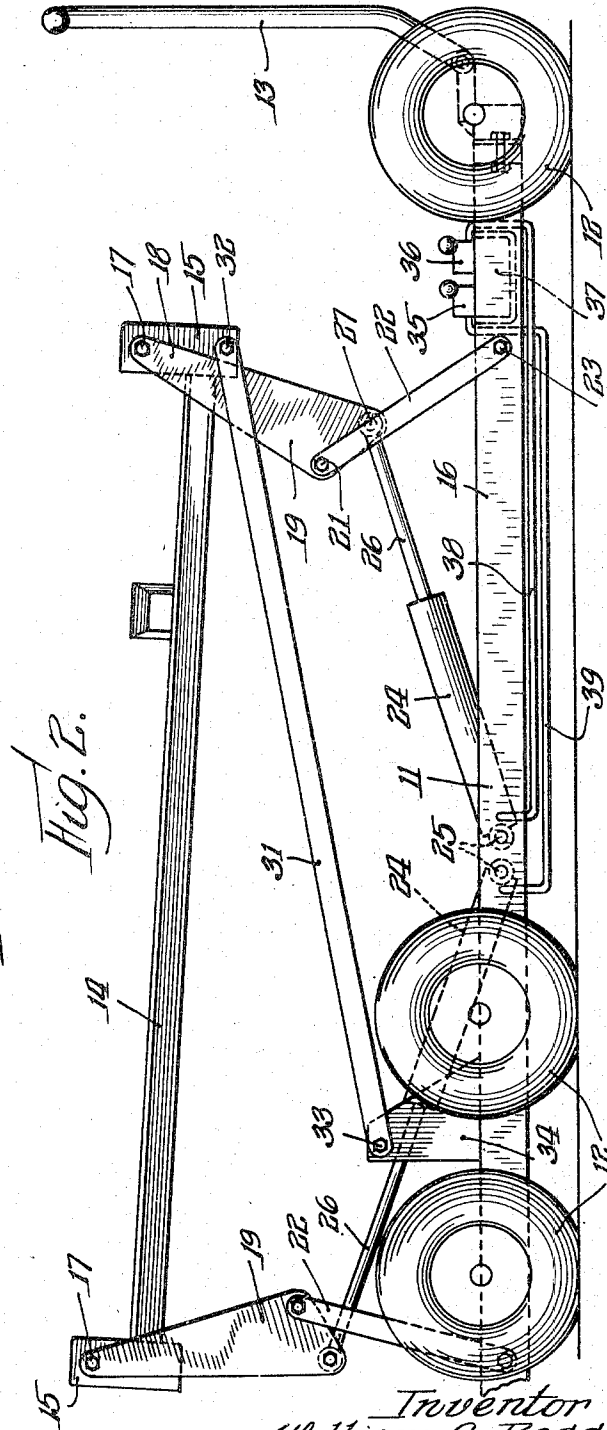
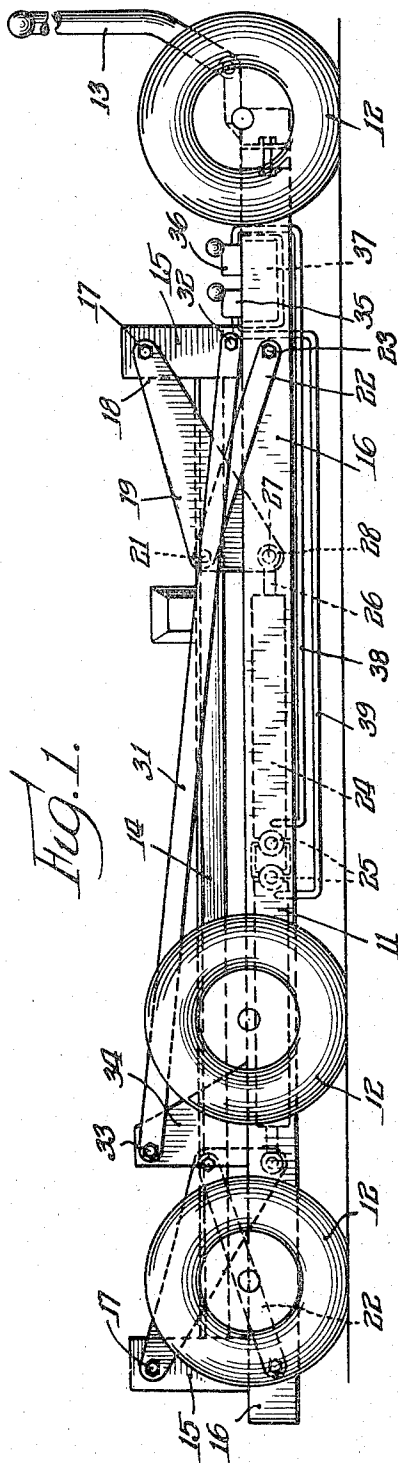
W. A. ROSS

2,449,863

LOAD LIFTING APPLIANCE

Filed March 31, 1945

3 Sheets-Sheet 1



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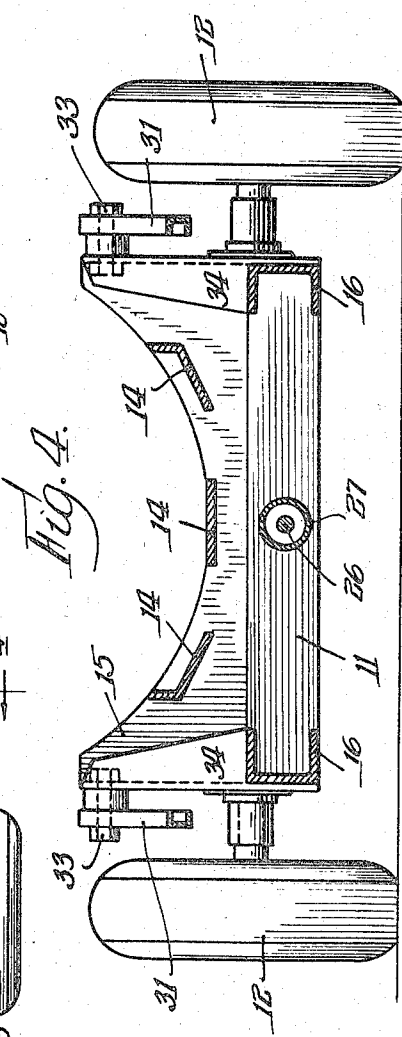
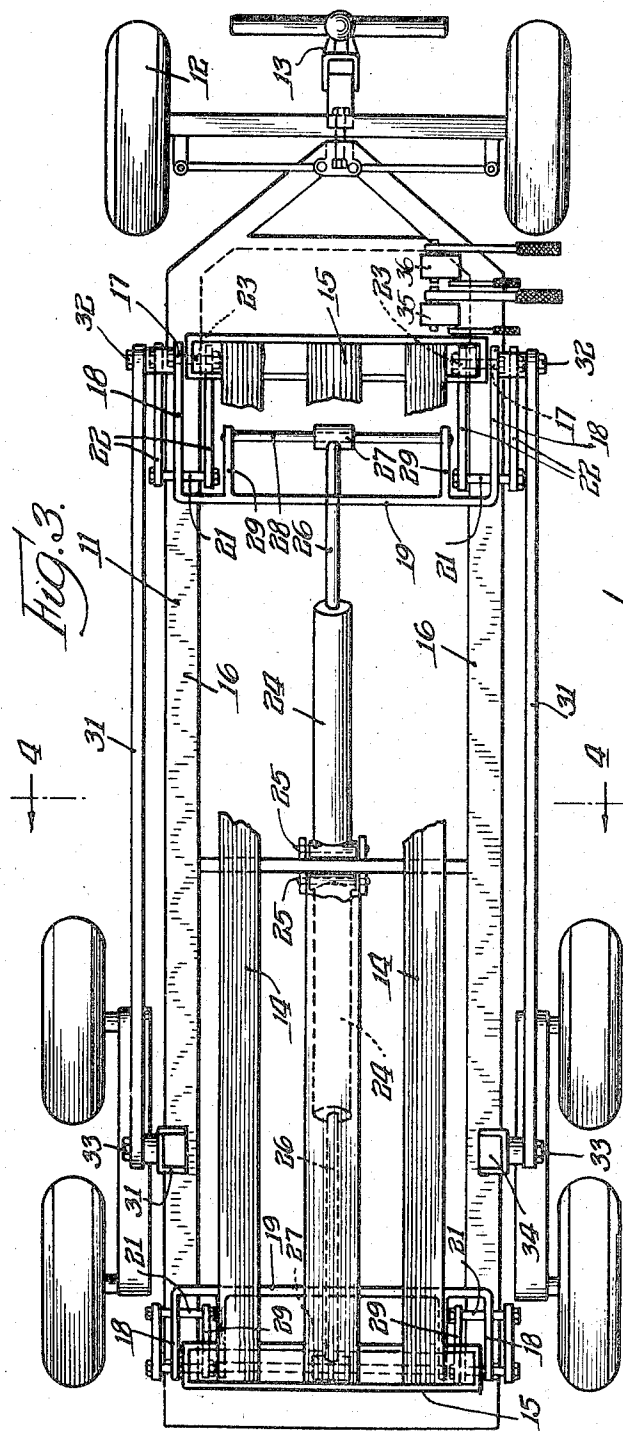
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3 Sheets-Sheet 2



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LOAD LIFTING APPLIANCE

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3 Claims. (Cl. 254—2)

1

The present invention pertains to certain innovative and valuable structural and functional advantages and benefits in load-lifting appliances for various purposes, such, for example, as the elevation of bombs for attachment to airplanes, but it is to be understood that the apparatus is in sense limited to such specific employment since it may be satisfactorily used in numerous other relations; furthermore, the invention, as defined in the appended claims, is not necessarily restricted or limited to the details of construction illustrated and described in that various modifications and changes may be resorted to without departure from the fundamental principles of the invention and without the loss or sacrifice of its material services.

To enable those skilled in this art to fully understand the invention, two preferred embodiments thereof have been illustrated in detail in the accompanying drawings to which reference should be had and in which the same parts have been supplied with like reference characters throughout the several views.

In these drawings:

Figure 1 is a side elevation of the novel lifting apparatus in its lowered condition;

Figure 2 is a comparable view of the device in its elevated relation;

Figure 3 is a plan view of the apparatus with parts broken away;

Figure 4 is a vertical cross-section on line 4—4 of Figure 3 viewed as indicated by the arrows;

Figure 5 is a side elevation of a modified structure in lowered state;

Figure 6 is an analogous view of the same in elevated relation; and

Figures 7 and 8 are fragmentary detail views.

Referring first to the apparatus presented in Figures 1 to 4 inclusive, it will be noted that the structure in this particular case includes an elongated vehicle-chassis 11 mounted on six carrying-wheels 12, 12 the front pair being manually steerable by a convenient handle 13.

The saddle or load-carrying frame, characterized as a whole 14, at each of its opposite ends, has cross bars or frames 15, 15 which in the lowermost position of the saddle rest upon the top of, and are supported by, the side-bars 16, 16 of the chassis.

The two ends of each of the two transverse members 15, 15 have hinged thereto at 17, 17 the opposite ends 18, 18 of a U-shape bell-crank frame 19 (see Figure 3) having hinged thereto at 21 a pair of links 22, 22 hinged at their lower ends to the chassis side-frame at 23, 23.

2

So far as described, these mechanisms are alike but reversed at both ends of the saddle or carriage 14.

Each such mechanism is operated independently of the other, or simultaneously therewith, by a cylinder 24, hinged to the central part of the chassis at 25, and the piston-rod 26 of the piston in the cylinder, hinged at 27 on a cross-rod 28 supported by supplemental arms 29, 29 integral with the member 19 (Figure 3).

The carriage front element 15 only has links 31 hinged at 32 to each of its opposite ends, each such link having its rear end hinged at 33 on a stationary bracket 34 mounted on, and fixed to, the corresponding side-bar 16 of the chassis 11.

The apparatus additionally includes two independently-operable, manually-actuated oil-pumps 35, 36 of ordinary and known construction drawing their oil from a common supply-tank 37, the forward pump 36 being connected by a conduit 38 to the interior of the lower portion of the front cylinder 24, the other pump 35 being joined in like manner to the rear cylinder 24 by a separate or independent conduit 39.

Obviously, when pump 36 is actuated by hand, the front lifting mechanism is operated and when pump 35 is utilized, the rear elevating means functions.

In the modified type of lifting-appliance, presented in Figures 5, 6, 7 and 8, the construction is the same as that already described except that, as to the front linkage, the links 31, 31 are omitted and the parts 119, corresponding to the elements 19 already referred to, are made longer and have sliding connections with the two side-bars of the chassis, each such connection comprising a horizontal-bar 41 mounted on the side-bar and in the guiding groove offered thereby a roller 42 on the element 119 travels forwardly and rearwardly.

From what precedes, it will be obvious that independent operations of the two manually-actuated oil-pumps 36 and 35 supply oil under pressure to the front and rear hydraulic-cylinders 24, 24 permitting the separate raising or lowering of either end of the saddle or carriage 14, the individual operations of these front and rear linkages permitting the carriage to be inclined in either direction at an angle from zero to approximately 15° from the horizontal.

For an explanation of the operation of this appliance, the front link mechanism will be referred to since the similarity of the front and rear linkages and their actions will be clear.

When actuated, the forward hand-pump 36

3

draws oil from the reservoir 37 which flows under pressure through the pipe 38 to the front hydraulic-cylinder 24, the piston-rod 26 of which therefore applies force to the bell-crank 19 at the point 27 where it is pivoted, the cylinder being hinged at point 25 around which it pivots.

This action of the piston-rod causes an upward motion of the registered points 17 of the bell-crank 19 by virtue of the constraint exerted on the part 19 at the points 21 by links 22 pivoting about the points 23 on the chassis of the vehicle and by the constraining effect of links 31 turning about their points 33 on the chassis.

The paths of travel of the aligned points 17 of the carriage are those of registered arcs with the major portion of the displacement vertically upward.

Such registered points 17 of the bell-crank frame 19 are two supporting locations for the load-carriage 14, the other component of the load being lifted by actuation of pump 35 at points 17 on the bell-crank 19 in the rear linkage, and, due to the relation of the front and rear points 17, 17 through the carriage 14, the paths of these two parts are similar.

The two pumps 35 and 36 are each equipped with manually-operated release-valves which permit lowering of the carriage or saddle of the device in the conventional manner when required, this being accomplished by allowing the oil in the two cylinders to flow back to the oil reservoir 37.

From the foregoing description no difficulty will be encountered in understanding the mode of operation of the type of mechanism illustrated in Figures 6 to 8 inclusive it being apparent that the control of the movement of the front part of the load carriage instead of being brought about by the pair of links 31, 31 is governed by the travel of the two rollers on the bell-crank member 119 in their guides 41, 41.

I claim:

1. In a load-lifting appliance including a vehicle chassis base, a load-carriage and means to raise and lower said carriage with relation to said base, the novel improvement being that said carriage raising-and-lowering means includes in combination a pair of front and rear bell-crank means fulcrumed on the corresponding front and

4

rear portions of said carriage, a pair of independent hydraulic operating-means both hinged on and near the center of the length of said base, one of said hydraulic-means facing forwardly and hinged on said front bell-crank means, and the other hydraulic-means facing rearwardly and hinged on said rear bell-crank means, front links hinged at one end on said base and hinged at their other end on said front bell-crank means, rear links hinged at one end on said base and at their other end hinged on said rear bell-crank means, and means governing the path of upward and downward travel of an end portion of said carriage.

2. The novel improvement combination set forth in claim 1 in which said governing-means includes additional link-means hinged to said end portion of the carriage and hinged to said base.

3. In a load-lifting appliance including a base, a load-carriage and means to raise and lower said carriage with relation to said base, the novel improvement being that said carriage raising-and-lowering means includes in combination front and rear bell-crank means fulcrumed on the corresponding portions of said carriage, independent hydraulic operating-means hinged to said front and rear bell-crank means and to said base, links hinged to said front and rear bell-crank means and to said base, and means governing the path of upward and downward travel of an end-portion of said carriage including means affording sliding engagement of the bell-crank means of said end-portion with said base.

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