

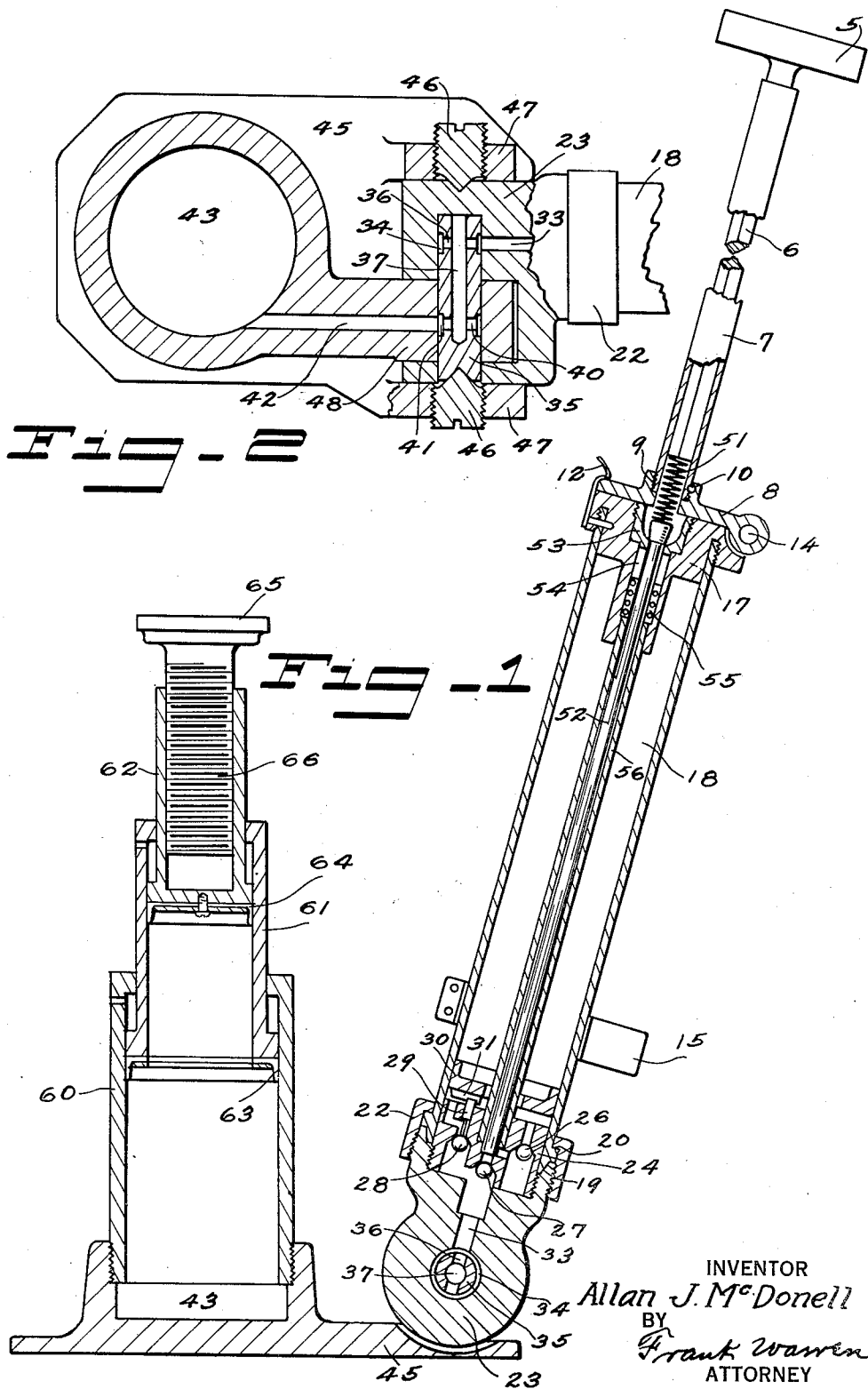
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A. J. McDONELL

HYDRAULIC JACK

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UNITED STATES PATENT OFFICE.

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HYDRAULIC JACK

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REISSUED

My invention relates to improvements in hydraulic jacks and more particularly to that type of jack that is light and compact in form so as to adapt it for use with motor vehicles. The automotive industry requires that an accessory must be more than workable. It must be quick and certain in operation under all conditions and further it must be convenient to use. In order to adapt the hydraulic jack to meet these strict conditions I have several objects in my invention, the first being, to provide a hydraulic jack which stores its fluid, for transferring the lifting effort to the lifting piston, in its operating handle. Storing the operating fluid in this manner keeps the three valves therein well lubricated and assures a sufficient supply of fluid to prime the pump at all times. This arrangement has the further advantage of reducing in size that portion of the jack that must be placed under the part to be lifted. This is of a particular advantage when motor vehicles are built as close to the ground as at present.

Another object of my invention is providing a hydraulic jack with a hinge and folding handle. In present day automobile construction the rear axle is very inaccessible due to the common practice of mounting spare tires and bumpers at the rear of the car. To overcome this difficulty, I have provided a handle of sufficient length as will enable one to properly and easily position the jack without crawling under the car. For the reason that the jack must be carried in the car at all times and is used but rarely, I hinge the handle to the base casting so that it may be folded to lie parallel to the axis of the lifting piston. To further reduce the length of the jack when stored, I provide a hinge joint near the center of the handle.

I accomplish these objects by devices illustrated in the accompanying drawings, wherein—

Figure 1 is a sectional view of my invention in elevation through the center of the lifting piston and operating handle; and Fig. 2 is a sectional view of the same in plan through the pin forming the joint between the pump base and handle.

Referring to the drawings throughout which like reference numerals indicate like parts, the numeral 5 designates the upper

operating handle to which is attached a squared rod 6. This rod is adapted to reciprocate in the outer tube 7, the bore of which is square to engage the rod 6. A tube 7 is secured to the hinge cap 8 by the threads at 9 and the lock pin 10. A latch 12 serves to hold the handle in operating position and when hinged about a pin 14 the clip 15 holds the handle in storing position.

A plug casting 17 supports the hinge pin 14 and forms a closure of the upper end of the oil storage reservoir 18. The lower end of tube 18 is finished with a tapered portion 19 immediately above which is a square shoulder 20. Coacting with shoulder 20 is the gland nut 22 adapted to secure the tube 18 to the hinge block 23 in a manner permitting partial revolution of the tube 18. In the block 23, or as I have illustrated in a separate piece 24 secured thereto, are seats for the intake valve 26, the check valve 27 and the return flow valve 28 together with their respective operating springs. In engagement with valve 28 is the tappet 29. Immediately above the tappet 29 is a ring 30 that is secured to the tube 18 and made integral therewith is a face cam 31.

A passageway 33 communicates with the annular groove 34 in the hinge pin 35. Ports 36 in turn communicate with the central passage 37. Another set of ports 40 communicate with the annular groove 41 which in turn communicates with the passage 42 which discharges into the lifting piston base chamber 43. The hinge block 23 is secured to the base 45 by pivot screws 46 screwed into lugs 47 which are part of the base 45. A passageway 42 is enclosed in lug 48 which is given sufficient breadth to prevent leakage of oil.

Secured to the rod 6 is the coil spring connector 51 which is in turn connected to the pump piston 52. To prevent oil leakage at this point I employ a packing nut 53, packing 54 and pressure spring 55. The pump barrel 56 is snugly fitted in the cap 17 but is permitted to turn therein. At its lower end the barrel 56 is secured to the member 24 by an oil tight joint.

Secured to the base 45 is the guide casing 60. Operating within said guide casing may be any ordinary type of hydraulic piston or a compound piston arrangement as shown as pistons 61 and 62 with their operating washers 63 and 64 respectively. Attached

to the top of the lifting piston may be a swiveling head 65 or a head made a part of an adjusting screw 66 as shown.

The method of operating my invention is substantially as follows: Assuming it be desired to jack up the wheel of an automobile. First the handle 5 is unfolded and secured in an operative position by means of the clip 12. The extended handle is then hinged about the pin 35 until it has reached a position where it will clear the overhanging portion of the car and still be in a convenient operating position. The head 55 is then placed directly under its point of engagement with the vehicle axle or frame.

A pumping effort is applied to the handle 5 which with its coacting parts withdraws the piston 52. A suction is created which opens the valve 26 and fills the void behind the pump piston 52 with the operating fluid. On reaching the limit of its stroke the valve 26 closes under action of its seating spring. On the descending stroke the check valve 27 is lifted from its seat and the operating fluid is forced in turn through the passages 33, 36, 37, 40 and 42 into the chamber 43. This additional fluid in chamber 43 will lift the lifting piston a given amount. This cycle must be repeated until the vehicle has been raised a desired amount. The relative areas of the pump piston and the lifting piston, as in all hydraulic jacks, will determine the rate of lift and the power possible to exert.

When it is desired to lower the vehicle the entire handle is rotated, by application of a twisting effort on the handle 5, until the cam 31 engages the tappet 29 thus forcing the valve 28 from its seat. This gives the fluid an unobstructed channel through the passages 42, 40, 37, 36 and 33 to return to the storage reservoir 18. Circulation on the return is produced by the weight of the vehicle on the head 65. It is believed apparent that, due to the use of the annular grooves 34 and 41 in the pin 35 the transfer

of fluid is unaffected by the annular position of the operating handle about the hinge pin 35.

It will be obvious from the foregoing that my jack consists of two parts, the handle and the lifting piston assembly. The principal part resides in the handle and the means whereby the fluid is stored and, under pressure, is transferred from the handle to the lifting piston assembly.

Manifestly numerous changes in the form of details and plan of construction of my hydraulic jack may be made without departing from the spirit and scope of my invention or sacrificing any of its advantages.

What I claim is:—

1. In a hydraulic jack of the class described, a lifting piston, a base casing, an operating handle hinged thereto, a fluid storage reservoir contained in said handle, means for transferring fluid from said reservoir to the lifting piston, a hinge in the operating handle, a pump in lower portion of the operating handle, a pump handle in said hinged portion of the operating handle and flexible means connecting said pump handle and the pump piston.

2. In a hydraulic jack of the class described, a lifting piston, a base casing, an operating handle hinged thereto, a fluid storage reservoir contained in said handle, means for transferring fluid from said reservoir to said lifting piston, means for transferring fluid from said lifting piston to said reservoir, a pump in said operating handle to supply pressure to said fluid, and a return flow valve adapted to be engaged by a cam attached to the operating handle and operated by a partial revolution of said operating handle about its longitudinal axis.

In witness whereof, I hereunto subscribe my name this 18th day of April, A. D. 1927.

ALLAN J. McDONELL.