

**July 28, 1970**

H. H. VERMETTE

**3,521,775**

## PORTABLE POWER LIFT

Filed Aug. 16, 1968

4 Sheets-Sheet 1

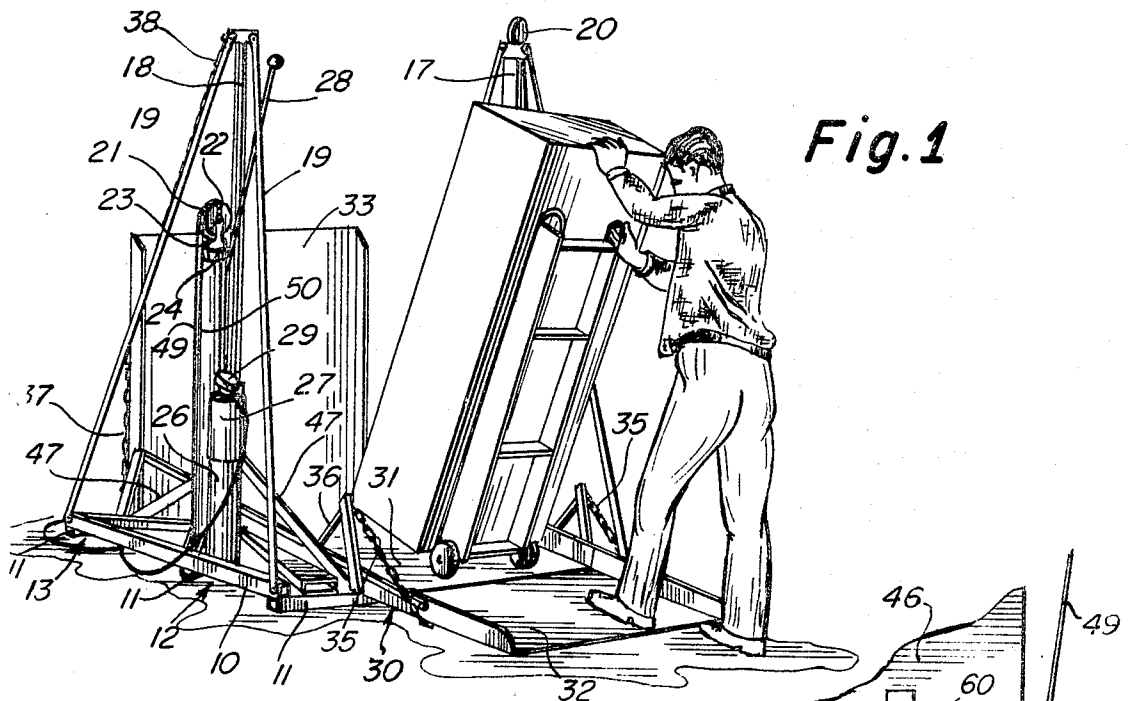


**Fig. 1**

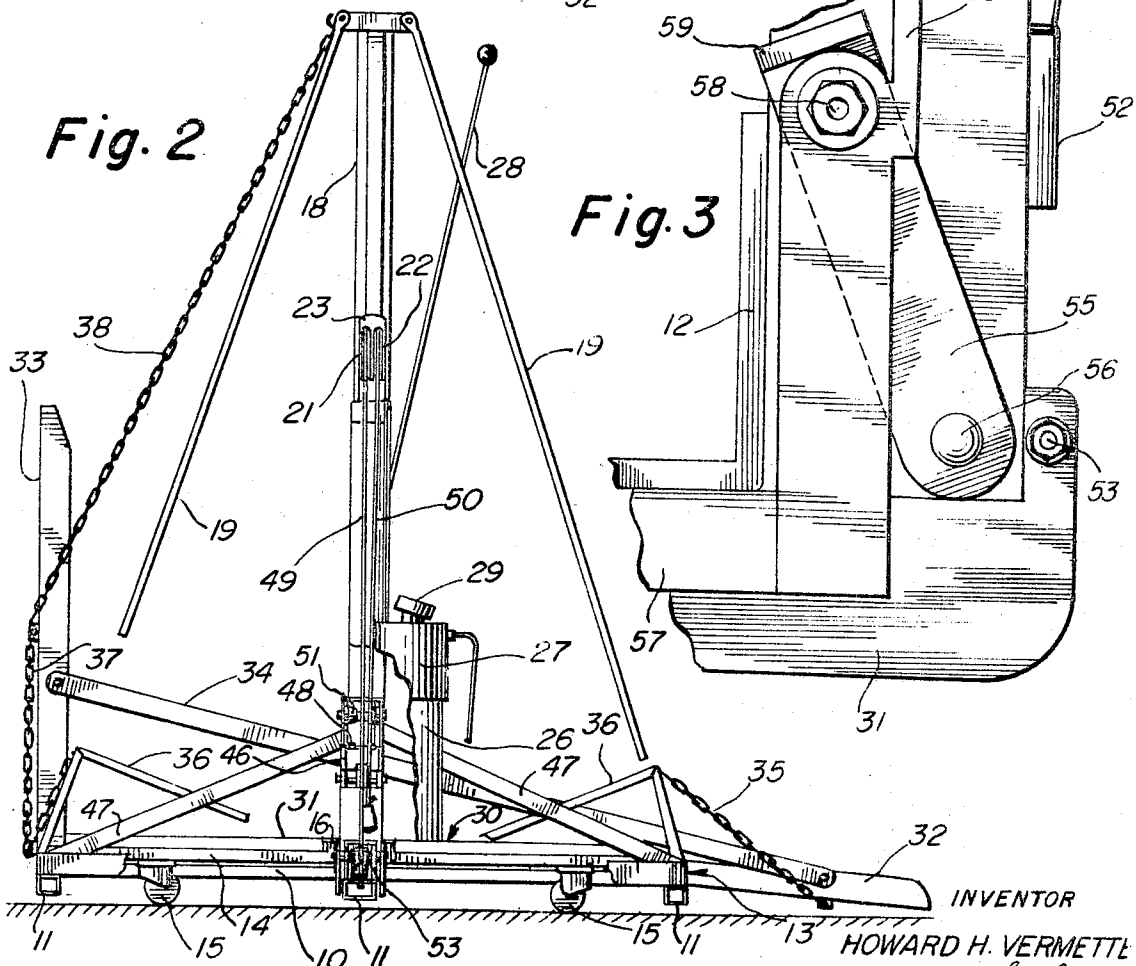


**Fig. 2**

*Fig. 3*

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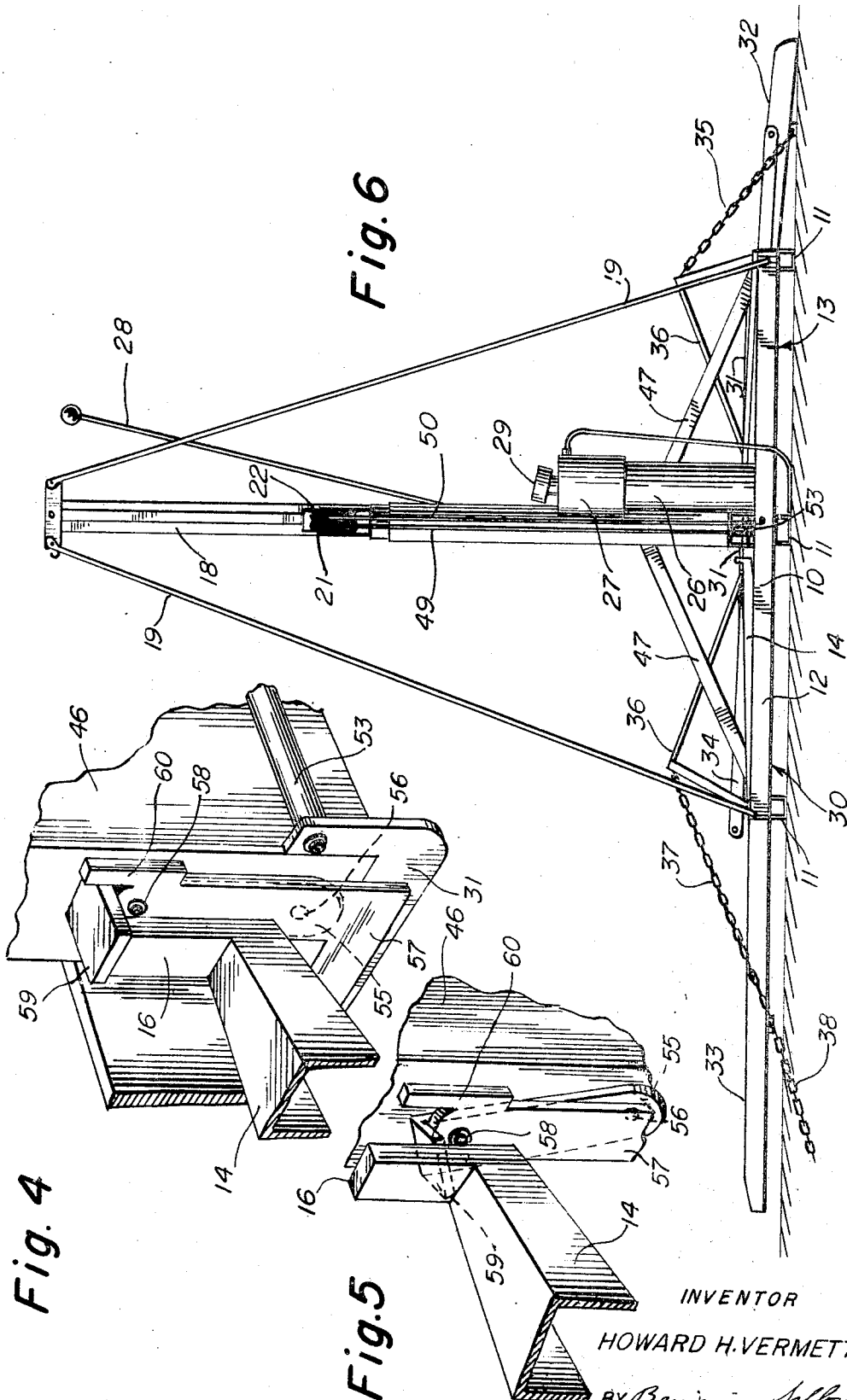
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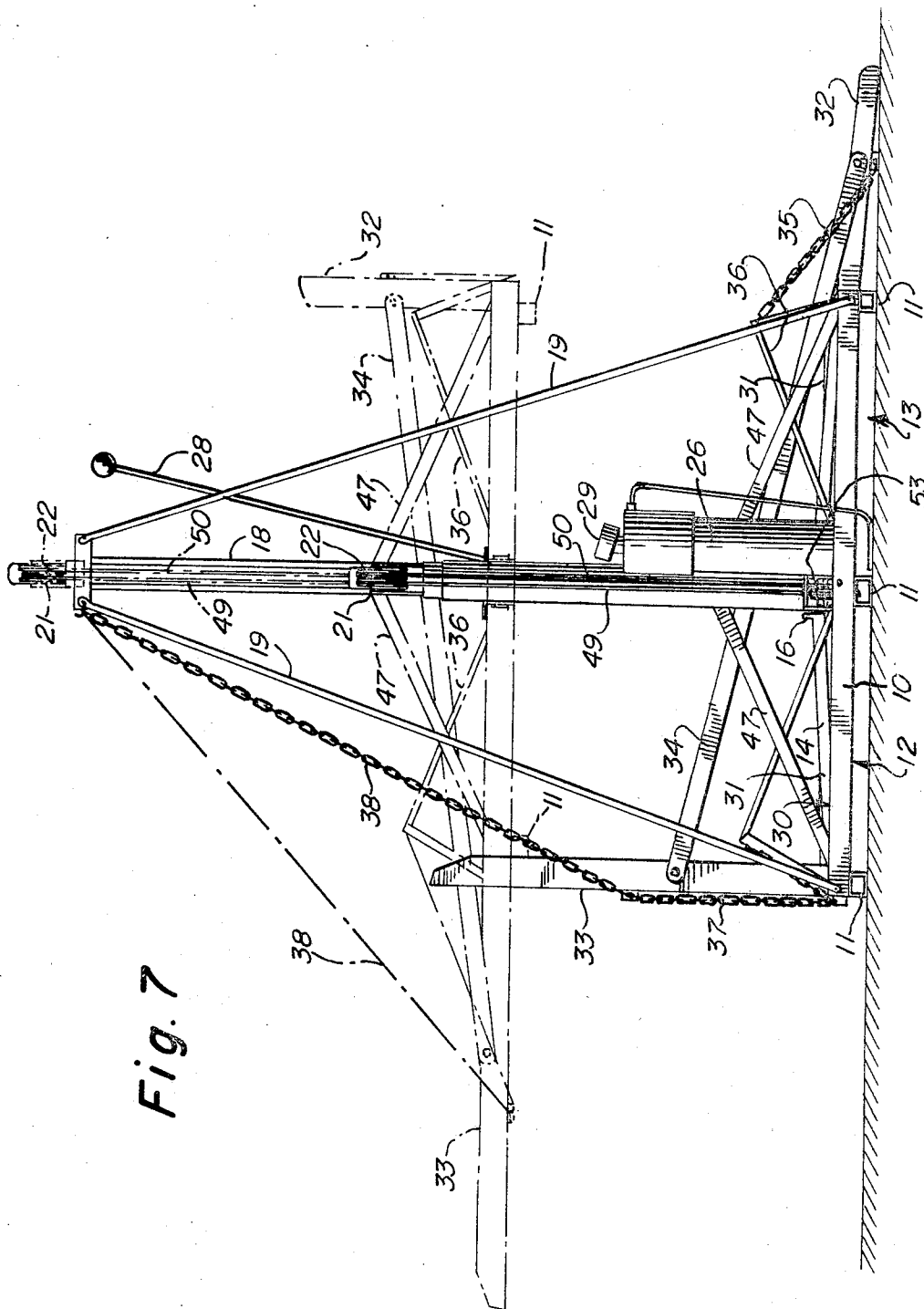


Fig. 7

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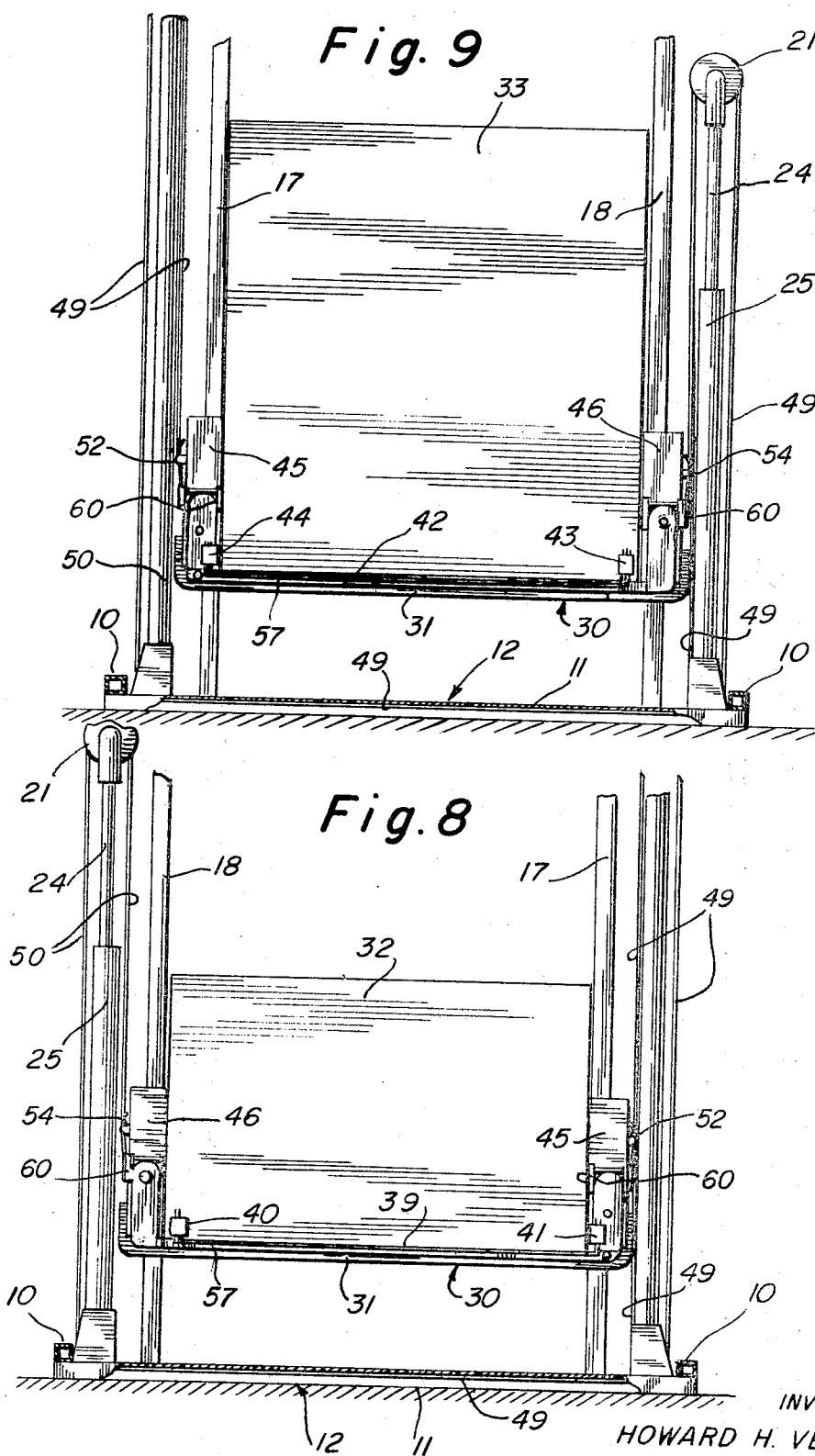
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PORTABLE POWER LIFT

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4 Sheets-Sheet 4



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3,521,775  
**PORTABLE POWER LIFT**  
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## ABSTRACT OF THE DISCLOSURE

A portable power lift comprising a frame having retractable casters and a platform movable vertically on the frame by a hydraulic hoist. The casters are retracted automatically as the platform is raised and may be extended as the platform approaches ground level. A dock board and ramp at opposite ends of the platform are tied together by connecting rods that raise one of these members as the other member is lowered. Both the dock board and ramp may be down at the same time to allow the platform to be used as a bridge. The lifting force is applied to the platform by cables attached to opposite sides of the platform. The arrangement of the cables prevents the platform from tilting or binding relative to the frame. A safety catch mounted on opposite sides of the platform prevents the platform from falling if either cable breaks. The hydraulic hoist has a gage adapted to measure the oil pressure. The dial of the gage is calibrated in pounds or grams to indicate the weight of the load directly.

This invention relates to a portable power lift for loading and unloading trucks from the floor level, and is particularly concerned with means for permitting the lift to be moved from one place to another, for anchoring it against such movement, and for lifting or lowering a heavy load easily and safely.

Heretofore trucks have been loaded from the floor level by fork lift trucks or by hoisting means permanently connected to the tailgate of the truck. Both of these methods are expensive because the fork lift trucks require a motor to provide the necessary mobility, and the tailgate hoist requires that hoisting equipment be mounted on each truck.

The lift of the present invention may be pushed manually from one place to another on retractable casters, and is not connected to any truck. It is considerably less expensive than a fork lift truck, and may be used all day long loading and unloading different trucks from the floor level.

The lift comprises a frame, a platform movable vertically in the frame, and a hydraulic hoist for moving the platform vertically. The cable arrangement permits the hydraulic hoist to lift a load of 2000 pounds five feet with a 30 inch stroke, and applies the lifting force equally to opposite sides of the platform to keep it from tilting or binding against the frame. The hoist has a gage that indicates the weight of the load to prevent overloading the platform. The platform has a pair of safety catches on opposite edges to prevent it from falling if either cable breaks.

The frame is provided with casters that may be moved downwardly into lift supporting position as the platform approaches the floor level to allow the lift to be rolled on the casters, or may remain in retracted position to hold the frame of the lift anchored in fixed position on the floor. When the casters are used to provide mobility, they are retracted automatically as the platform is raised.

The platform has a ramp hinged at one end and a dock board hinged at the other end. The ramp and dock board are interconnected so that one is moved upwardly by the downward movement of the other. A chain connected to

the dock board and to the frame insures that the movement of the dock board and ramp is gradual in each direction. The ramp and dock board may be kept in their down positions at the same time, if desired.

Suitable structure by means of which the above mentioned and other advantages of the invention are attained will be fully described in the following specification, taken in conjunction with the accompanying drawings showing a preferred embodiment of the invention, in which:

FIG. 1 is a perspective view, on a reduced scale, showing a lift embodying the invention as it is being loaded;

FIG. 2 is a fragmentary side elevational view, with the lift supported on the casters;

FIG. 3 is an enlarged fragmentary elevational view showing a flanged lever pivoted to engage a caster supporting arm to move the casters downwardly into lift supporting position and to disengage the arm to retain the casters in retracted position;

FIG. 4 is an enlarged fragmentary perspective view showing the flanged lever engaging the caster supporting arm;

FIG. 5 is a view similar to FIG. 4, with the flanged lever in nonengaging position;

FIG. 6 is a side elevational view with the casters in retracted position and both the ramp and the dock board in the down position;

FIG. 7 is a side elevational view with the dock board up and the ramp down in solid lines, and the reverse in dash lines;

FIG. 8 is an end view looking at the ramp with the platform partially raised; and

FIG. 9 is an end view, looking at the dock board with the platform partially raised.

Referring to the drawings, a plurality of longitudinal rails 10 and transverse rails 11 are bolted together to form a base 12 for a suitable frame 13. A plurality of arms 14 are pivotally secured to each outer rail 11 adjacent each end thereof, and each arm is inclined upwardly from the end, as shown in FIG. 7. A swiveled castor 15 is mounted on the underside of each arm 14 intermediate its length, as shown in FIG. 2. A flange 16 extends upwardly from the outer end of each arm 14 for a purpose hereinafter disclosed. The frame also includes an upright 17 at one side thereof and a similar upright 18 at its opposite side. The uprights are secured to opposite ends of the center rail 11 and are braced by rods 19 extending diagonally from the upper end of the uprights to the corners of the base.

A pulley 20 is rotatably mounted in fixed position adjacent the upper end of the upright 17. Two pulleys 21 and 22 are rotatably mounted in side by side relationship in a yoke 23 secured to the other end of a piston rod 24. The piston rod 24 is slidable relative to a cylinder 25 adjacent the upright 18. The rod 24 is reciprocated relative to the cylinder 25 by oil or other hydraulic fluid from a tank 26 mounted on the base 12. The flow of oil into and out of the cylinder 25 is controlled by a motor 27 mounted on top of the tank 26 and actuated by a switch lever 28. The lever 28 is long enough to be conveniently accessible to an operator standing on the lift at any level, or standing on the floor near the lift. The tank 26 has a gage 29 that measures the oil pressure. The gage is calibrated in pounds or grams, so that it directly indicates the weight of the load being lifted, without requiring conversion from a reading of the liquid pressure per unit area.

A platform 30, mounted for sliding vertical movement relative to the frame 13, comprises a center section 31 for carrying the load, a ramp 32 hinged to one end of the section 31, and a dock board 33 hinged to the opposite end of the section 31. Although either the ramp or the dock board may be used for moving the load on to

or off the platform, the ramp is normally down in the down position of the platform, to permit loading from the floor level, and the dock board is up. The dock board is normally down to permit the load to be moved from the platform to a truck, and the ramp is up. To save time, the dock board is lowered and the ramp is raised as the platform is moved upwardly, and the ramp is lowered, and the dock board raised, as the platform is moved downwardly.

The dock board and ramp are interconnected by a pair of tie rods 34 that raise either the ramp or the dock board as the other is lowered. The tie rods are detachable at one end to permit both the ramp and the dock board to remain down at the same time if desired. Two chains 35, each secured at one end to a support 36 and at its other end to the ramp, limit the downward movement of the ramp when the platform moves upwardly and the dock board is raised. Similar chains 37 perform the same function for the dock board. The supports 36 extend upwardly from the platform 30 to which they are secured. Another chain 38 detachably secured to the top of the upright 17 or 18 and to the dock board limits the rate of downward movement of the dock board.

The chain 38 is too short to allow the dock board to assume its down position when the platform is in its low position, and must be detached to permit the dock board to stay down in the low position of the platform. As the platform is moved upwardly, the chain 38 slackens to permit downward movement of the dock board. As the platform is moved upwardly, the slack in the chain 38 increases because the vertical distance between the dock board and the top of the uprights is reduced. When the amount of slack in the chain 38 is sufficient, the dock board 33 is pushed outwardly past its dead center. The weight of the dock board causes it to move downwardly when it is pushed outwardly past dead center, but the chain 38 prevents the dock board from falling to its down position. The chain 38 limits the distance the dock board can move downwardly, and permits it to move downwardly gradually as the platform moves upwardly and the slack in the chain 38 increases. The tie rods 34 move the ramp upwardly at the same rate at which the increase of slack in the chain 38 permits the dock board to move downwardly.

As shown in FIG. 8, a torsion spring 39 has one end secured in a socket 40 secured to the lower edge of the ramp 32 adjacent one end thereof, and its other end secured in a socket 41 secured to the platform section 31 adjacent the opposite end of the ramp. The spring urges the ramp toward its vertical or up position, and exerts sufficient force to partially overcome the weight of the ramp. A similar torsion spring 42 has its ends secured in sockets 43 and 44 mounted on the lower edge of the dock board 33 and the section 31, respectively, as shown in FIG. 9, to partially overcome the weight of the dock board.

The vertical movement of the platform is guided by housings 45 and 46 secured to opposite edges of the section 31 and slidably mounted on the uprights 17 and 18, respectively. Each of the housings is braced by diagonal struts 47, as shown in FIGS. 2 and 6. A safety catch 48 is contained in each housing 45 and 46 to prevent the platform from falling if either cable 49 or 50 breaks. The specific structure of the safety catch is fully described in a separate patent application filed by applicant on Sept. 12, 1968, under Ser. No. 759,456. Two rollers 51 are mounted in each housing 45 and 46 near the top and the bottom of the housing. These rollers ride on the uprights 17 or 18, respectively, to keep the housings from tilting relative to the uprights.

The cable 49 has one end thereof secured to the base 12 adjacent the upright 18, and its other end secured to the housing 45, as indicated at 52. From the base 12 the cable 49 extends around the pulley 21, around a roll 53, through the center transverse rail 11, around a second

roll 53 at the opposite side of the base, and around the pulley 20 to the housing 45. As the piston rod 24 moves the pulley 21 upwardly, the cable 49 exerts its lifting force against the housing 45.

The cable 50 has one end thereof secured to the base 12 adjacent the upright 18, and its other end secured to the housing 46, as indicated at 54. The suspension of the platform directly under the cables prevents the load from tilting inwardly. As the piston rod 24 moves the pulley 22 upwardly, the cable 50 exerts its lifting force against the housing 46. Since both housings 45 and 46 are located along the transverse center line of the platform 30, the pull on both sides of the platform is equal. The equalization of the lifting force on opposite sides of the platform makes it possible to use lightweight channels for the uprights 17 and 18, without danger of either upright tilting as the platform moves relative thereto.

A lever 55 is pivotally secured adjacent its lower end to each of the opposite side walls of the housing 46, as indicated at 56 in FIG. 3. The upper end portion of each lever is pivotally secured to one upper end portion of a U-shaped bar 57, as indicated at 58. The U-shaped bar 57 extends transversely of the center section 31 of the platform and is channel shaped so that each vertical end portion straddles one of the housings 45 or 46 to extend between the housing and the adjacent flange 16. The upper end of each lever 55 extends outwardly at right angles in the direction away from the housing to provide a flange 59. The flange 59 is out of vertical alignment with the flange 16 when the lever 55 is at its innermost angular position, and overlies the upper end of the flange 16 in the vertical position of the lever. The lever 55 is moved pivotally about its pivot 56, in the clockwise direction as viewed in FIG. 3, by pushing the flange 59 on either side of the housing 46 outwardly. This pivotal movement of the lever 55 moves the bar 57 to the right, as viewed in FIG. 3, until the lever 55 is vertically disposed. A stop member 60 rigidly secured to the lever 57 limits the clockwise pivotal movement of the lever 55 (as viewed in FIG. 3) to prevent movement of the lever past its vertical position, in which the flange 59 is in vertical alignment with the flange 16 for reasons hereinafter disclosed.

Two levers 55 are pivotally secured to opposite side walls of the housing 45 and to the opposite vertical end portion of the bar 57. The pivotal connections are reversed at this side of the platform, so that the upper ends of these levers 55 are pivoted to the housing 45 and their lower ends are pivoted to the bar 57. The pivotal movement of the levers 55 at opposite sides of the platform are in opposite directions because of the reversal of the pivotal connections. The stop member 60 is on the edge of the lever closest to the platform, instead of on the edge remote from it. As the platform 30 approaches the floor level with the levers 55 in their vertical position, each flange 59 engages the top of the flange 16 with which it is vertically aligned. Due to the weight of the platform, the flanges 59 move the inner ends of the arms 14 downwardly. The arms 14, acting as levers, each about its caster as a fulcrum, lift the frame off the floor so that the entire lift can be rolled on the casters.

If it is desired to hold the lift anchored against movement at the floor level, any one of the levers 55 is moved pivotally to move all four flanges 59 out of vertical alignment with the flanges 16 before the platform moves downwardly far enough to allow the flanges 59 to engage the flanges 16. The levers 55 are normally held out of vertical alignment with the flanges 16 to permit the platform to be moved downwardly without lifting the frame off the floor, and are moved into alignment only when it is desired to move the lift on the casters.

Although a preferred embodiment of the invention has been described in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restrictive, as many details of construction may be modified or changed without departing

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from the spirit or scope of the invention. Accordingly, I do not desire to be restricted to the exact structure described.

I claim:

1. A portable power lift comprising a frame, a platform mounted for vertical movement relative to said frame, a hydraulic hoist for moving said platform vertically relative to said frame, caster means mounted on said frame, and means mechanically interengageable with said caster means for moving said caster means into lift supporting position, each of said caster means comprising an arm pivotally secured to said frame and a caster mounted on the underside of said arm intermediate its length, and said means mechanically interengageable with said caster means comprising a plurality of levers mounted on said platform and movable vertically with said platform whereby said levers are engageable with the inner ends of said arms as said platform is moved downwardly to hold said lift supported off the floor in the lowermost position of said platform, and means allowing said lift to rest on the floor when said levers are disengaged from said arms.

2. A portable power lift as recited in claim 1, in which said levers move each arm pivotally about its caster as a fulcrum to lift said frame off the floor when said platform moves downwardly with said levers in vertical alignment with said arms.

3. A portable power lift comprising a frame, a platform mounted for vertical movement relative to said

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frame, a hydraulic hoist for moving said platform vertically relative to said frame, caster means mounted on said frame, means for moving said caster means into and out of lift supporting position, said platform comprising a center section, a ramp hinged to one end of said center section, a dock board hinged to the opposite end of said center section, and means interconnecting said ramp and said dock board whereby one moves upwardly about its hinge as the other is moved downwardly about its hinge.

4. A portable power lift as recited in claim 3, in which said interconnecting means comprises a pair of tie rods pivotally connected to opposite edges of said dock board and detachably pivoted to opposite edges of said ramp whereby said dock board and ramp may both remain in down position.

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ROBERT G. SHERIDAN, Primary Examiner

U.S. Cl. X.R.

187—9; 214—2