Aug. 14, 1928. 1,680,536

T. GENSMER

HYDRAULIC JACK

Filed March 30, 1925 2 Sheets-Sheet 1

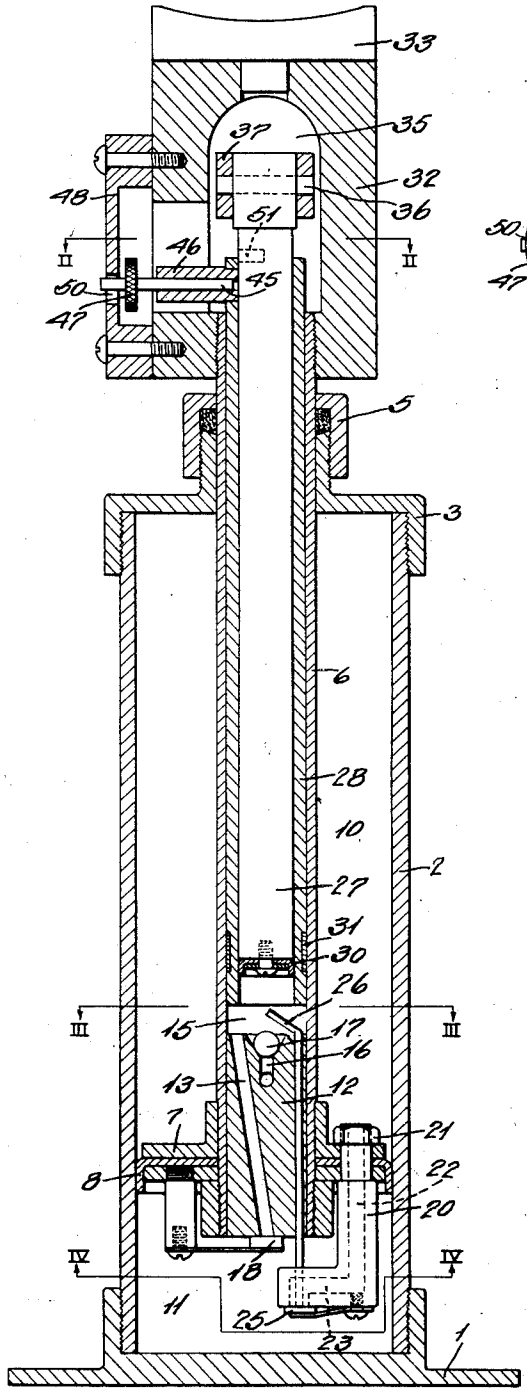


Fig. I

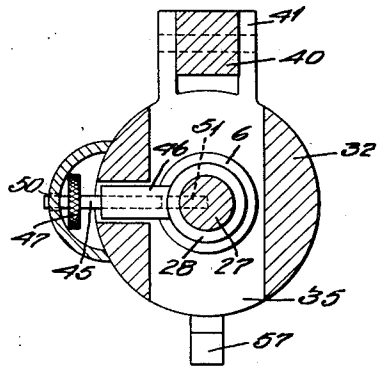


Fig. II

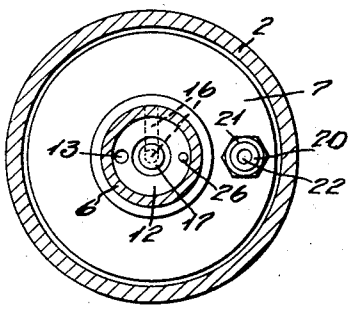


Fig. III

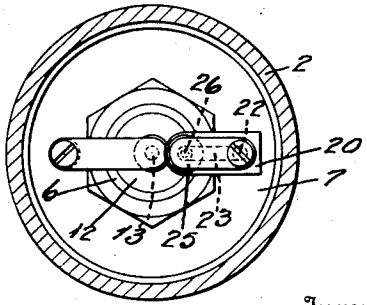


Fig. IV

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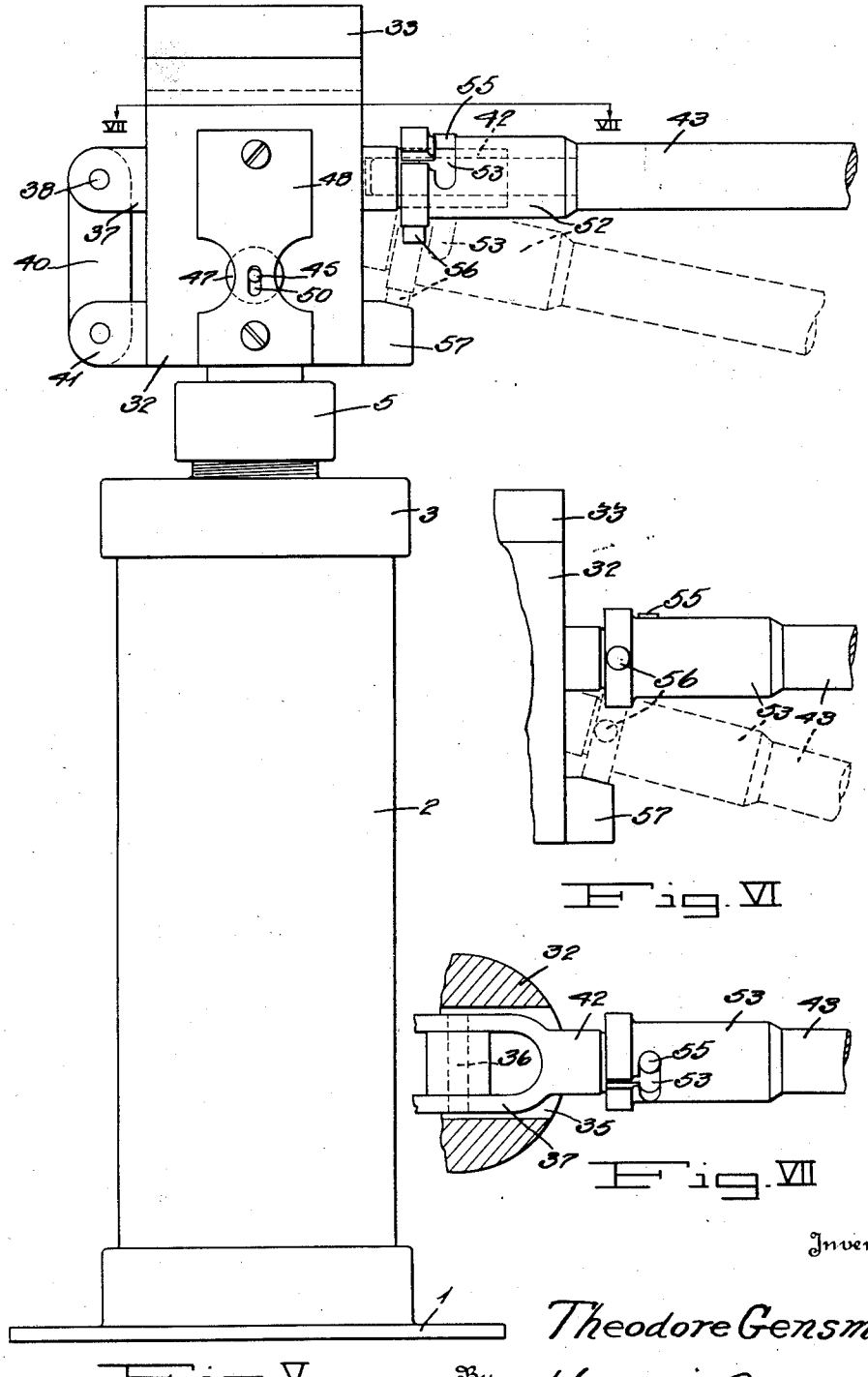


Fig. V

Fig. VI

Fig. VII

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UNITED STATES PATENT OFFICE.

THEODORE GENSMER, OF PORTLAND, OREGON.

HYDRAULIC JACK.

Application filed March 30, 1925. Serial No. 19,298.

The object of my invention is the provision of a jack of the hydraulic type that is of simple, strong and practical construction and of relatively light and portable form especially adapting it for automobile use and wherein the application of power may be predeterminately varied to afford a longer and quicker lifting action, or, selectively, a shorter lifting movement of the head with correspondingly inverse variations in the lifting capacities of the jack in such respective operative conditions.

It is the province of my invention to improve generally the class of apparatus to which it appertains and further objects and advantages residing in my new and improved jack will be readily apparent in the course of the succeeding description.

The invention consists in the novel construction and adaptation of a hydraulic jack and in the combination of parts and devices as will be fully set forth in the following description, illustrated in the accompanying drawings, and finally pointed out in the claims.

Referring to said drawings, Figure I is a view in vertical section of a jack embodying my invention.

Fig. II is a view in cross section on line II—II of Fig. I.

Fig. III is a view in cross section on line III—III of Fig. I.

Fig. IV is a view in cross section on line IV—IV of Fig. I.

Fig. V is a view in side elevation of my invention.

Fig. VI is a fragmentary view in side elevation of a detail of my invention.

Fig. VII is a fragmentary view in cross section on line VII—VII of Fig. V.

Referring to said views, the reference numeral 1 indicates an extended base for my improved jack supporting a tubular cylinder 2 with which it forms a pressure-tight connection. The upper end of said cylinder is closed by a screw-cap 3 provided with a packing-gland 5 for the accommodation of a tubular rod 6. Within said cylinder said rod is provided with a plunger 7 of the usual type having a leather cup 8 to make an operative oil-tight fit with the cylinder-walls. Said plunger divides the interior of said cylinder into upper and lower chambers 10 and 11, respectively.

The lower end of said rod 6 is provided with a plug 12 having a passage 13 providing communication between the lower chamber 11 and a tubular compartment 15 within the rod above said plug. An angular passage 16 in said plug and extending through the wall of the rod 6 affords communication between said compartment 15 and the chamber 10 which is controlled by a ball-valve 17, as seen in Fig. I, to allow the passage of oil or other hydraulic medium in one direction only, that is to say, from the chamber 10 into compartment 15. The bottom of said passage 13 is also closed by a valve 18 against the flow of liquid in other directions except from the compartment 15 into the lower chamber 11.

A fitting 20 of angular configuration is secured to the plunger being extended therethrough and fastened by a nut 21. Said fitting is formed with a passage 22 connecting the chambers 10 and 11 having an offset at 23 whereat at the opening into the lower chamber a valve 25 is positioned to normally prevent the flow of liquid therethrough from chamber 11 to chamber 10. Said valve 25 is operatively engaged by a rod 26 extending through the plug 12 and thereabove to be depressed by engagement with the piston 27 when it is desired to open the valve 25 to allow the escape of oil from the chamber 11 to the chamber 10 and the lowering of the jack-head, as will be more fully described.

The tubular compartment 15 within the rod 6 contains the concentric pistons 27 and 28 of which the inner piston 27 includes a cup-leather 30 engageable with the interior wall of the piston 28 and which in turn is provided with a packing-band 31 engaging the interior wall of the rod 6.

A head 32 is rigidly mounted on the rod 6 and includes the rest 33 at its upper end where objects to be lifted are supported. Said head is formed with a chambered opening 35 in which the upper ends of pistons 27 and 28 extend. The piston 27 is connected at its upper end, as by the pin 36, with a hand-lever 37 extending through said opening 35 and pivotally connected at 38 with a link 40 which in turn is pivoted to a lug 41 while at its opposite end said lever is formed at 42 with a cylindrical portion which is socketed in an extension handle 43, as shown in broken lines in Fig. V.

Said piston 27 to which the handle-lever 37 is directly connected may be operated in

reciprocating movements within the tubular piston 28 and serves to draw in oil on its upward stroke through the passage 16 from the chamber 10 into the compartment 15 and upon the downward stroke of the piston it forces the oil from said compartment through the passage 13 into the chamber 11 to elevate the main plunger 7 with the rod 6 and the head 32. The valve 25 serves to prevent the backward flow of said oil.

To provide a faster movement of the plunger but with a corresponding reduction in its lifting capacity I couple the tubular piston 28 to the piston 27 so that they are actuated together as a single member having a larger area of piston displacement. This union is accomplished by a pin 45 slidable in a bushing 46 rigidly secured in the upper portion of the piston 28. The outer end of said pin is provided with an actuating disk 47 and is guarded from injury by a housing 48 in which the outer extremity of said pin is supported when at its outermost limits in a slot 50. Piston 27 is formed with a recess 51 to receive the pin 45 when the piston 27 is depressed, whereupon the pin may be pushed into said recess 51 to enable the two pistons to be actuated as a unit in the same manner as previously explained.

The socket-portion 52 of the extension handle is formed with a slot 53 in which a stud 55 on the cylindrical portion 42 of the hand-lever is received securing the extension handle in place and admitting of limited rotary movements. A button 56 is formed on said extension handle which is arranged to engage a lug 57 projecting from the head when the extension handle is positioned at one extremity of its rotary movement as limited by said stud in the slot 53. In this position of the handle, as shown in Fig. V, the pumping action of the lever and the stroke of the pistons are limited to the extent that the downward movement of the pistons are limited to a point just above the upper end of the rod 26. When, however, the extension handle is given a partial rotation to remove the button 56 from its alignment with lug 57, as shown in Fig. VI, the full stroke downward of the handle will cause the pistons to descend sufficiently to engage and depress the rod 26 and open the valve 25 to admit of the passage of oil under the pressure of the weight upon the head from the chamber 11 through the passage 22 into the chamber 10 and thus allow the descent of the plunger in the cylinder.

While I have described my improved jack with considerable detail I do not intend to confine myself as respects the present invention to the precise construction shown as modifications and alterations in details may obviously be made without departure from the spirit of the invention and all such variations are deemed as included herein as are within the reasonable scope of the appended claims.

Having described my invention, what I claim, is:—

1. A jack of the class described, consisting in the combination of a cylinder, a plunger within the cylinder having a tubular rod extending axially outward of the cylinder and forming a pump cylinder, said rod having a plug in its lower end formed with passages affording communication between the chamber in the cylinder above said plunger and the interior of said rod and from the interior of said rod to the cylinder chamber below said plunger, respectively, valves for each of said passages admitting of the passage of liquid from above the plunger to below the plunger only, an angularly shaped fitting secured to said plunger formed with a passage affording a by-pass from below the plunger to the space above the plunger, a valve normally closing the passage of liquid upwardly in said by-pass, a trip-rod engaged with said by-pass valve and extending through said plug to the interior of said tubular rod, two concentric pistons operatively mounted in said tubular rod extending outwardly of said cylinder, a head on said tubular rod above said cylinder having a chambered opening therein, a lever extending through said head having a link connection with said head and operatively connected to the inner said pistons, said lever being formed with a cylindrical end, an extension-handle rotatively connected to said cylindrical lever-end provided with a stop adapted to limit the downward stroke of said lever-handle in one of its rotary positions wherein said pistons will not engage said trip-rod, and means for connecting said pistons together to act in unison consisting in a pin slidable in said outer piston and receivable in a recess in said inner piston.

2. A jack of the class described, consisting in the combination of a cylinder, a plunger within the cylinder having a tubular rod extending axially outward of the cylinder and forming a pump cylinder, said rod having a plug in its lower end formed with passages affording communication between the chamber in the cylinder above said plunger and the interior of said rod and from the interior of said rod to the cylinder chamber below said plunger, respectively, valves for each of said passages admitting of the passage of liquid from above the plunger to below the plunger only, an angularly shaped fitting secured to said plunger formed with a passage affording a by-pass from below the plunger to the space above the plunger, a valve normally closing the passage upwardly in said by-pass, a trip-rod engaged with said by-pass valve and extend-

ing through said plug to the interior of said tubular rod, two concentric pistons operatively mounted in said tubular rod extending outwardly of said cylinder, a head on said tubular rod above said cylinder having a chambered opening therein, a lever extending through said head having a link connection with said head and operatively connected to the inner of said pistons, said lever being formed with a cylindrical end, an extension-handle rotatively connected to said cylindrical lever-end provided with a stop adapted to limit the downward stroke of said lever-handle in one of its rotary positions wherein said pistons will not engage said trip-rod, and means for connecting said pistons together to act in unison.

3. A jack of the class described, consisting in combination, a cylinder, a tubular rod extending into said cylinder having a chambered head on its outer end and forming a pump cylinder, a plunger secured to the lower end of said rod dividing the interior of said cylinder into upper and lower chambers, the lower end of said rod being formed with passages affording communication between said upper chamber and the interior of said rod and the interior of said rod to the lower chamber, respectively, valves for each of said passages admitting of the passage of liquid from said upper chamber to the lower chamber only, a fitting secured to said plunger formed with a passage affording a by-pass from the lower chamber to said upper chamber, a valve closing the passage of liquid from the lower to the upper chamber, two concentric pistons operatively mounted in said tubular rod extending outwardly into the chambered portion of said rod-head, a trip-rod extending through the lower portion of said tubular rod and engaged with said by-pass valve adapted to be actuated by the inner of said pistons to open said valve at the extremity of the downward stroke of said piston, a pumping lever operatively connected with said inner piston, means on said lever to limit the downward stroke of said inner piston predeterminately to avoid actuating said trip-rod, and means for connecting said pistons together.

4. In a jack of the class described, a cylinder, a slidable tubular rod in said cylinder to form a pump cylinder, a plunger on said rod operable in said cylinder, said plunger having an angular fitting forming a by-pass for the passage of liquid from below to above the plunger, a valve restraining the upward flow of said liquid, a trip-rod engaging said valve, a pair of concentric pistons slidable in said tubular rod, and means to lengthen the stroke of one of said pistons to engage and cause said trip-rod to open said valve.

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