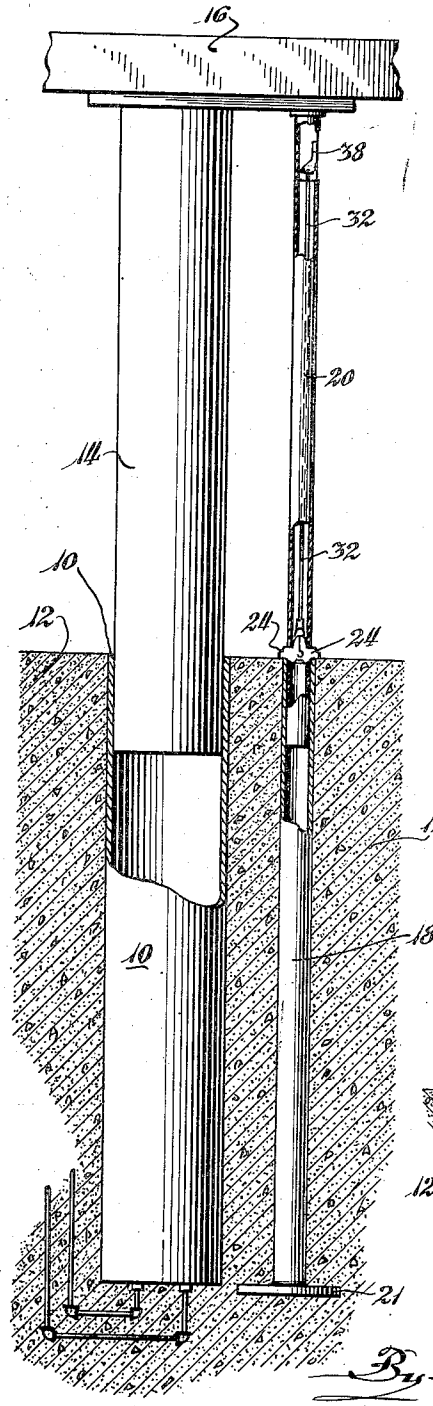
July 20, 1954 L. F. JASEPH 2,684,129

COMBINED NONROTATING AND SAFETY DEVICE FOR LIFTS

Filed Jan. 4, 1951 3 Sheets-Sheet 1

Fig. 1.



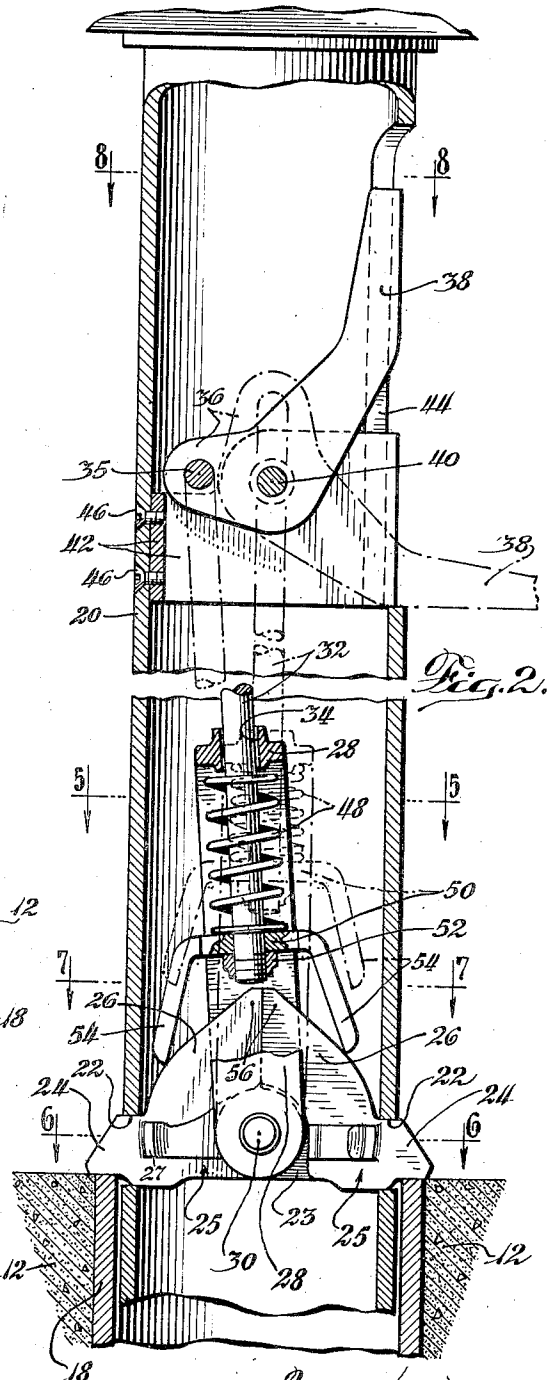


Fig. 2.

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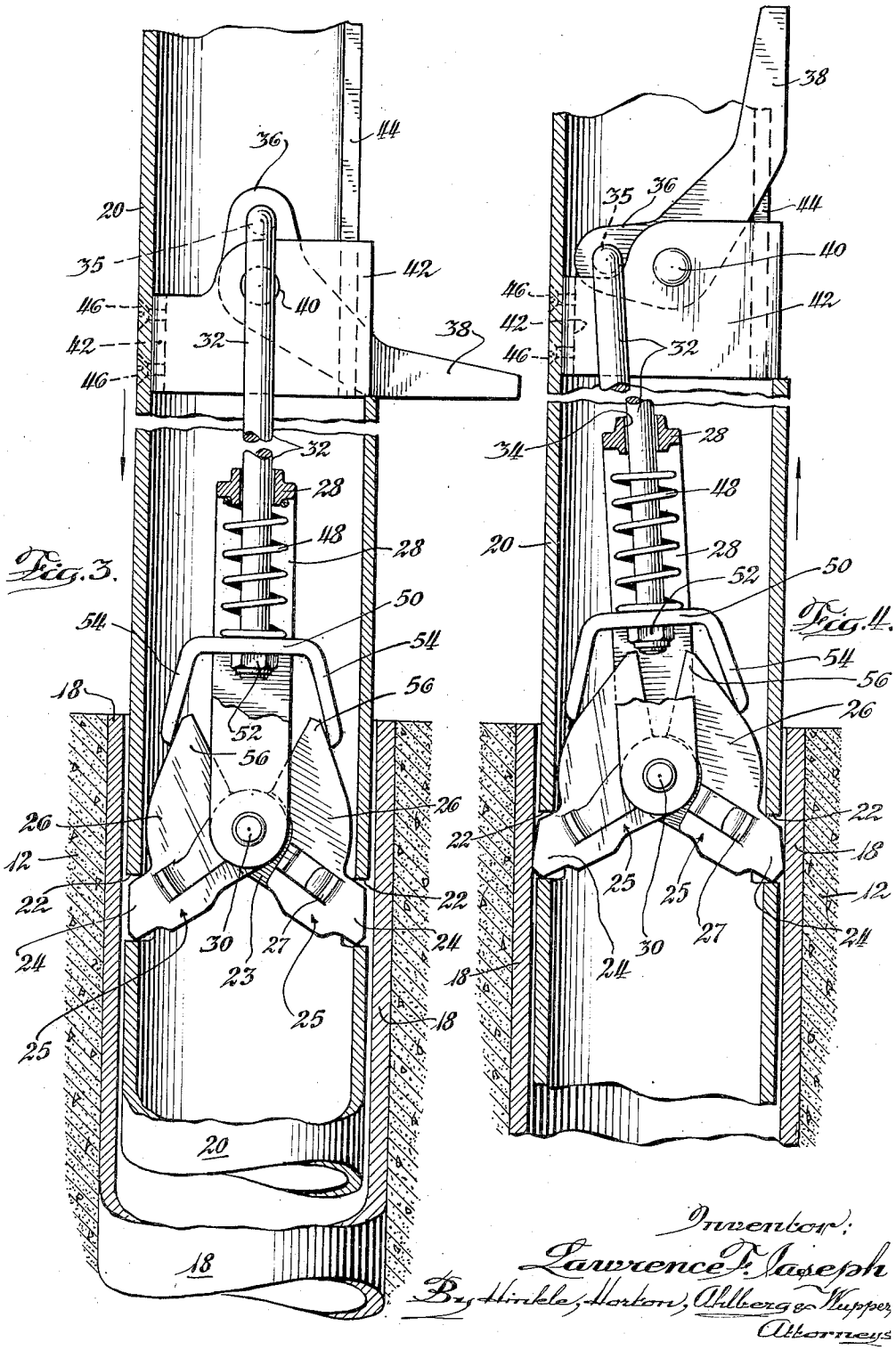

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Fig. 5.

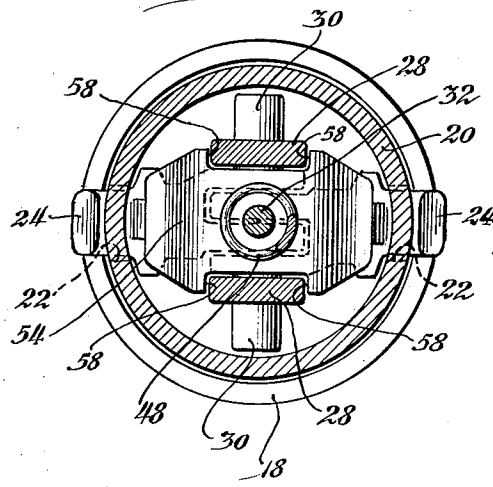


Fig. 6.

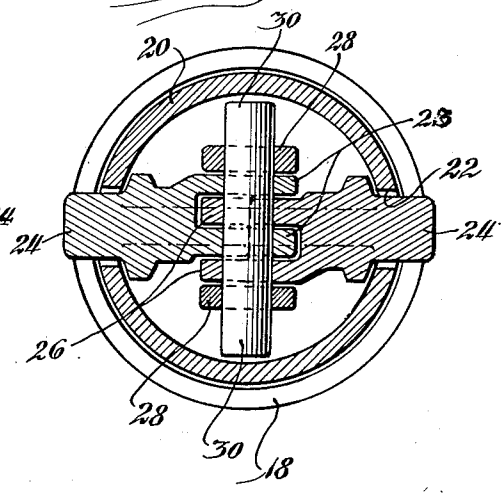


Fig. 7.

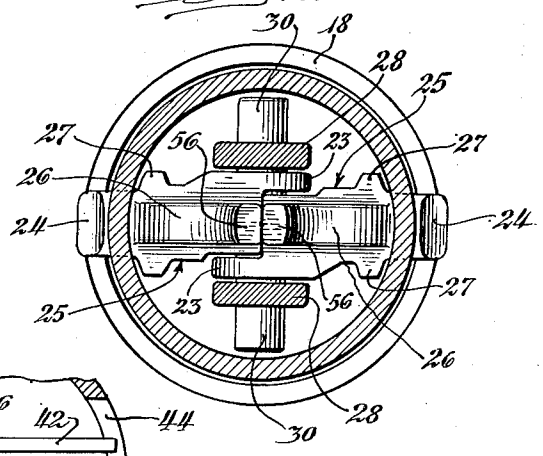
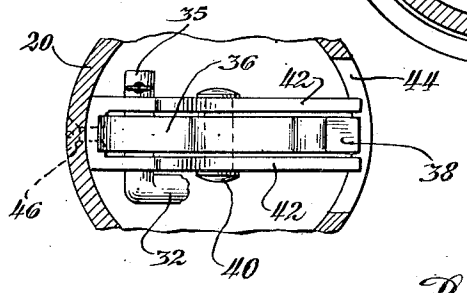


Fig. 8.



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UNITED STATES PATENT OFFICE

2,684,129

COMBINED NONROTATING AND SAFETY DEVICE FOR LIFTS

Lawrence F. Jaseph, Memphis, Tenn., assignor to Rotary Lift Company, Memphis, Tenn., a corporation of Delaware

Application January 4, 1951, Serial No. 204,391

11 Claims. (Cl. 187—8.49)

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My invention relates generally to lifts of the hydraulic or compressed air-hydraulic single post type, and more particularly to improved means for preventing rotation of such lifts and for preventing accidental lowering thereof.

In hydraulic and compressed air-hydraulic lifts of the single post type, it is sometimes desirable that the lift be so constructed as to be nonrotatable, and it is usually essential that the lift be provided with safety means to prevent accidental lowering of the lift.

It is therefore a primary object of my invention to provide a lift having an improved automatically operable safety leg which is also effective to prevent rotation of the lift.

A further object is to provide an improved safety device which is automatically conditioned for operation whenever the lift is moved to its lowermost position, and which, when in position holding the lift in elevated position, cannot be disengaged except by raising the lift slightly above the position in which it was locked.

A further object is to provide an improved locking mechanism for lifts, most of the operating parts of which are enclosed in a safety leg, and which may be manually conditioned for release and automatically conditioned for operation.

A further object is to provide a lift safety leg mechanism which may be readily assembled, which has few parts likely to get out of order, and in which most of the operating parts are mounted within the leg.

Other objects will appear from the following description, reference being had to the accompanying drawings, in which—

Fig. 1 is a part sectional view of a lift incorporating the improved combined nonrotating and automatic safety leg;

Fig. 2 is an enlarged central vertical sectional view of the automatic safety locking means, showing the parts in full lines in the positions assumed when the lift is locked in elevated position;

Fig. 3 is a view similar to Fig. 2, showing the parts in the positions assumed as the lift is being lowered;

Fig. 4 is a view similar to Fig. 2, showing the parts in the positions assumed while the lift is being elevated;

Figs. 5, 6 and 7 are transverse sectional views taken on the lines 5—5, 6—6 and 7—7 respectively, of Fig. 2, assuming the parts to be in the dotted line positions; and

Fig. 8 is a transverse sectional view taken on the line 8—8 of Fig. 2.

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Referring to Fig. 1, the lift is conventionally illustrated as comprising a cylinder 10 firmly fixed in a foundation 12, and having a plunger or post 14 carrying a platform or vehicle supporting structure 16. The conventional hydraulic or compressed air control valves and connections therefor have been omitted.

Fixedly secured in the foundation 12, adjacent and parallel to the cylinder 10, is a receiver formed by a smaller diameter pipe or tube 18 into which an elongated support comprising a pipe 20 is telescoped. The pipe 20 is rigidly secured, either permanently or detachably, to the platform 16 and slides freely in the tube 18. The pipe 18 preferably rests upon a load bearing base plate 21.

In Fig. 1, the platform is shown in its elevated position, and in this position a substantial length of the lower end portion of the tube 20 projects into the tube 18. The plunger 14 and platform 16 are thus prevented from rotating about the axis of the plunger 14 by the tube 20.

As best shown in Figs. 2, 3, and 4, the tube 20 is provided with a pair of slots 22 through which project the latching projections or legs 24 of a pair of bell crank latching elements or castings 25, best shown in Figs. 4 to 7. These castings are similar, and each, in addition to the latching projection 24, has a pair of hinge portions 23, aligned 90° sector shaped web portions 26 which form upwardly extending abutment legs, and a pair of lugs 27 extending in opposite direction from the web portion 26. These bell crank castings are fitted together back to back to form a hinge joint, and they are held assembled by a generally U-shaped strap or clevis 28, the lower ends of which have holes in alignment with holes in the hinge portions 23 to receive a pintle 30. The pintle is nearly as long as the internal diameter of the tube 20 so that it is not necessary to secure it against longitudinal movement.

A rod 32 extends freely through an opening 34 in the transverse portion of clevis 28, and at its upper end has a right angle bend portion 35 to form a pivotal connection with an operating lever 36, which includes a handle 38. The lever 36 is pivoted on a pin 40 carried in a U-shaped frame 42. The ends of the legs of the frame 42 rest upon the pipe 20 at the lower end of a hand hole slot 44 therein, and its cross portion is secured to the pipe by countersunk screws 46. The slot 44 is sufficiently wide that the handle 38 may be grasped readily to swing the operating lever 36 from the position in which it is

shown in full lines in Fig. 2 to the position in which it is shown in dot-dash lines in said figure.

An inverted U-shaped stop member 50 and elastic means formed by a compression coil spring 48 are slidable on the rod 32 and are retained thereon by a self-locking nut 52 threaded at the lower end of the rod 32. The member 50 comprises two depending stop arms 54 which, under certain conditions, as shown in Fig. 2, limit the extent of separation of the ear portions 56 of the webs 26 so as to prevent the latching projections 24 from being fully withdrawn from the openings 22 in the pipe 20. As best shown in Fig. 5, the stop member 50 is held against rotation on the rod 32 by having notches 58 embracing the vertical arms of the clevis 28.

When the lift is in elevated position, as shown in Figs. 1 and 2, the latching projections 24 extend through the slots 22 and rest upon the upper end of the pipe 18. The pipe 20 thus forms a safety leg to support the lift and the load carried thereby and also to prevent rotation thereof.

When it is desired to lower the lift the handle 38 is grasped and the lever 36 swung from the position in which it is shown in full lines in Fig. 2 to its dash-dot line position. Since the latching projections will normally be bearing all, or substantially all, of the weight of the lift and its load, such movement of the lever 36 will not withdraw the latching projections 24 but instead will raise the stop member 50 lifting the arms 54 upwardly from the casting webs 26 and compressing the spring 48, as indicated in dot-dash lines in Fig. 2. The operator then operates the lift controls to elevate the lift sufficiently to take the load off the latching projections 24, whereupon the spring 48 will expand, and, through the clevis 28 and pivoted pin 30, swing the castings 24 to the position shown in Fig. 3 where their ears 56 engage the stop arms 54 of the stop member 50. It will be noted that in this limiting position the latching projections 24 still lie within the openings 22 of the pipe 20, but do not project outside the pipe. The operator may then operate the hydraulic or pneumatic controls to permit lowering the lift.

As the lift approaches its fully lowered position the handle portion 38 of the lever 36 strikes the upper end of the pipe 18 and is rotated to its vertical position. The parts will then assume the positions in which they are shown in Fig. 4, in which position the weight of the latching castings 24 and of the parts connected thereto tends to move the latching projections 24 outwardly and they thus slide along the inner surface of the pipe 18 while the lift continues to move to its fully lowered position. When the lift is again raised to its fully elevated position, the latching projections will be forced outwardly through their openings 22 (due to their weight and the weight of the connected parts) to the positions in which they are shown in Fig. 2, when they are again ready to prevent accidental lowering of the lift. It will be noted that in this position the load is carried directly by the latching projections 24, and relative pivotal movement of the latching members is limited by the abutment of the edges of the web portions or abutment legs of these members.

In order to assemble the mechanism in the pipe 20, the castings 25, together with their pivot pin 30, clevis 28, spring 48, and rod 32 are inserted in the open lower end of the pipe 20 until the upper end of the rod 32 may be grasped through the opening 44, whereupon the lever 36, which has previously been assembled on the U-shaped frame 42, is connected to the horizontally bent portion 35 of the rod 32. The frame 42 is then inserted in the pipe and secured therein by means of the screws 46. While inserting the frame 42 it is of course necessary to make certain that the latching projections 24 enter their openings 22.

To disassemble the mechanism, it is necessary merely to remove the screws 46, slide the U-shaped frame 42 upwardly and outwardly to raise the rod 40 higher than normally, thereby completely withdrawing the latching projections from the holes 22. The frame 42, together with the pin 40 and lever 36 may then be disconnected from the horizontally bent portion 35 of rod 32. The remaining assembly is then rotated so as to bring the latching projections 24 out of alignment with the holes 22 and dropped from the bottom of the pipe 20.

From the foregoing it will be clear that I have provided a simple and rugged mechanism which is effective not only as a safety leg to prevent accidental lowering of the lift, but also as a means to prevent rotation of the load bearing structure and plunger.

While I have shown and described a preferred embodiment of my invention, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles of the invention. I therefore desire, by the following claims, to include within the scope of the invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. In a lift having a load supporting structure, a safety device to prevent accidental lowering of the load supporting structure comprising, a pair of telescoping tubes, the outer of said tubes being fixed parallel to and below the path of movement of the load supporting structure, means securing the upper end of the inner tube to the load supporting structure, a pair of gravity operated latching members within the inner tube, each member having a latching part piercing the inner tube for engagement with the upper end of the outer tube when the lift is in its elevated position, an operating lever pivoted within the upper end of the inner tube, a rod pivoted to the operating lever and extending toward the latching members, an element operable to move the latching members to unlatched position in which their latching parts are retracted into the inner tube, a spring forming an operating connection between the lower end of the rod and said element to enable said lever to be moved to latch retracting position without moving said element and to store energy in the spring to provide a force available to retract the latching parts as soon as the latter are free to be retracted, and means operable incidental to the movement of the inner tube to its lowermost position to pivot the operating lever to latch releasing position.

2. In a single post lift having a cylinder, a plunger reciprocable in the cylinder, a load support structure on the plunger, and means to control the elevation and lowering of the lift; a combined means for preventing rotation of the lift and accidental lowering thereof comprising, a first tube adjacent and parallel to the lift cylinder, a second tube secured to the upper end of the plunger and slidable within the first tube, a

gravity operated latching means mounted within the second tube near the lower end thereof and having parts projectible therefrom to rest upon the upper end of the first tube and thereby prevent lowering of the plunger, yielding means interconnected with said latching means, operating means interconnected with said yielding means to stress the latter to exert a force to retract said latching means when the latter are free to move, and a part engageable with the upper end of the first tube to render said yielding means ineffective upon complete lowering of the lift and thereby to free said latching means for projection from the second tube into position for latching engagement with the upper end of the first tube.

3. In a lift having a load supporting structure, a safety device to prevent accidental lowering of the load supporting structure comprising a pair of telescoping tubes, the outer of said tubes being fixed parallel to and below the path of movement of the load supporting structure, means securing the upper end of the inner tube to the load supporting structure, a pair of gravity operated latching members within the inner tube, each member having a latching part projectible through an opening in the inner tube for engagement with the upper end of the outer tube when the lift is in its elevated position, said latching members being interfitted for relative pivotal movement, an operating lever pivoted within the upper end of the inner tube, a rod pivoted to the operating lever and extending toward the latching members, the pivotal connection between the rod and operating lever being located so as to be movable past dead center when the lever is swung to latch retracting position, a clevis pivotally connected to the latching members and operable to move them to unlatched position in which their latching parts are retracted into the inner tube, and a spring forming an operating connection between the lower end of the rod and said clevis whereby said lever may be moved to latch retracting position without moving said clevis and the energy stored in the spring is available to retract the latching parts as soon as the latter are free to be retracted.

4. In a lift having a load supporting structure, a safety device to prevent rotation and accidental lowering of the load supporting structure comprising, a pair of telescoping tubes, the outer of said tubes being fixed parallel to and below the path of movement of the load supporting structure, means securing the upper end of the inner tube to the load supporting structure, a pair of latching members within the inner tube, each member having a latching part projectible through an opening in the inner tube for locking engagement with the outer tube when the lift is in its elevated position, an operating lever pivoted within the upper end of the inner tube, a rod pivoted to the operating lever and extending toward the latching members, an element operable to move the latching members to unlatched position in which their latching parts are retracted into the inner tube, and a spring forming an operating connection between the lower end of the rod and said element whereby said lever may be moved to latch retracting position without moving said element and the energy stored in the spring is available to retract the latching parts as soon as the latter are free to be retracted.

5. In a lift having a load supporting structure, means to prevent accidental lowering of said

structure comprising, telescoping inner and outer tubes, said inner tube having its upper end secured to the load supporting structure and said outer tube being fixed in vertical alignment with the inner tube and having its upper end below the load supporting structure when the latter is in its lowermost position, and said inner tube having a substantial portion of the lower end thereof extending into the outer tube when the load supporting structure is in its fully elevated position, said inner tube also having a pair of slots positioned so as to be adjacent the upper end of the outer tube when the load supporting structure is elevated to its normal operating level and having an access opening near the upper end thereof, a pair of latching members having latching projections capable of being moved through said slots in the inner tube and to rest upon the upper end of the outer tube, a handle accessible through said access opening in the inner tube, an operating connection between said handle and said latching members for applying a retracting force thereto, said operating connection including a spring whereby said handle may be moved to latch disengaging position by compressing said spring, said handle when in the latter position projecting from the inner tube through the access opening therein, whereby when the latching projections are not in load bearing engagement with the upper end of the outer tube the energy stored in the spring will cause retraction of the latching projections, and when the load supporting structure approaches its lowermost position the handle will engage the upper end of the outer pipe and will be forced into the inner tube to restore said latching members to a position in which their latching projections may again extend through the slots in the inner tube upon subsequent elevation of the load supporting structure approximately to its upper normal level.

6. In a single plunger lift having a load supporting structure, means to prevent rotation and accidental lowering of said structure comprising, a pair of telescoping tubes, namely, an inner and an outer tube, said inner tube having its upper end secured to the load supporting structure, said outer tube being fixed in position adjacent and parallel to the lift plunger and having its upper end below the load supporting structure when the latter is in its lowermost position, said inner tube having a substantial portion of the lower length thereof extending into the outer tube when the load supporting structure is in its fully elevated position, said inner tube also having a pair of slots positioned so as to be adjacent the upper end of the outer tube when the load supporting structure is elevated to its normal operating level, said inner tube having an access opening near the upper end thereof, a pair of pivotally joined latching members having latching projections capable of being moved through said slots in the inner tube and to rest upon the upper end of the outer tube, means to limit the extent of relative pivotal movement of the latching members, a handle accessible through said access opening in the inner tube, and an operating connection between said handle and said latching members for applying a retracting force thereto, said operating connection including a spring whereby said handle may be moved to latch disengaging position by compressing said spring.

7. In a lift having a plunger carrying a load supporting structure, means to prevent acciden-

tal lowering of said structure comprising, a pair of telescoping inner and outer tubes, said inner tube having its upper end secured to the load supporting structure and said outer tube being anchored in vertical alignment with the inner tube and having its upper end below the load supporting structure when the latter is in its lowermost position, and said inner tube having a substantial portion of the lower end thereof extending into the outer tube when the load supporting structure is in its fully elevated position, said inner tube also having a pair of slots positioned so as to be adjacent the upper end of the outer tube when the load supporting structure is elevated to its normal operating level and having an access opening near the upper end thereof, a pair of pivotally connected latching members having latching projections capable of being moved through said slots in the inner tube and to rest upon the upper end of the outer tube, a handle accessible through said access opening in the inner tube and movable between positions respectively for engagement and disengagement of said latching members, an operating connection between said handle and said latching members for applying a retracting or disengaging force thereto, said operating connection including a spring whereby said handle may be moved to latch disengaging position by compressing said spring without moving the latching members, said handle when in the latch disengaging position projecting from the inner tube through the access opening therein, whereby when the latching projections are no longer in load bearing engagement with the upper end of the outer tube the energy stored in the spring will cause retraction of the latching projections, and when the load supporting structure approaches its lowermost position the handle will engage the upper end of the outer pipe and the latter will be forced into the inner tube to restore said latching members to engaging condition.

8. In a lift having a vertically movable structure for supporting automobiles or the like, means for supporting said structure in a raised position, comprising, in combination; an elongated, hollow support member mounted on said structure and extending downwardly therefrom; a receiver mounted below the path of movement of said structure and slidably receiving said support member, a pair of bell crank latching elements in said support member, means pivoting said latching elements in back to back relation to each other, latching legs defined on said respective latching elements extending radially outward in opposite directions from the pivotal connection between said elements and piercing said tube to be thrust outwardly into latching engagement with said receiver by gravitationally induced toggle action of said legs upon movement of said tube into raised position, abutment legs on said respective elements extending upwardly from said pivotal connection in opposed relation to each other for limiting upward pivotal movement of said respective elements induced by the weight thereof and the moment of said receiver and said support member acting on said latching legs, operating means at the upper end of said support member, and elastic means interconnected between said latching elements and said operating means to be stressed thereby to move said pivotal connection of said elements upwardly to retract said latching legs out of latching relation to said receiver upon unloading of said legs.

9. In a lift having a vertically movable structure for supporting automobiles or the like, means for supporting said structure in raised position, comprising, in combination, a receiver mounted below the path of movement of said supporting structure, an elongated, hollow support member mounted on said supporting structure and extending slidably into said receiver; a pair of latching elements in said support member pivotally connected in back to back relation to each other, the pivotal connection between said elements being vertically movable in said support member, latching legs defined on said respective elements extending radially outward in opposite directions from said pivotal connection and piercing said support member to be projected outwardly therefrom into latching engagement with said receiver by the gravitationally induced toggle action of said legs upon movement of said support member to raised position, abutment means on said respective latching elements for locking said legs in latched position by limiting upward swinging movement of said elements about said connection induced by the weight of said elements and the turning moment of said receiver and said tube on said latching legs, and operating means interconnected with said latching elements for shifting said pivotal connection therebetween upwardly to unlatch said legs from said receiver.

10. In a lift having a vertically movable structure for supporting automobiles or the like, means for supporting said structure in raised position comprising, in combination; an elongated, hollow support member mounted on said structure and extending downwardly therefrom; a receiver mounted below the path of movement of said structure and slidably receiving said support member, a pair of latching elements within said support member having latching parts projectable through transverse openings defined therein to have latching engagement with said receiver when said support structure is in raised position, an operating lever pivoted at the upper end of said support member, an operating spring interconnected between said latching members and said lever to be stressed by the latter to automatically shift said latching elements to unlatched position upon unloading of said latching parts thereof.

11. In a lift having a vertically movable structure for supporting automobiles or the like, means for supporting said structure in raised position comprising, in combination, a receiver mounted below the path of movement of said structure, an elongated support member mounted on said supporting structure and extending into said receiver, latching means on said support member engageable with said receiver to latch said supporting structure in raised position, operating means at the upper end of said support member, elastic means interconnected between said latching means and said operating means to be stressed by the latter to automatically unlatch said latching means upon removal of the vertical load from the latter.

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