Feb. 14, 1939. B. S. LANKIN 2,147,535

HYDRAULIC JACK

Filed April 28, 1937 2 Sheets-Sheet 1

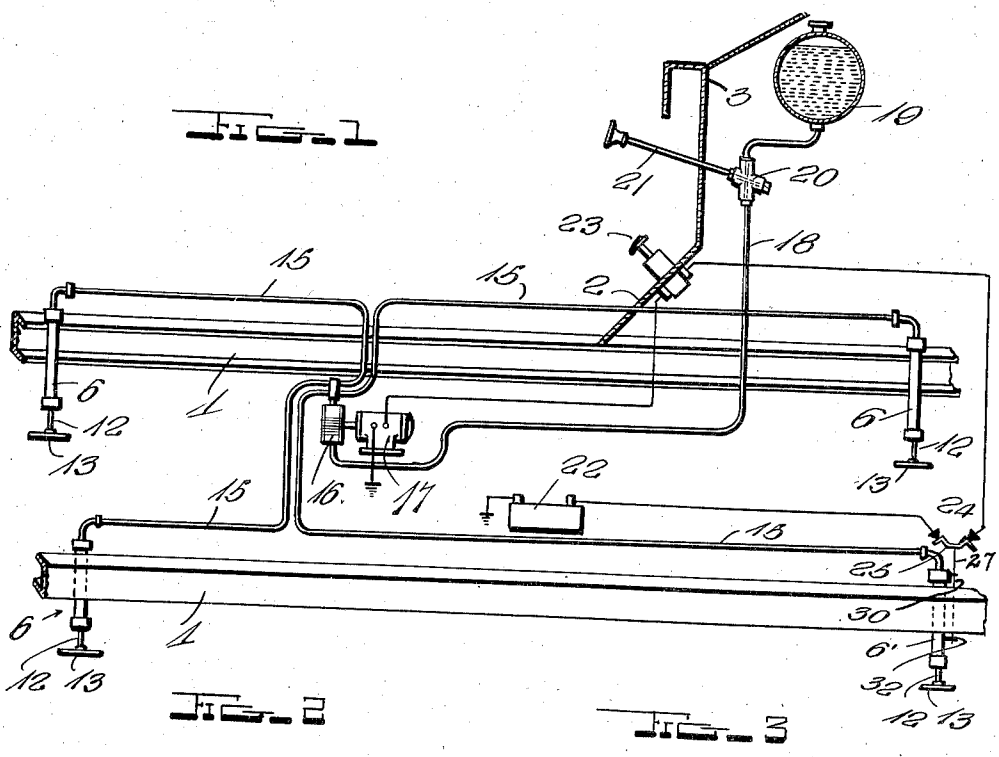


FIG. 1

FIG. 2

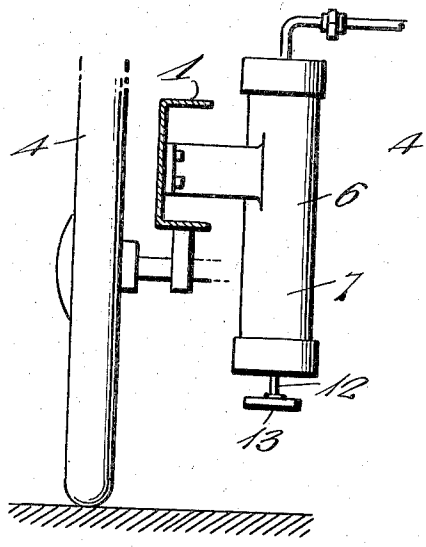
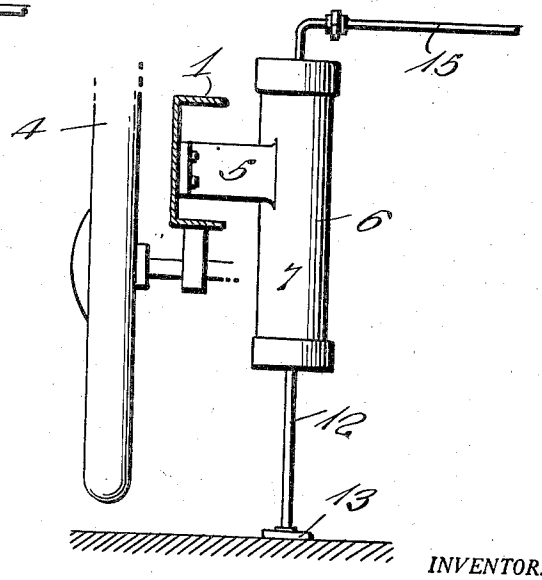


FIG. 3



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Feb. 14, 1939. B. S. LANKIN 2,147,535

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Filed April 28, 1937 2 Sheets-Sheet 2

FIG. 4

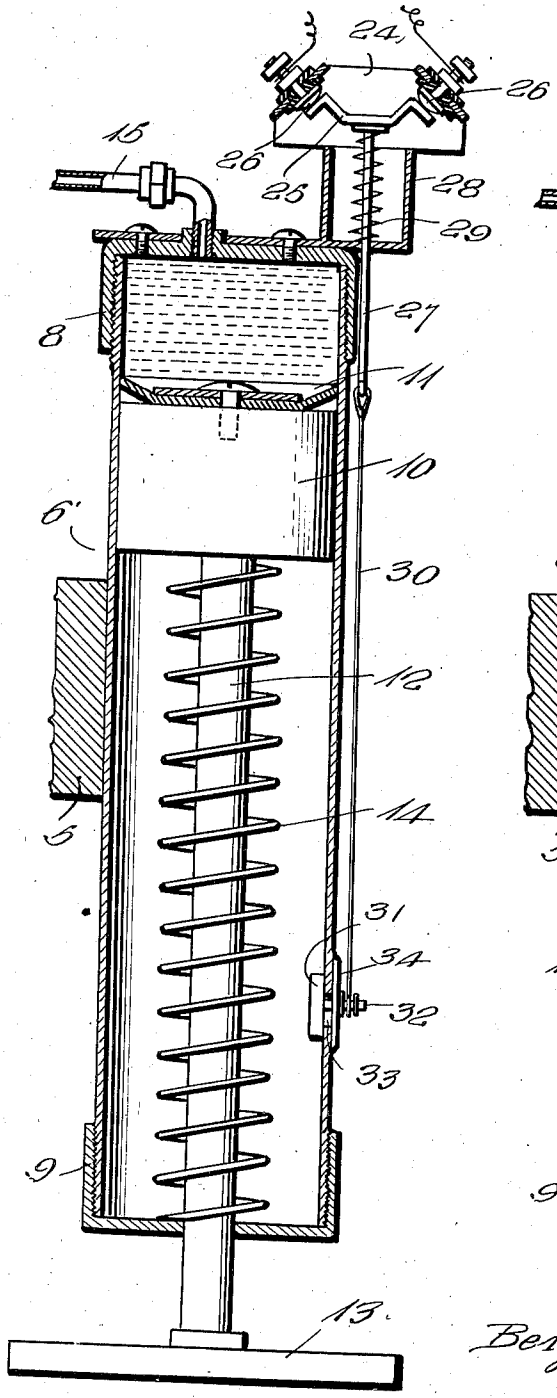
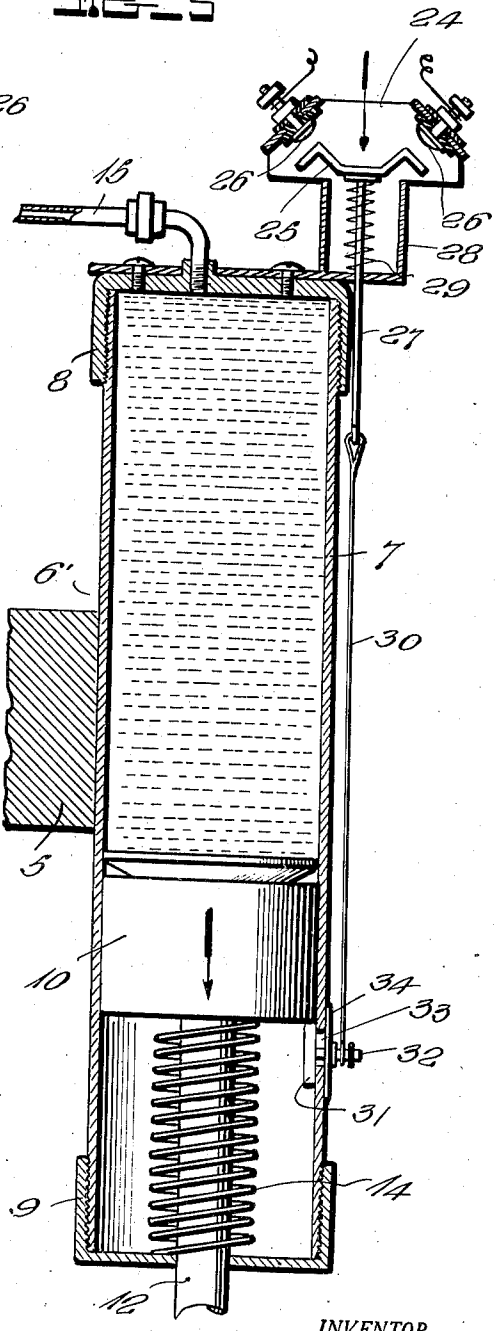


FIG. 5



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HYDRAULIC JACK

Benjamin S. Lankin, Bridgeton, N. J.

Application April 28, 1937, Serial No. 139,597

2 Claims. (Cl. 60—52)

This invention relates to hydraulic jacks for automobiles or like vehicles.

One object of the invention is to provide jacks which may be permanently applied to the vehicle and operated at will so that the vehicle may be lifted off or let down onto the ground in a ready and convenient manner to allow tire repairing or replacing or other operations to be performed.

Another object of the invention is to provide a novel construction and arrangement of a plurality of jacks and operating means therefor on the vehicle whereby the jacks may be simultaneously operated and controlled.

Still another object of the invention is to provide novel hydraulic-electric means for operating the jacks, and a novel construction of jack for use in a vehicle raising and lowering system of this character.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Fig. 1 is a diagrammatic perspective view of a portion of the frame and cowl of an automobile, showing the application of the invention thereto.

Fig. 2 is a cross-section through one of the side frame bars, showing a wheel and a jack mounted on the frame bar adjacent thereto.

Fig. 3 is a view similar to Fig. 2 showing the jack operated to raise the wheel.

Fig. 4 is a vertical section through one of the jacks, showing the parts thereof in normal position.

Fig. 5 is a similar view showing the jack plunger depressed for a raising action and also showing the cut-out switch thereof in cut-out position.

Referring now more particularly to the drawings, 1 designates portions of the side frame bars of an automobile chassis, 2 the foot board, 3 a portion of the cowling and 4 one of the wheels of the vehicle, the showing of a single wheel being only necessary to a disclosure of my invention.

Mounted by brackets 5 or in any other suitable manner upon the frame bars 1 adjacent to the vehicle wheels, or at other suitable points, are hydraulic jacks 6 and 6', the arrangement of said jacks being such that when the jacks are actuated the vehicle will be bodily raised uniformly to lift all the wheels above the ground or other surface on which they rest.

The jacks 6 are similar in construction to each other, while the jack 6' is similar in construction to the jack 6 except as to certain features hereinafter mentioned. Each jack 6 comprises a casing or cylinder 7 closed at top and bottom by heads 8 and 9 and having arranged therein a piston or plunger 10 provided with a cup or packing 11 of leather or other suitable material for an obvious purpose. The said piston or plunger 10 has connected therewith a rod 12 which is vertically movable therewith and extends downwardly and outwardly through an opening in the head 10. The lower end of this rod carries a base piece or foot plate 13 adapted in the operation of the jack to engage the ground or other surface. A coiled spring 14 is disposed about the rod between the head 9 and plunger 10 and operates to normally hold the plunger and rod in elevated or retracted position.

The jacks are arranged in a fluid supply system including a series of distributing tubes or pipes 15 communicating at their outer ends with the upper ends of the casings or cylinders of the jacks 6 and 6' and communicating at their opposite ends with a gear type pump or other suitable pump 16 driven by an electric motor 17. The pipes 15 communicate with the outlet of the pump, the inlet of which communicates with a feed pipe 18 leading from a fluid storage tank or reservoir 19 disposed within the space enclosed by the cowling 3. This pipe 18 is provided with a control valve 20 operable by actuating means 21 disposed so as to be conveniently operated from the driver's seat or some other suitable point within or on the vehicle.

The pipes 15 and 18 and upper portions of the casings 7 of the hydraulic jacks are designed to be filled normally with the motive fluid employed, which may be oil or other suitable fluid, confined within said pipes and casing when the valve 20 is closed. The valve 20 may be opened whenever it is necessary to replenish the pipes and jack casings with fluid to maintain the proper supply of fluid therein and the valve 20 is opened for a flow of fluid from the tank or reservoir 19 to the pipes for the feed of oil whenever the jacks are set into action to raise the vehicle. When the valve 20 is opened and the motor 17 set into action fluids will be pumped by the pump 16 into the jack casings 7 to depress the plungers 10 therein against the resistance of their springs so as to bring the foot plates 13 into contact with the ground and raise the vehicle to the desired level. As soon as the vehicle is raised to the desired level the operation of the motor 17 is stopped and the valve 20 closed, whereby the fluid is retained in the jack casings and pipes against displacement to maintain the vehicle in an elevated position. The vehicle may be maintained in an elevated position as long as the valve 20 is held closed, but upon opening this valve the excess amount of fluid contained in the jack casings will be forced back through the pipes and into the tank 19 by the upward movement of the pistons or plungers 10 under the action of their springs 14 and the weight of the vehicle until the plungers are fully retracted. The valve 20 is then again

closed to maintain the normal supply of fluid in the jack casings and pipes until it is desired to set the system into operation again for a vehicle raising action.

The motor 17 is arranged in an electric circuit including a battery 22, a manually operable switch 23 and an automatic switch 24. The switch 23 may be a foot pressure operated or other suitable type of switch mounted on the foot board 2 or the instrument board of the vehicle so as to be conveniently operated for the purpose of opening or closing the circuit between the battery and the motor. The switch 23 is normally open, while the switch 24 is normally closed, and this switch 24 is adapted to be automatically opened when the plungers in the jack casings are depressed to the proper degree to raise the vehicle to the desired extent, at which time the switch 24 will be operated to break the circuit and stop the operation of the motor 17.

The switch 24 is designed to be operated when the vehicle is elevated to the desired height by the depression of the plungers in the jack cylinders. Conveniently this switch device may be mounted upon one of the jack cylinders so as to be controlled by the movements of the plunger therein. The switch is shown in the present instance as mounted upon the cylinder of the jack 6', said switch comprising a switch member 25 movable into and out of engagement with circuit make and break contacts 26. The switch member 25 is carried by a vertically movable stem 27 supported by a bracket 28 which also supports the contacts 26, and this switch member is adapted to be normally held in closed position by a spring 29. The stem 27 is coupled by a suitable connection 30 with an actuating slide 31 mounted upon the interior of the casing 7 of the jack 6 or adjacent to the lower end thereof, in proper position to be engaged by the plunger 10 therein at the limit of its downward movement to draw the switch member 25 downwardly to open position. This slide 31 is provided with a stem 32 projecting outwardly through and movable in a guide slot 33 in the casing 7 and properly held in position and guided in its movements by a guide plate 34 slidably engaging the outer side of the casing, the stem 32 being coupled to the lower end of the connection 30. Downward movement of the plunger 10 thus causes the opening of the switch 25 to break the circuit to the motor and to stop the pumping action of the pump. When the valve 20, after being closed, is opened to release the fluid for backflow from the casings 7 into the pipes, in order to lower the vehicle again, the upward movement of the plunger 10 releases the slide 31 and spring 29 restores the slide to normal position and again brings the switch member 25 into engagement with the contacts 26 to close the circuit at that point.

In the present instance I have shown the circuit breaking means 25, 26 used in connection with only one jack member. This circuit breaking means comes into action only when the said jack member is operated to its fullest extent, that is, when the plunger of the jack member is moved to lift the adjacent wheel to the maximum extent desired above the surface of the ground. Even in the event, therefore, that the load carried over this jack is less than the load carried over any one or all of the remaining jacks all the jacks will be operated to raise the adjacent wheels sufficiently off the surface of the ground before the circuit breaking means comes into action.

From the foregoing description, taken in connection with the drawings, the construction and mode of operation of my improved hydraulic jack and means for raising and lowering an automobile or other like vehicle will be readily understood and it will be seen that the invention provides a jack of novel construction and means for operating a plurality of such jacks whereby mechanism of this kind permanently mounted on the vehicle, may be operated whenever it is desired to elevate the vehicle and raise its wheels from the ground or other supporting surface, that the vehicle may be held supported for any time period desired, and that it may be lowered to bring its wheels again into contact with the ground or other supporting surface by simple manipulation of a controlling valve. Also it will be seen that the invention provides simple, reliable and efficient means for supplying the fluid under pressure to the jacks and for stopping the action of the fluid supplying means automatically when the vehicle is raised to the proper height. A mechanism of this kind may be applied to any type of automobile or other like vehicle in a ready and convenient manner, without in any manner altering the construction thereof, and at a very low cost, and it provides a means permanently mounted on the vehicle by means of which the vehicle may be raised at any time for the purpose of repairing or replacing tires, lubricating the vehicle or performing various other operations thereon.

While the structure herein shown is preferred, it will, of course, be understood that changes in the form, construction and arrangement of the parts may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim is:—

1. In a hydraulic jack, a casing, a vehicle raising and lowering plunger in the casing, means for admitting a pressure fluid to and allowing it to flow from the casing, and a power controlling device carried by the casing and embodying stationary switch contacts, a contact movable into and out of engagement therewith, a sliding element adapted to be engaged by the plunger at the limit of the plunger movement for shifting the movable contact out of engagement with the stationary contacts, a motion transmitting connection between said sliding element and the movable contact, and a spring for simultaneously retracting the sliding element and moving the movable contact into engagement with the stationary contacts.

2. In a hydraulic jack, a casing, a plunger in the casing fluid impelled in one direction, a spring in the casing for moving the plunger in the opposite direction, means for admitting a pressure fluid to and allowing it to flow from the casing, power means for supplying fluid to the casing, and means for controlling the power to said power means embodying an electric switch, a slide connected with the switch and adapted to be operated by the plunger at the limit of its working movement to shift the switch to a power cut off position, and a spring for simultaneously moving the slide and switch in a direction opposite to that in which they are moved by the action of the plunger.

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