United States Patent

Rishovd

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[54] VEHICLE JACK

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[52] U.S. Cl. ..... 254/2 B, 254/93 H

[51] Int. Cl. B60p 1/00

[58] Field of Search ..... 254/2 R, 2 B, 2 C, 93; 91/41, 91/45

[56] References Cited

UNITED STATES PATENTS

2,805,839 9/1957 Branick ..... 254/93 R

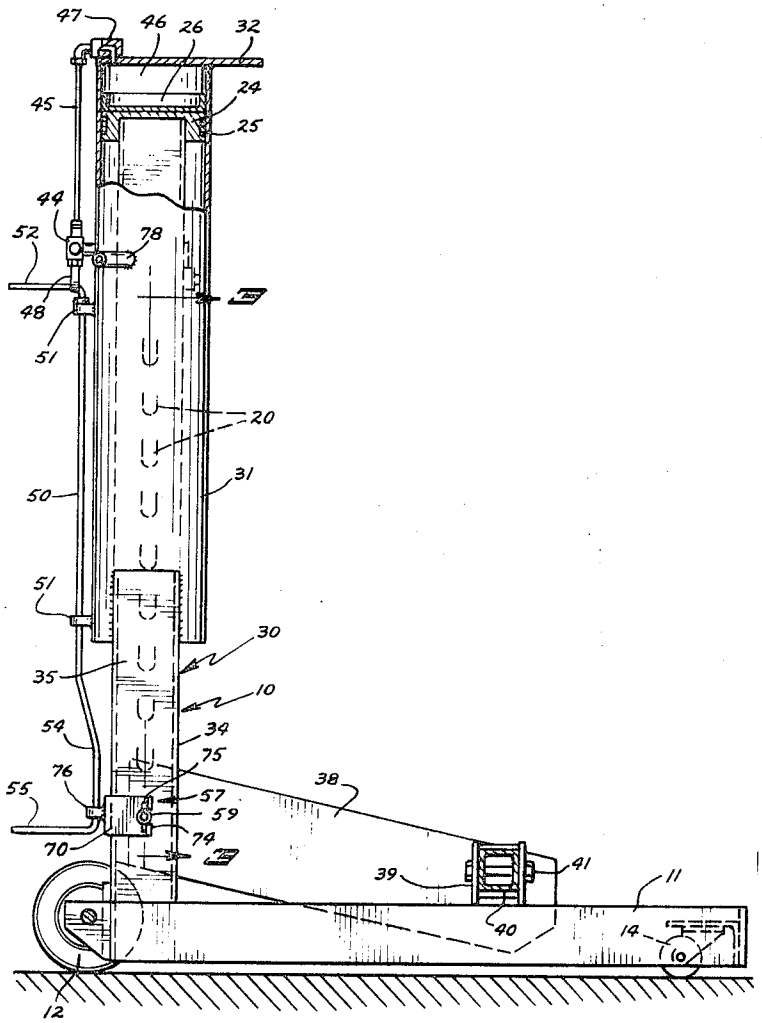
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[57] ABSTRACT

A fluid operated lift jack for vehicles or the like having a first stop means for limiting downward movement of the jack cylinder and a second stop means for limiting upward movement of the cylinder, said stop means yieldably retained in operative position, a single control for selectively admitting or withdrawing fluid from the jack to raise or lower the cylinder, and said control having connection with said stop means to make the second stop means inoperative during raising and the first stop means inoperative during lowering of the cylinder.

5 Claims, 6 Drawing Figures



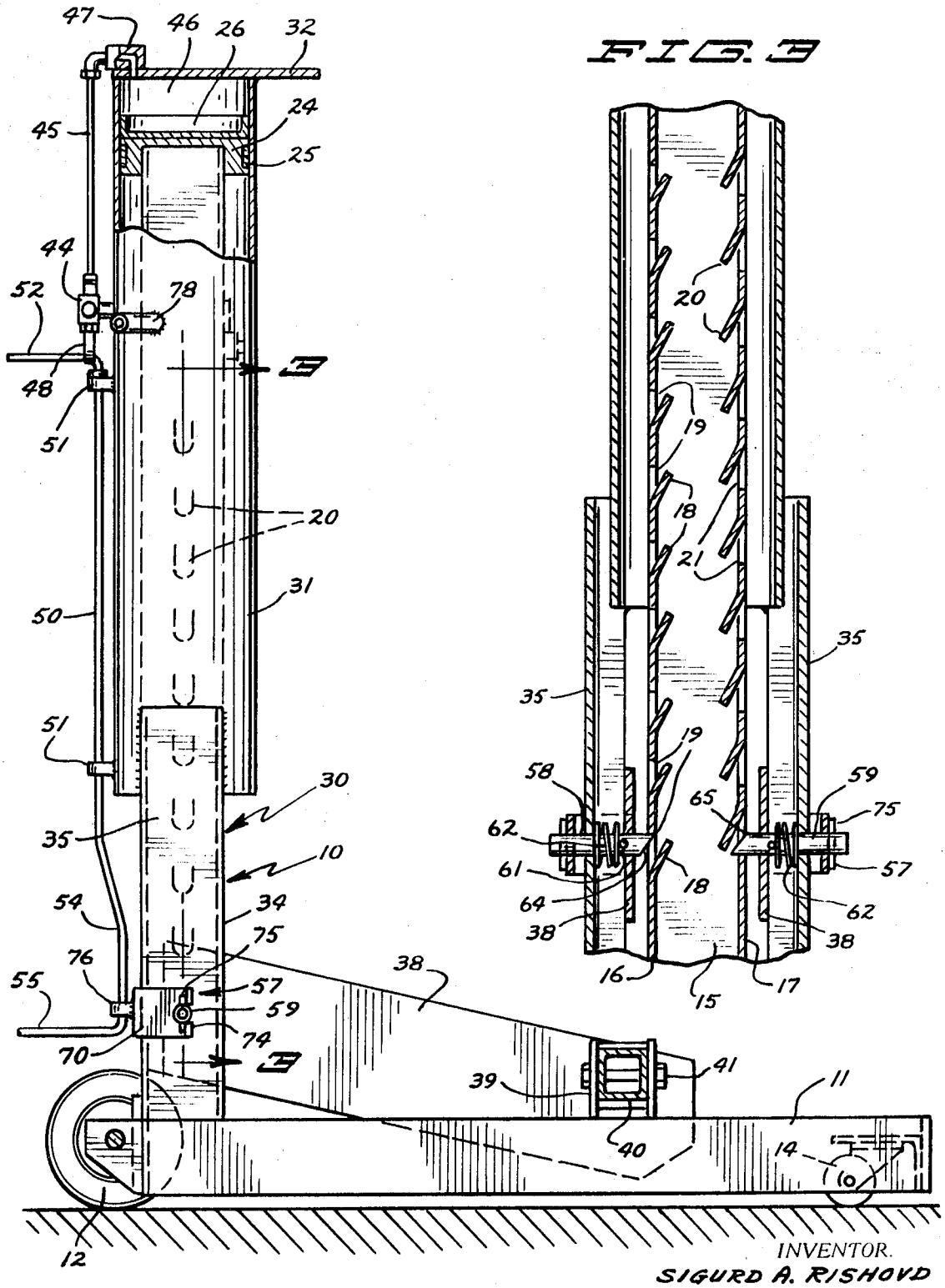


FIG. 1

FIG. 3

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FIG. 2

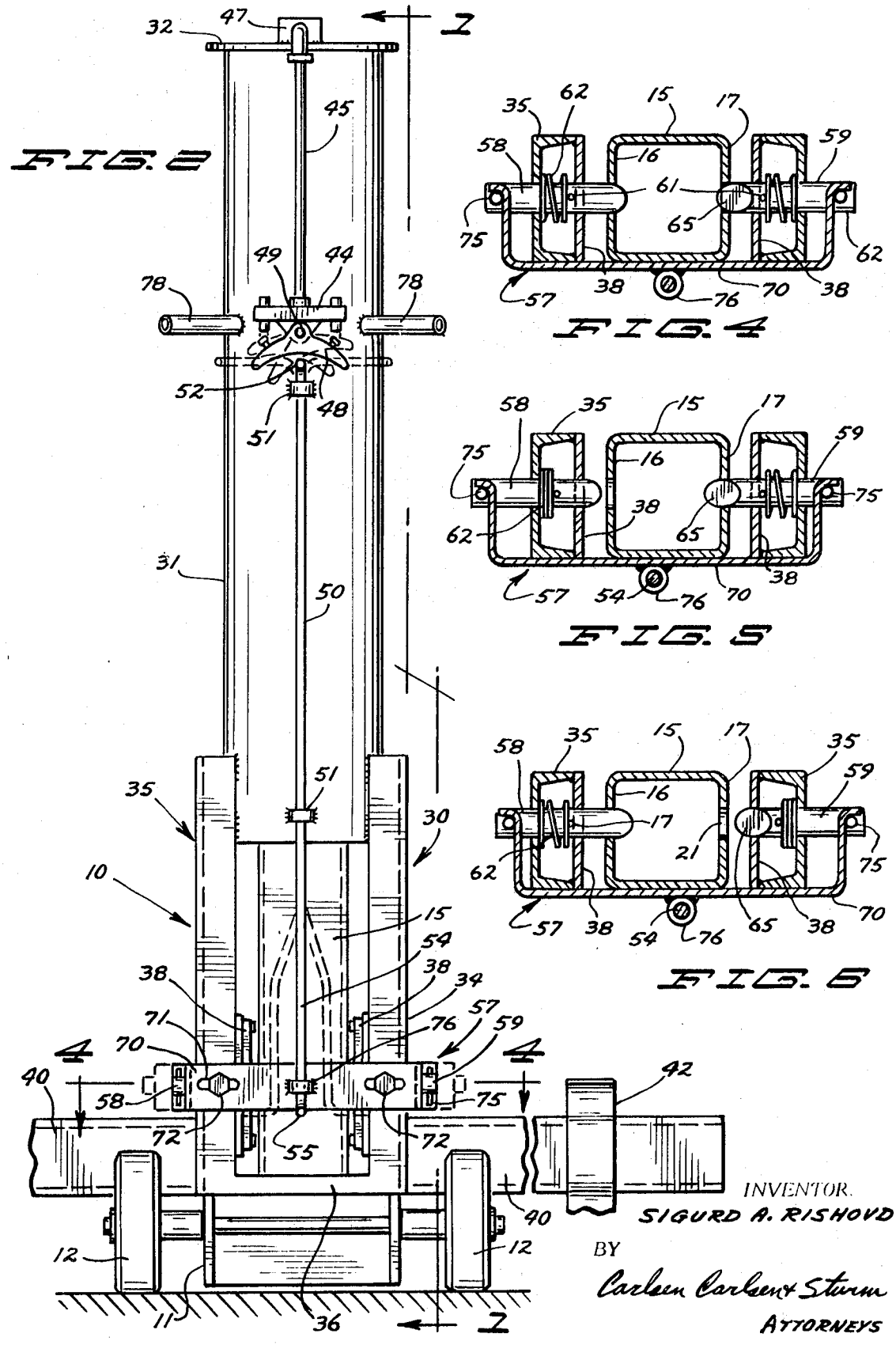


FIG. 4

FIG. 5

FIG. 6

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VEHICLE JACK

BACKGROUND OF THE INVENTION

This invention relates generally to fluid operated jacks for lifting vehicles, trailers, boats or the like and more particularly concerns stop mechanism in such jacks for locking the jack against accidental and rapid expansion or contraction.

Some vehicle jacks which are operated by hydraulic or pneumatic pressures are provided with a mechanical stop means such as a tooth and ratchet to prohibit the jack from collapsing in the event of fluid leakage. Such a stop means is preferably operative during lifting movement or extension of the jack.

However, it is also desirable to provide stop means to restrict upward or explosive movement of the jack. This may occur when weight or pressure is suddenly removed from the jack such as when a vehicle slips off of it and the internal fluid pressure in the jack cylinder tends to cause it to extend.

For sake and convenience and clarity of understanding the stop means prohibiting contraction or lowering of the jack will be referred to as the down stop means while the stop means prohibiting extension or raising will be referred to as the up stop means.

In an ideal structure both stop means are operative when the jack is in neutral position, being neither extending or contracting, while only the down stop means is operative as the jack is being extended and only the up stop means is effective as the jack is being contracted.

The invention is an improvement over U.S. Pat. Nos. 2,805,839 and No. 2,838,027 to Branick which are generally directed toward the same objectives.

The primary object of the present invention is to provide a fluid operated jack for vehicles or the like with mechanical stop means operated by the fluid control means for limiting extension or retraction of the jack where leakages occur or where great pressures are suddenly applied to or removed from the jack.

Another object of the invention is to provide two independent stop means in a jack for restricting expansion and contraction movement wherein both stop means are normally spring held in locking engagement but which may be independently removed from locking engagement to permit extension or retraction of the jack by fluid transfer.

Still another and more specific object of the invention is to provide a fluid operated extensible and contractable jack with stop means for limiting movement in either direction and wherein a single control operates the fluid means and the stop means whereby one stop means is operative when the jack is extended and the other stop means is operative when the jack is contracted.

With these and other objects in view the invention broadly comprises an upright fluid extensible jack carrying a lifting device for engagement under a vehicle frame, a valve device for selectively admitting or draining fluid under pressure from the jack, a fixed support base for the jack having an upright post with a series of oppositely directed rachet teeth at either side thereof, a pair of selectively operable latch members respectively engageable with said ratchet teeth, and a single manual control for simultaneously operating the valve device and latch members.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a side elevation of the jack taken on line 1—1 of FIG. 2 showing the jack in lowered or contracted condition with the upper portion thereof partially broken away to enable better understanding of the construction.

FIG. 2 is a front elevation of the jack in the same condition as shown in FIG. 1 with the lift arms broken away to conserve space.

FIG. 3 is an enlarged fragmentary vertical section through the central portion of the jack taken on line 3—3 of FIG. 1 and looking in the direction of the arrows and showing both stops in locking position.

FIG. 4 is a horizontal section through the jack taken on line 4—4 of FIG. 2 and looking downwardly and showing both stops in locking position.

FIG. 5 is similar to FIG. 4 but shows the up stop withdrawn from locking position.

FIG. 6 is similar to FIG. 4 but shows the down stop withdrawn from locking position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, reference numerals will be used to denote like parts or structural features in the different views. The jack is denoted generally by the number **10** and includes a base platform **11** supported on front and rear wheels denoted respectively at **12** and **14**. An elongated tube **15** which is square in cross section is mounted on the base platform in fixed upright position.

The sidewalls of tube **15**, referred to as left and right sidewalls when viewed in FIGS. **3** to **6**, are respectively designated by numerals **16** and **17**. The left sidewall **16** has a row of tabs **18** punched inwardly therefrom to project at an upwardly extending angle within the tube as shown in FIG. **3**. These tabs have their curved upper edges punched out with each leaving an arched downwardly facing stop edge **19** in wall **16**. The right sidewall **17** has a row of tabs **20** punched inwardly therefrom to project at a downwardly extending angle within the tube. These tabs project in just the reverse direction from tabs **18** with the lower edges thereof punched from wall **17** each leaving an arched upwardly facing stop edge **21**.

At its upper end the tube **15** is capped by a bearing member **24** having a sealing ring **25** mounted peripherally thereon and a piston cup **26** mounted on the top thereof. The structure hereinabove described constitutes the base or fixed portion of the jack.

The extensible portion of jack **10** is designated generally by the numeral **30**. This includes a cylinder member **31**, closed at its upper end by plate **32** and slidably encircling the bearing and piston members **24** and **26** and tube **15** to form an extensible jack assembly therewith. A U-shaped bracket **34** of channel material has its legs **35** welded to the sides of the cylinder **31** and extends downwardly therefrom on either side of the post **15**. The cross portion **36** of bracket **34** has an opening (not shown) through which post **15** extends.

A pair of plates **38** rigidly secured one to each bracket leg **35** extend rearwardly from the bracket in slightly diverging relation over base platform **11**. Near their extended ends these plates jointly support an upwardly opening cross channel **39** within which aligned lift arms **40** have their inner ends pivoted on bolts **41** for movement between an extended operating position as in FIG. **2** and an upwardly folded nonoperating position. Saddle members **42** for engaging under an automobile frame or bumper bracket in lifting relation thereto, shown partially in FIG. **2**, are mounted on each of the lift arms **40**.

A valve **44** mounted on cylinder **31** is adapted for connection with a standard compressed airhose. Valve **44** connects the hose with a line **45** which has an open connection with chamber **46** at the upper end of cylinder **31** through coupling **47**. A valve actuator **48** is pivoted at **49** on the valve. When the actuator is in neutral position as shown in FIG. **2**, the valve **44** is closed so that air can neither enter or leave the chamber **46**. When the right side of the actuator **48** is tilted upwardly, as viewed in FIG. **2**, air will be admitted into chamber **46** to raise cylinder **31** and extend the jack. Conversely, when the left side of the actuator is tilted upwardly, air is allowed to drain from chamber **46** through the valve to atmosphere, thus lowering cylinder **31** and contracting the jack.

Tilting of actuator **48** to operate valve **44** is accomplished by a control rod **50**. This rod is journaled for oscillating movement in vertically spaced bearings **51** mounted on the cylinder **31** and has its upper end bent outwardly to form an upper handle **52**. The lower portion of the rod **50** is offset inwardly as at **54** and then bent outwardly to form a bottom handle **55**.

The stop mechanism is designated generally by the numeral 57 and is mounted on the bracket 34. A pair of latch members 58 and 59 are mounted one in each of the bracket legs 35 in transversely opposing relation for sliding movement toward and away from each other on a common axis. Each latch member may have its inner end portion supported by the adjacent plate 38 through which it extends.

Each latch member carries a cross pin 61 and a spiral spring 62 encircling the member and held under compression between the pin. A leg 35 urges the latch member inwardly against the tube 15. Latch member 58 has its inner end beveled as at 64 on its underside with the end positioned to latch under the edges 19. Latch member 59 has its inner end beveled as at 65 on its upper side with the end positioned for latching engagement over the edges 21.

A latch release strap 70 having a generally U-shape is mounted on the bracket 34 at the level of the latches. The strap has a pair of slots 71 (FIG. 2) each of which receives a bolt 72 allowing the strap lateral sliding movement. The end portions of the strap extend rearwardly along the sides of bracket 34 and are slotted as at 74 (FIG. 1) to receive the outer ends of the latches 58 and 59. Cross pins 75 are provided in the latches outside of the strap. A bearing ring 76 is mounted medially on the strap and the offset portion 54 of rod 50 extends therethrough.

In operation the jack or lift is wheeled into the proper lifting position relative to the front or rear end of a vehicle by means of handles 78 mounted near the top of the cylinder. The jack is positioned so that the saddle members 42 will engage under transversely spaced portions of the vehicle frame when the jack is extended.

An air pressure hose is then attached to valve 44. Handle 52 (or handle 55) is then turned to the right as viewed in FIG. 2 tilting the right side of actuator 48 upwardly and causing valve 44 to admit air through line 45 to chamber 46. This causes the entire extensible portion 30 of the jack to raise including the plates 38 and lift arms 40 raising the vehicle to the desired position.

As the handle 52 is turned to the right rod 50 will turn in bearings 51 causing the rearwardly offset portion 54 of the rod to shift to the left moving strap 70 therewith to the position shown in FIG. 5. Accordingly, latch member 58 is removed from engagement with post 15. As the jack extends the bracket 34 carries latch member 59 upwardly along the wall 17 with the beveled surface 65 thereof sliding along the tabs 20. In the event that any leakage should occur in the air pressure system, latch 59 will provide a stop against the adjacent stop edge 21 preventing collapsing of the jack.

When the jack has been extended to the desired position handle 52 is returned to its centered position moving the stop mechanism to its neutral position shown in FIG. 4 bringing latch 58 again into engagement with the stop edges 19 on wall 16 and the extensible portion 30 of the jack is locked against movement in either direction.

To contract the jack the handle 52 is again turned to the right so as to extend the jack slightly so that both latches 58 and 59 are disengaged from edges 19 and 21. The handle is then turned to the left as viewed in FIG. 2 tilting the left side of actuator 48 upwardly. This adjusts valve 44 to open chamber 46 to atmosphere through line 45. With this movement of rod 50 the stop mechanism 57 is shifted to the position shown in FIG. 6 withdrawing latch 59 from engagement with the wall 17 but leaving latch 58 in ratcheting engagement with tabs 18 in wall 16. Accordingly, if weight is suddenly removed from lifting arms 40, the latch 58 will engage against the stop edge 19 immediately thereabove preventing rapid exploding or extension of the jack.

The invention thus provides a construction wherein a single control operates the jack and the stop mechanism 57 so that positive safety locking action is automatically provided during either extension or contraction.

Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by United States Letters Patent is:

1. In a vehicle jack having a base, a fluid actuated lift member mounted on the base for raising and lowering movement, a fluid cylinder associated with the lift member, valve means for admitting fluid to and discharging it from the cylinder, an upright member on the base having one row of upwardly directed stop teeth and a second row of downwardly directed stop teeth, first and second latch members mounted on the lift member and in yieldable engagement respectively with said first and second rows of teeth to lock the member against raising and lowering movement, a single control means movable to one position for simultaneously admitting fluid to the cylinder to raise the lift member and to make said second latch member inoperative and to a second position for simultaneously discharging fluid from the cylinder to lower the lift member and to make said first latch member inoperative.

2. The subject matter of claim 1 wherein said latch members are disposed in opposing horizontal alignment on the lift member, said valve means being mounted on the lift member in spaced relation above the latch members, and said control means comprising an elongated rod journaled in vertical position on the lift member for oscillating movement with the upper portion of the rod having operative connection with the valve means and the lower portion of the rod having operative connection with the latch members.

3. The subject matter of claim 2 wherein said rod has radially extending handles for oscillating the rod at both its upper and its lower ends.

4. In a fluid operated lift jack for vehicles or the like,

a. a support base,

b. an elongated tube mounted integrally in upright position on the base and having a piston head on its upper end,

c. a lift cylinder having a closed upper end mounted on the piston for vertical sliding movement axially of the tube and having a vehicle lifting bracket thereon,

d. means for admitting air under pressure to and discharging it from the lift cylinder above the piston for selectively raising or lowering the cylinder,

e. means forming rows of ratchet teeth on opposing sides of the tube,

f. a pair of opposing latch members supported by the cylinder in position to be engageable one with each row of ratchet teeth,

g. a single control for the air means and the latch members adapted to move one latch member to a nonoperative position when air is admitted to the cylinder and to move the other latch member to a nonoperative position when air is discharged from the cylinder.

5. The subject matter of claim 4 wherein

h. each of said latch members is provided with a spring means urging it inwardly into engagement with the ratchet teeth,

i. a bracket member mounted on the cylinder for lateral shifting movement and having connection with each of said latch members,

j. and said control comprising an upright rod journaled on the lift cylinder and connected to the bracket member at a point offset from its turning axis whereby as the rod is rotated in one direction it will shift the bracket in one direction to move one latch member outwardly against its spring means and when rotated in the opposite direction will move the other latch member outwardly against its spring means.

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