United States Patent

[11] 3,619,007

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[21] Appl. No. **830,376**
[22] Filed **June 4, 1969**
[45] Patented **Nov. 9, 1971**
[73] Assignee **Leco, Inc.**
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[54] **STATIONARY OR MOBILE, RELATIVELY MOVABLE, LOAD-CARRYING, POWERED MEMBERS**
7 Claims, 12 Drawing Figs.

[52] **U.S. Cl.** **298/11,** 214/502, 214/512, 280/43.17, 298/22
[51] **Int. Cl.** **B60p 1/34**
[50] **Field of Search** 298/11, 22; 280/34, 5.1, 43.17, 42.22, 42.23; 214/512, 502

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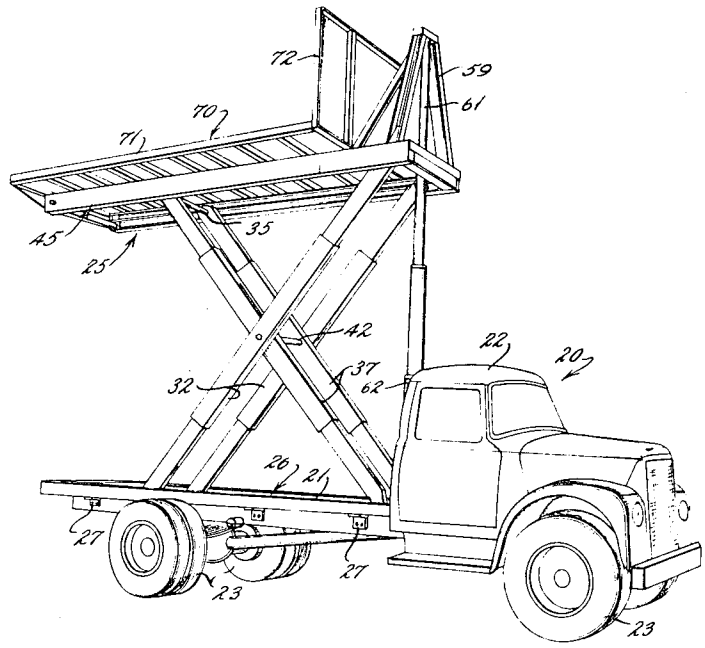
ABSTRACT: Relatively movable load-carrying members connected to be maintained in predetermined relation with hydraulic means for producing relative movement, to serve for example as a hi-lift, the device being of a character to be mounted on a fixed or other base such as a vehicle, and also designed to be tilted to dump a load carried thereby.



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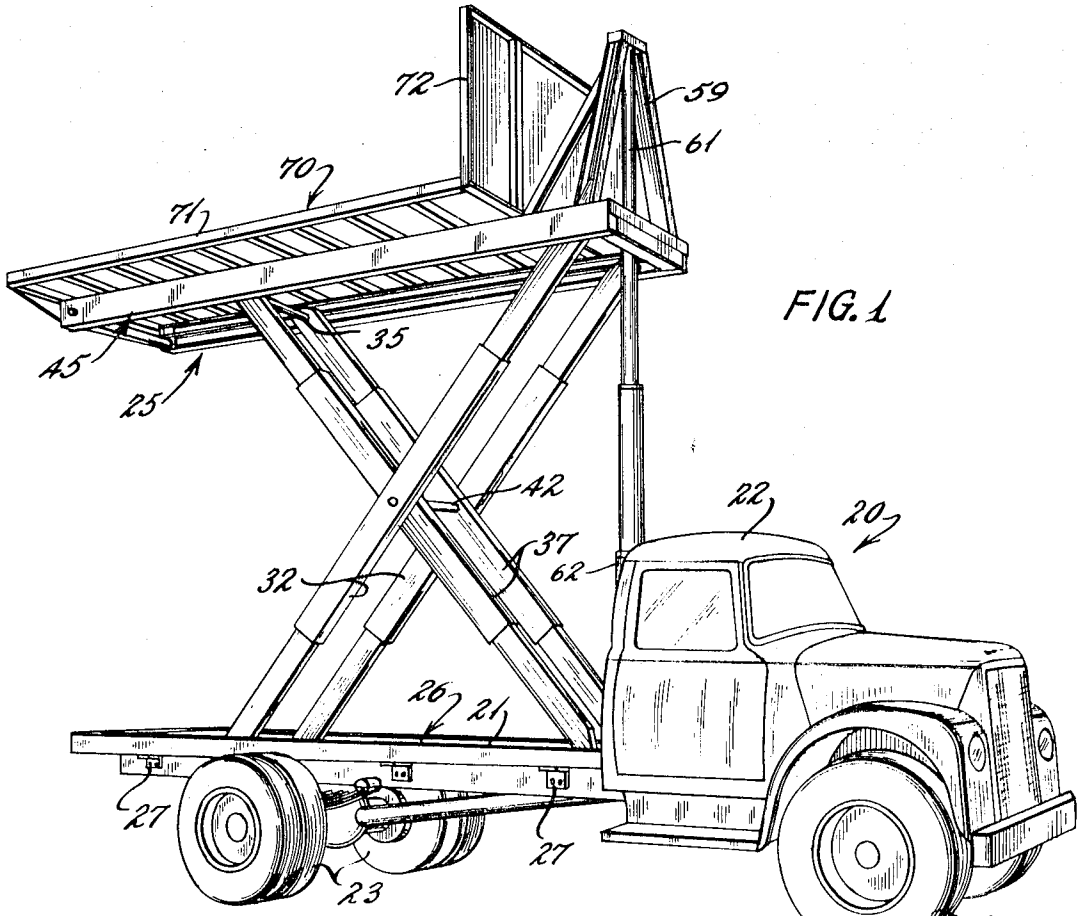

FIG. 1

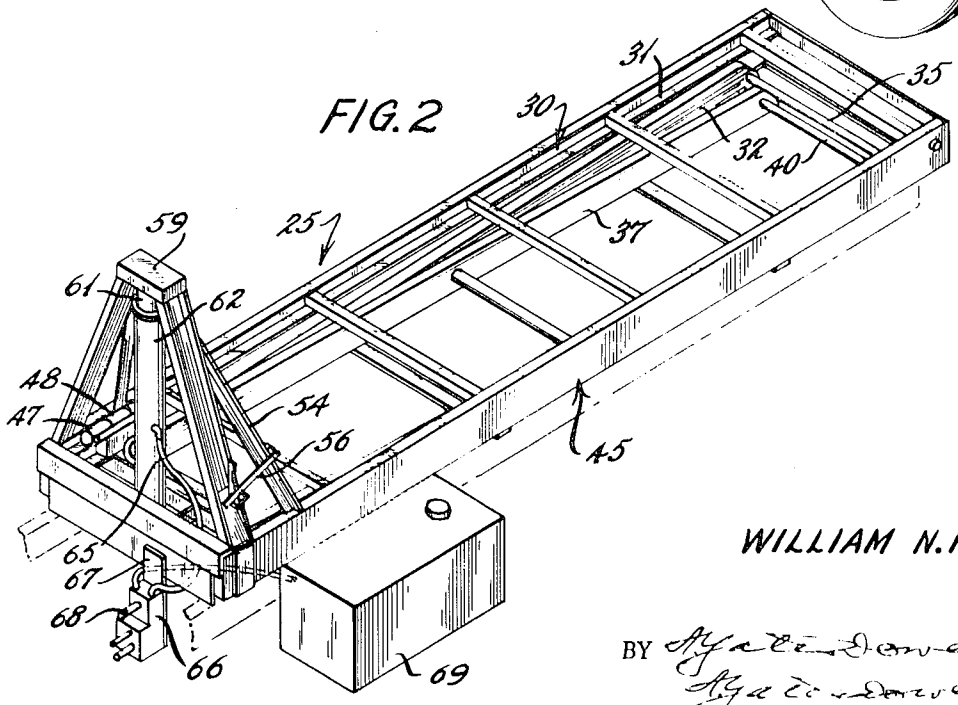

FIG. 2

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FIG. 3

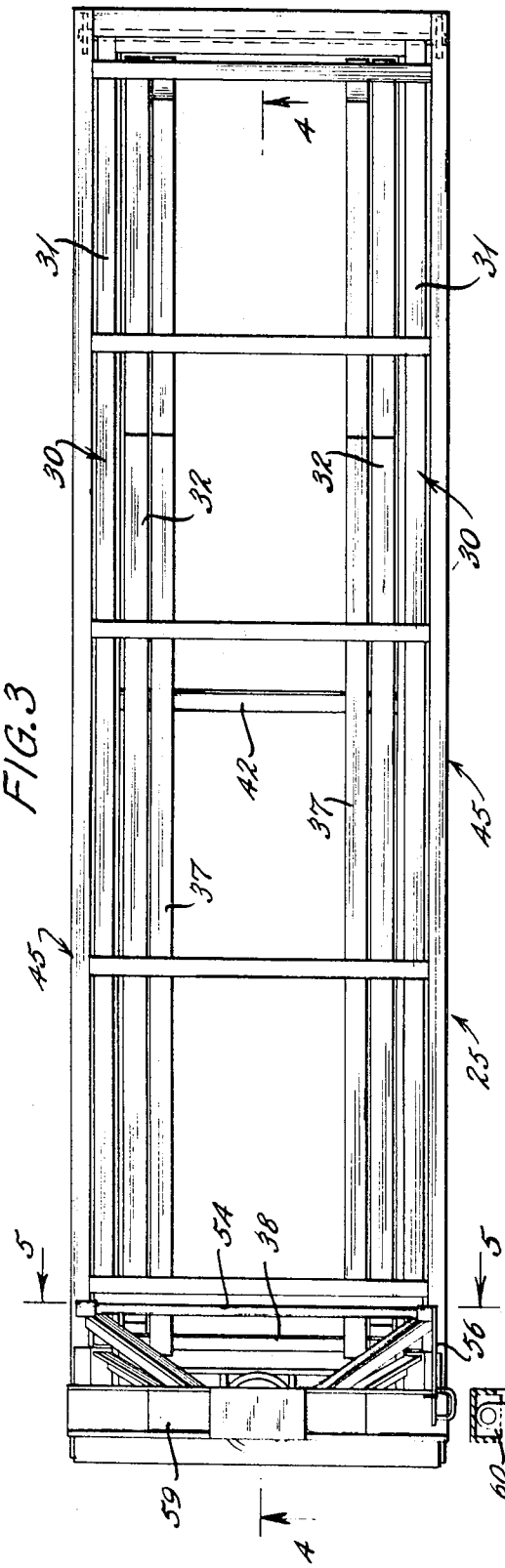
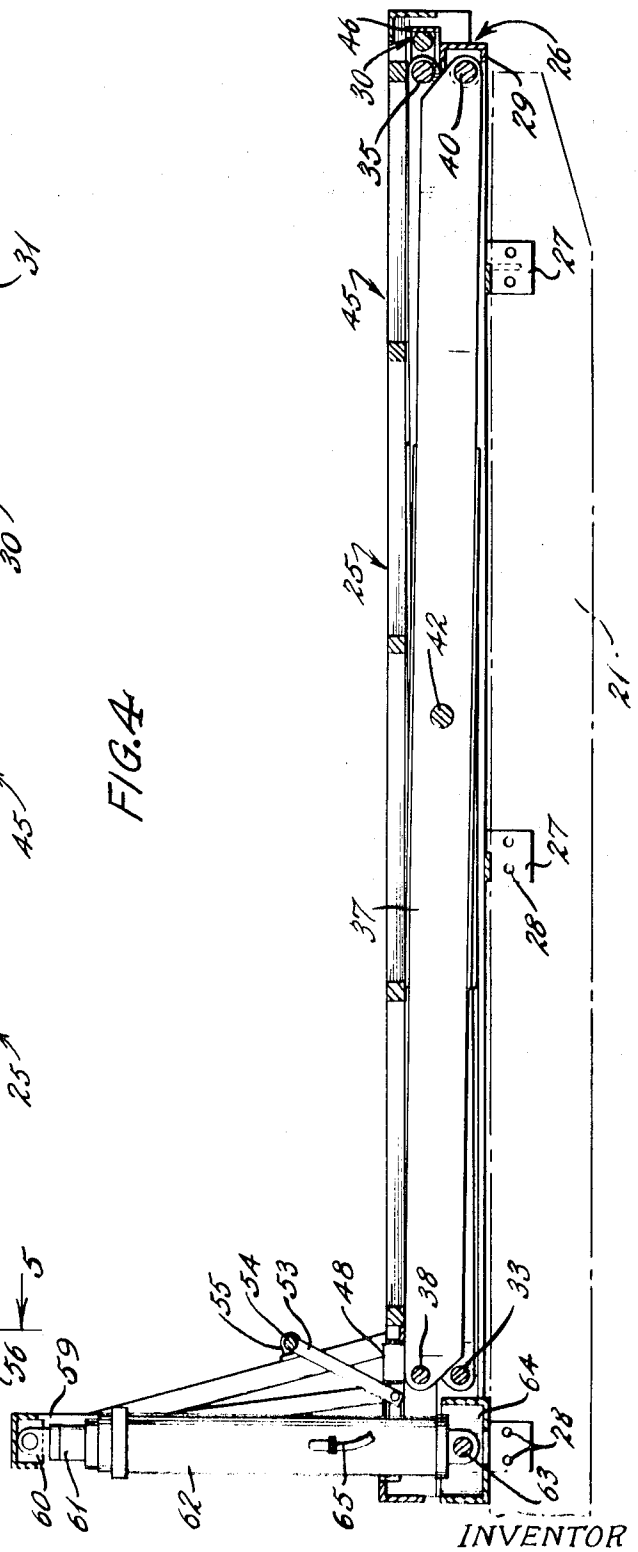


FIG. 4



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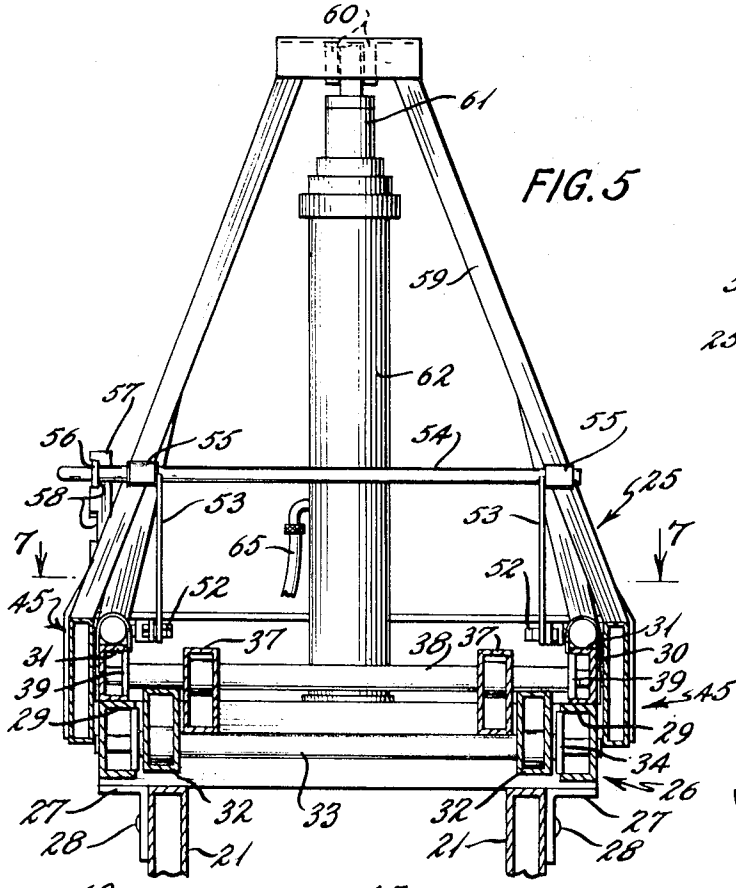

FIG. 5

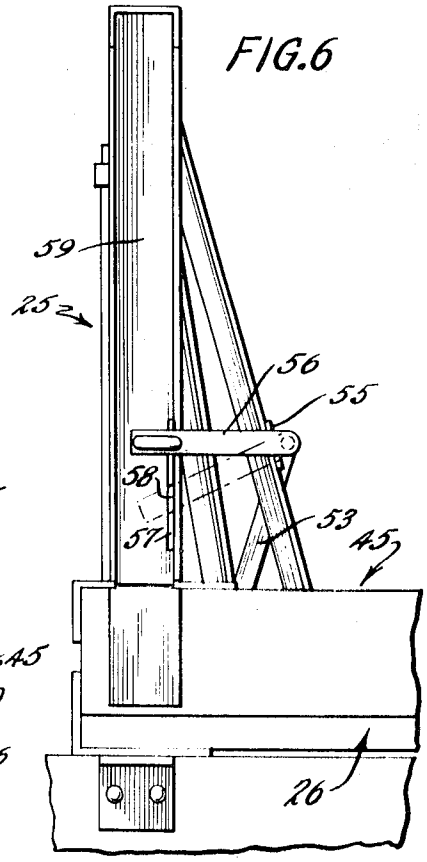

FIG. 6

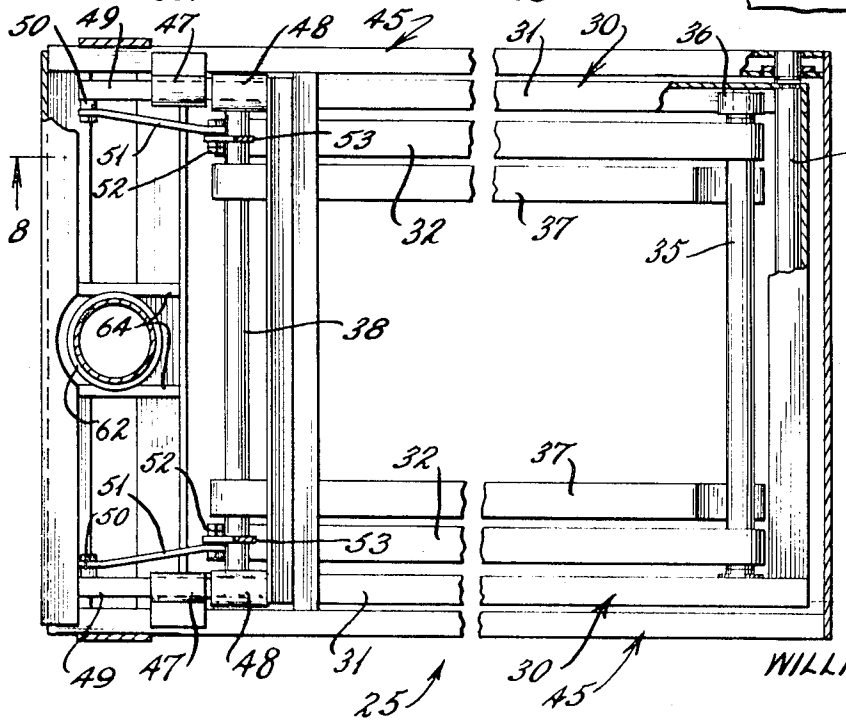

FIG. 7

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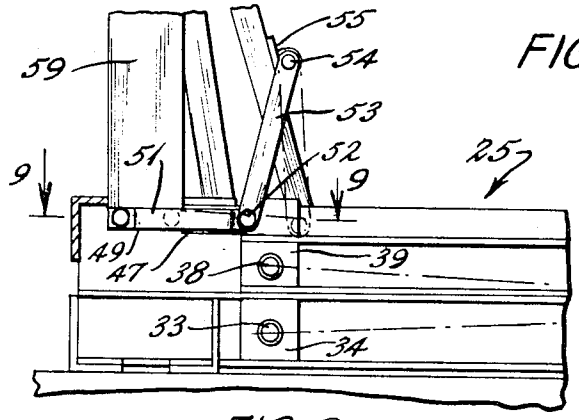


FIG. 8

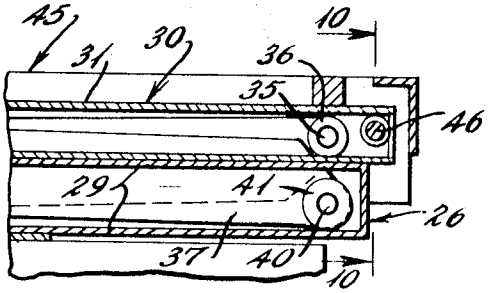
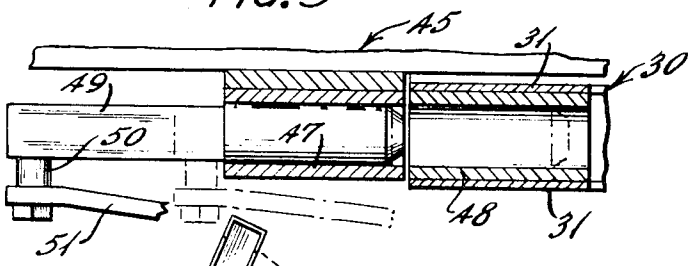
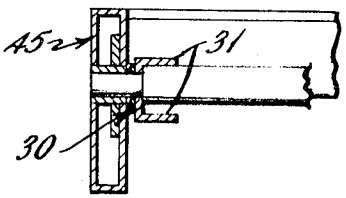


FIG. 10

FIG. 9





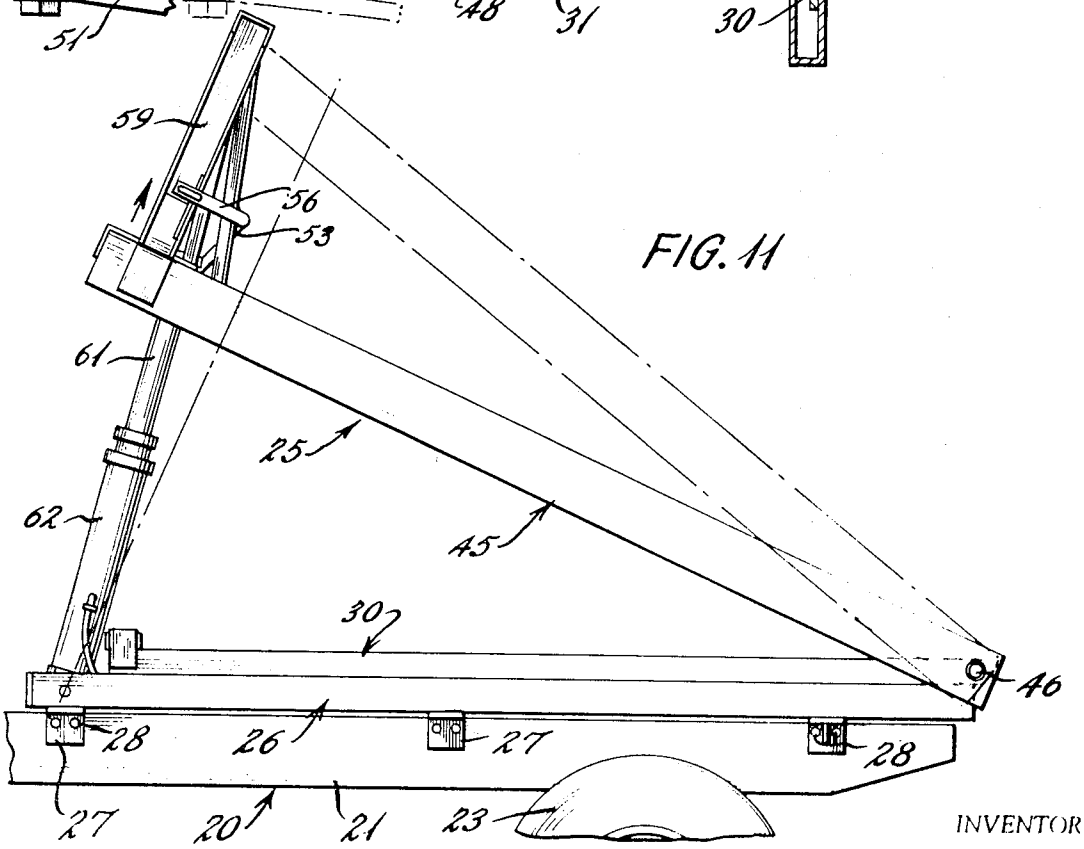


FIG. 11

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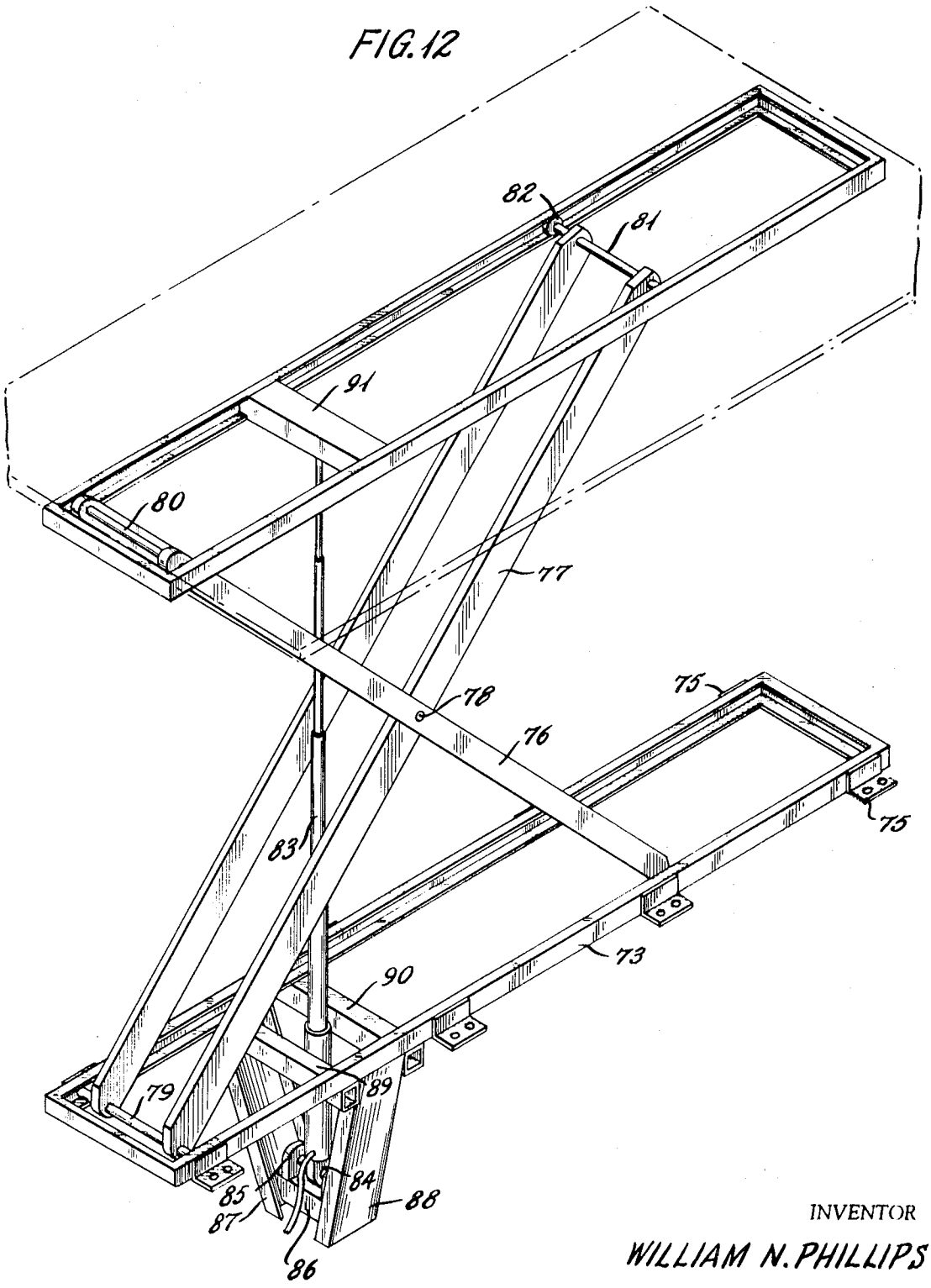
FIG. 12



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STATIONARY OR MOBILE, RELATIVELY MOVABLE, LOAD-CARRYING, POWERED MEMBERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to load-carrying or sustaining mechanisms some of which are capable of being mounted on a fixed base and others of which are designed to be mounted for mobility as on a vehicle, and which load-carrying structure is of unitary construction to provide a hoist or a hi-lift.

2. Description of the Prior Art

Heretofore load-sustaining devices have been provided, some for mounting on a stationary support while others have been mounted on automotive trucks some of which have been of the dump variety. Also, vehicles have been provided with hi-lift mechanism for raising the load-sustaining portion generally parallel to the earth and efforts have been made to provide a combination hi-lift and dump truck body with such body pivotally mounted so that it can be raised and lowered hydraulically and be operated to dump the contents by independent means, all of such prior art devices having been of limited satisfaction.

SUMMARY OF THE INVENTION AND OBJECTS

The present invention is a load-carrier which in its simpler form is complete in itself and capable of being removably mounted on a stationary base, or may be applied to a mobile base such as that of a conventional vehicle. The load-carrier of the present invention includes a pair of generally rectangular unitary frames which in the simpler form may have one frame carried by a support and with means for maintaining the frames in predetermined relation, such means being scissor-like lever arms connected by fixed pivots to corresponding ends of the frames and with the opposite and remote ends of the lever arms movably engaged with the frames in spaced relation and with hydraulic single cylinder means connected centrally to corresponding end portions of the frames for applying force at right angles or normal to such frames for producing relative movement therebetween, whereby when the proximity of the frames is varied they will still be maintained in such predetermined relation. The invention also adds to the simple structure dump means for one of the frames. In such construction the unit may be removably mounted on a conventional chassis and such unit includes a lower fixed frame, a hi-lift frame, and a dump frame with a bed or body mounted thereon in which the hi-lift frame is connected to the fixed frame by pairs of hi-lift arms so that when the hi-lift frame and the dump frame are connected together the body is raised to an elevated position generally parallel with the chassis. When the hi-lift frame and the dump frame are disconnected, the hi-lift frame will remain on the fixed frame and the dump frame and the body will pivot around a center adjacent to the rear of the hi-lift frame when the front of the dump frame is raised.

It is an object of the invention to provide a simple inexpensive generally universal load-sustaining device with a load-carrying portion movable relative to the remaining portion while maintained in generally parallel relation thereto. The load-carrying portion is provided with scissor-type lever arms which maintain the load-carrying portion in generally parallel relation to the remaining portion and with hydraulic single cylinder means connecting the frames centrally adjacent to corresponding ends thereof for applying force normal to the frames for varying the proximity of the frames one to the other.

Another object of the invention is to provide a load-sustaining device of the character indicated which may be removably mounted either on a fixed or moveable support such as a vehicle chassis and with such device including a member with a bed or body mounted thereon and constructed to be connected thereto.

A further object of the invention is to provide a hi-lift or dump unit capable of being removably mounted on a conventional vehicle chassis or a fixed support and which unit includes a lower fixed frame, a hi-lift frame and a dump frame with a bed or body mounted thereon in which the hi-lift frame is connected to the fixed frame by arms so that when the hi-lift frame and the dump frame are assembled and the hi-lift is operated the body will be raised to an elevated position generally parallel with the chassis and when the hi-lift frame and dump are disconnected the hi-lift frame will remain on the fixed frame and the dump frame and the body will revolve around a center adjacent to the rear of the hi-lift frame when the front of the dump frame is raised.

BRIEF DESCRIPTION OF THE DRAWINGS X

FIG. 1 is a perspective of the present invention mounted on a conventional truck chassis and operated as a hi-lift;

FIG. 2, a perspective of the unit per se in collapsed position;

FIG. 3, an enlarged top plan view;

FIG. 4, a section on the line 4—4 of FIG. 3;

FIG. 5, an enlarged section on the line 5—5 of FIG. 3;

FIG. 6, an enlarged fragmentary side elevation of the front portion of the apparatus;

FIG. 7, a section on the line 7—7 of FIG. 5;

FIG. 8, a section on the line 8—8 of FIG. 7;

FIG. 9, an enlarged fragmentary section on the line 9—9 of FIG. 8;

FIG. 10, an enlarged fragmentary section on the line 10—10 of FIG. 8;

FIG. 11, a side elevation illustrating the device in use as a dump body; and

FIG. 12, a perspective of a simplified form of unit.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With continued reference to the drawings, a truck 20 has a chassis 21 with a cab 22 mounted on one end, and such chassis is supported by ground-engaging wheels 23. The truck 20 is of conventional construction and forms no part of the inventive concept.

A hi-lift or dump unit indicated generally at 25, includes a lower frame 26 having downwardly extending brackets 27 located on opposite sides of the chassis 21 and connectable thereto by bolts or other fasteners 28. The lower frame 26 preferably is constructed of channel members with inwardly turned flange portions 29.

A hi-lift frame 30 is located above the lower frame 26 and is constructed of channel members having flange portions 31 extending inwardly toward each other. The hi-lift frame 30 and the lower frame 26 are adjustably connected together by spaced pairs of hi-lift arms which permit the hi-lift frame 30 to be raised and lowered generally parallel to the lower frame 26. One end of each of the first pair of hi-lift arms 32 is pivotally mounted on a shaft 33 carried by brackets 34 on the lower frame 26, and the opposite ends of such arms are connected by a shaft 35. A roller 36 is mounted on the opposite ends of the shaft 35 and such rollers 36 are disposed between the flange portions 31 of the hi-lift frame 30. The second pair of hi-lift arms 37 are pivotally connected at one end to a shaft 38 carried by brackets 39 on the hi-lift frame 30, and the opposite ends of such second arms are connected by a shaft 40 having rollers 41 mounted thereon. The rollers 41 are disposed between the flange portions 29 of the lower frame 26. The flange portions of the lower frame 26 and the hi-lift frame 30 function as guideways for the rollers 41 and 36, respectively. The arms 32 and 37 are connected together by a shaft 42 located generally centrally of each pair of arms so that when the hi-lift frame is raised the arms 32 and 37 will have a scissors movement to maintain the lower frame and the hi-lift frame in generally parallel relationship with each other.

A generally rectangular dump frame 45 is provided which is slightly larger than the hi-lift frame 30 and is disposed outwardly thereof substantially in the same plane. The dump

frame 45 is pivotally connected to a shaft 46 carried at the rear of the hi-lift frame 30 so that the dump frame can pivot relative to the hi-lift frame, as will be described later.

The hi-lift frame 30 and the dump frame 45 are adapted to be selectively connected together at their forward ends so that they will be raised simultaneously to function as a hi-lift when separated. In order to connect the frames together the hi-lift frame 30 is provided with a sleeve 47 welded or otherwise attached thereto and the dump frame 45 is provided with a sleeve 48 which is axially alignable with the sleeve 47 when the frames are in lowered position. A pin 49 is axially slidably mounted within the sleeve 48 carried by the dump frame and such pin is provided with means for extending and retracting the same for locking the sleeves together.

The means for extending and retracting the pin includes a stub shaft 50 mounted adjacent one end of the pin 49 and such stub shaft rotatably receives one end of a first link 51. The opposite end of the link 51 is pivotally connected by a pin 52 to a second link 53. The second link extends upwardly and is welded or otherwise attached to a cross shaft 54 journaled in bearings 55 and having a crank arm 56 at one end. Movement of the crank arm 56 causes rotation of the shaft 54 which in turn will rotate the links 51 and 53 and cause the pin 49 to be extended into and retracted from the sleeve 48. When the pin is extended, it is received within the sleeve 47 to lock the hi-lift frame 30 and the dump frame 45 together. As illustrated in FIGS. 2, 5 and 6, an upstanding member or post 57 is mounted on the dump frame 45 and such post has a pair of spaced notches 58 which receive and lock the crank arm 56 in adjusted position.

In order to raise and lower the frames 30 and 45, an upright support or A-frame 59 is mounted on the front end of the dump frame 45 and such support is provided with a pair of downwardly extending lugs 60 pivotally connected to a telescopic piston rod 61 carried by a fluid cylinder 62. The fluid cylinder is pivotally mounted by a pin 63 carried by supports 64 in the lower frame 36 and such cylinder is provided with fluid under pressure through a fluid line 65 from a pump 66 mounted on a support 67 carried by the lower frame 26. The pump 66 can be driven in any desired manner, as by a stub shaft 68 connectable to the power takeoff of the trunk 20. A reservoir 69 is mounted in any convenient place on the unit 25 to supply fluid to the pump 66 when the piston rod is being raised and to receive fluid from such pump when the piston rod is being lowered.

The upper portion of the upright support 59 is spaced substantially above the dump frame 45 to permit a relatively long fluid cylinder to be used and to produce a pulling lifting action rather than a pushing action. With this type of construction the entire lifting mechanism is carried by the unit 25 and therefore no additional mounting structure for the lifting mechanism is necessary on the chassis 21.

A body 70 (FIG. 1) is mounted on top of the dump frame 45 and rearwardly of the upright support 59. As illustrated the body includes a bed 71 with a front panel 72; however, the body could be of any conventional construction including with fixed sides, stake sides, tail gate, and the like. The body provides a foundation for supporting articles being carried.

In the operation of the device, when it is desired to use the unit as a hi-lift mechanism, the crank arm 56 is moved to the lower position, as shown in phantom in FIG. 6, to extend the pin 49 into the sleeve 47 and lock the hi-lift frame 30 and the dump frame 45 together. Since the rear portions of the hi-lift frame and the dump frame 45 are raised when the piston rod 61 is extended. During the raising of the frame of the rollers 36 and 41 of the arms 32 and 37 will be confined between the flange portions 31 and 29 as the frames move to a position illustrated in FIG. 1 with the body 70 substantially parallel to and spaced from the chassis 21.

When the device is to be used as a dump truck, the crank arm 56 is moved to the upper full-line position, as shown in FIG. 6, which rotates the cross-shaft 54 and retracts the pin 49 from the sleeve 47 so that the hi-lift frame 30 and the dump frame 45 no longer are connected at their forward ends. When fluid under pressure is introduced into the cylinder 62, the piston rod 61 is extended and an upward lifting action will be applied to the front of the dump frame 45 which will cause the dump frame to pivot about the shaft 42 aT the rear thereof and move the dump frame to the position illustrated in FIG. 11. When it is desired to convert the unit to a hi-lift again, it is necessary only to lower the dump frame 45 and then shift the crank arm 56 to the lower position, as previously described. The moving of the crank arm extends the pin 49 into the shaft 48 and locks the front portions of the hi-lift frame and the dump frame together.

In FIG. 12 a simpler form of the invention is illustrated which comprises a pair of unitary generally rectangular frames 73 and 74. Each of these frames may be of channel iron construction for strength and with one of the frames being provided with brackets 75 by means of which the frame may be attached either to a fixed or to a movable support in order to maintain the frames 73 and 74 in generally parallel relation. Scissor arms 76 and 77 are provided connected by pivot means 78. The arms 76 and 77 respectively are mounted about fixed pivots 79 and 80 carried by the frames 73 and 74. The opposite ends of the pivot arms 76 and 77 are mounted on pivots 81 supported in rollers 82 in the channels of the frame 74. Thus when the frames are moved relative to each other the pivots 81 and rollers 82 move lengthwise of the frames 73 and 74 but always at the same spacing as the pivots 79 and 80. In order to supply force for producing relative movement between the frames 73 and 74 an extensible hydraulic cylinder 83 is provided, the lower end of which is carried in a lower cylinder mount on the side of the frame remote from the frame 74. Such cylinder mount includes a pivot 84 mounted in bosses 85 on the crossmember 86 carried by brackets 87 and 88 welded or otherwise fixed to the frame 73 between cross bars or supports 89 and 90. The opposite end of the hydraulic cylinder 83 is attached to a crossbar 91 extending between the sides of the frame 74 and welded or otherwise fixed thereto.

I claim:

1. A hi-lift or dump unit for mounting on a vehicle chassis comprising a base frame, means for connecting said base frame to the chassis of the vehicle, a hi-lift frame movably connected to said base frame by spaced pairs of hi-lift arms, a dump frame having a swingable connection with said hi-lift frame adjacent one end thereof, lock means slidably mounted on said dump frame, lock-receiving means carried by said hi-lift frame and adapted to receive said lock means when the same is extended, lever means for extending and retracting said lock means to engage and disengage said receiving means, said lock means being located in spaced relation to the swingable connection between said hi-lift frame and said dump frame, an upright support mounted on the end of said dump frame remote from said swingable connection, fluid cylinder means connecting said base frame and said upright support, and a body mounted on said dump frame, whereby when said lock means is disposed within said receiving means the dump frame and the hi-lift frame are locked together and operation of said fluid cylinder means will raise the body in a generally horizontal plane, and when said lock means is retracted from engagement with said receiving means, one end of the body will be raised and cause tilting thereof.

2. A hi-lift or dump unit comprising a first frame, a second frame movably mounted on said first frame, a third frame having a swingable connection with said second frame adjacent one end thereof, lock means spaced from said swingable connection for selectively connecting said second and third frames, and means for raising one end of said third frame while maintaining the same generally parallel to said first frame when said second frame and said third frame are locked together, and swinging said third frame about said swingable connection when said second frame and said third frame are unlocked.

3. The structure of claim 2 in which the movable mounting between said first frame and said second frame includes spaced pairs of hi-lift arms.

4. The structure of claim 2 in which said lock means for selectively connecting said second and third frames includes retaining means carried by one of said second and third frames, receiving means carried by the other of said frames and axially alignable with said retaining means, pin means slidably mounted in said retaining means, and means for moving a portion of said pin means axially into engagement with said receiving means.

5. The structure of claim 4 including means for securing said pin means in adjusted position.

6. The structure of claim 2 including mounting means for mounting said hi-lift or dump unit on the chassis of a vehicle.

7. The structure of claim 2 in which said means for raising one end of said third frame includes an upright support on said third frame and fluid-cylinder means connecting said first frame and said upright support to provide a lifting force for said third frame.

* * * * *