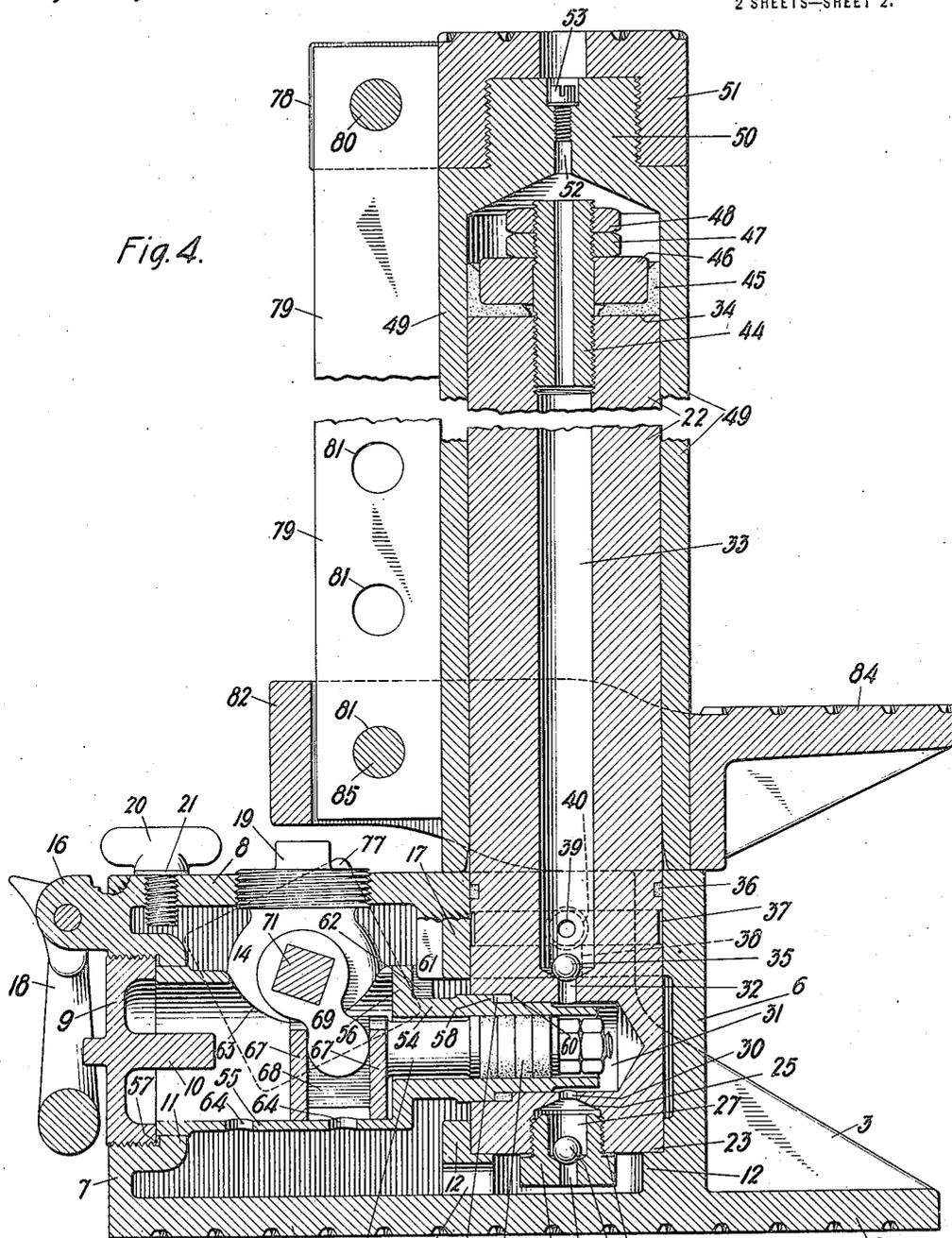


C. WIGTEL.
 HYDRAULIC JACK.
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 2 SHEETS—SHEET 2.



Witnesses:
John Waldheim
Marion Buell

Inventor:
Carl Wigtel.
 by *Daniel A. Carpenter,*
 Atty

UNITED STATES PATENT OFFICE.

CARL WIGTEL, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE WATSON-STILLMAN COMPANY, OF ALDENE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HYDRAULIC JACK.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL WIGTEL, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings and city and State of New York, have invented a certain new and useful Improvement in Hydraulic Jacks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in the construction of hydraulic jacks, its object, generally stated, being the production of an efficient jack so constructed as to render all of its parts simple and strong and to facilitate the work required to assemble them and to remove any of them when the jack needs to be repaired or cleaned. The invention consists of a hydraulic jack having the several features of construction which are hereinafter described and specified in the claims.

On the accompanying two sheets of drawings on which like reference-numerals designate like parts of different views;

Figure 1 is a plan of a jack embodying the invention;

Fig. 2, a sectional elevation of a portion thereof, the sectional plane being indicated by the line *x, x*, Fig. 1;

Fig. 3, a sectional elevation of another portion, the sectional plane being indicated by the line *y, y*, Fig. 1; and

Fig. 4, an elevation and vertical section of the jack, the sectional plane being indicated by the line *z, z*, Fig. 1.

Not only does this jack differ in construction from all others which are commonly known, but its novel features affect its operation by preventing much trouble such as imperfect action of the somewhat delicate valves, pistons, packings and springs of other jacks occasionally causes, so that it is evident that its principle also differs in important particulars from that of any of the known jacks.

The base of this jack is oblong, the part 1 being substantially a parallelogram in shape, and the part 2 being an extension of the part 1 and being reinforced at its sides by the braces 3. On the part 1 is a fluid-reservoir having the sides 4 and 5, the ends 6 and 7, and the top 8, the part 1 of the base being the bottom of the reservoir, and the

screw-plug 9 being a removable portion of the end 7. This plug includes the central inwardly extending projection 10 formed on its head. The end 7 also includes the inwardly extending annular projection 11 which is internally threaded and in which this screw-plug fits. The hollow block or ring 12 (Figs. 3 and 4) is fast on the base and wall 6 and the space within the ring is connected with the space which nearly surrounds it by an opening 13 close to the base, so that the interior of the ring next to the base forms part of the reservoir. The braces 3 are fast both on the part 2 of the base and on the wall 6. The entire base, the reservoir-walls 4, 5 and 6, the braces 3, and the ring 12 are preferably parts of a steel casting, which includes also all of the end 7 of the reservoir except the screw-plug 9. The blocks 14 and 15 (Figs. 2 and 4) formed on the inner faces of the walls 4 and 5, respectively, and on the top wall 8, of the reservoir, and the lug 16 on the wall 7, are also parts of this casting, and still another part of it is the approximately round block or ring 17, formed on the walls 8 and 6 over the ring 12. The handle 18 is attached to the lug 16. The screw-plug 19 normally closes an opening which extends through the wall 8 and through which the operating-fluid is poured into the reservoir, and the screw 20, on which is the packing-washer 21, confined between the head of the screw and the wall 8 through which the screw extends, should usually press the washer firmly against the wall so as to prevent leakage of the fluid, but when the jack is in use this screw should be loosened a little to enable air to enter the reservoir.

The ram fits on a pillar or upright rampost, instead of in a cylinder as rams usually do, and comprises a hollow cylindrical portion into which the post extends and on which is the head of the ram. The rampost 22 is a nearly solid cylinder, preferably of steel. The end 23 of this post rests on a seat cut in the ring 12 and is snugly surrounded by a portion of the ring. The post extends upward from this ring across the fluid-chamber of the reservoir and through the block or ring 17 and wall 8 and thence into the hollow part of the ram. The hollow screw-plug 24 fits in the hole 25, drilled in the post from the end 23, and on this plug is a packing-washer 26, clamped between the

end of the post and head of the plug. The chamber 27 in this plug is connected with the interior of the ring 12 by the vertical port 28, and in that chamber is the ball-valve 29 which normally closes the port, the valve-seat being at the upper end of the port and the ball being movable upward from its seat, so that fluid can be drawn through this port from the reservoir, by the pump hereinafter described. The small hole 30 at the inner end of the hole 25 intersects the recess 31, drilled in the ram-post and extending nearly through it from one side. The hole or port 32 connects the recess 31 with the hole 33, drilled in the ram-post from its end 34, and this port is normally closed by the ball-valve 35 which is movable upward from its seat formed at the inner or lower end of the hole 33. The ram-post is tight in the wall 8 and block or ring 17, and in the post is a groove containing the ring 36 of packing. The other groove 37, just below this packing, extends around the post and is connected by the vertical grooves 38, formed in the ring 17, with the fluid-chamber of the reservoir. The hole 39 extends from the hole 33 to the recess 40, drilled in the post and intersecting the groove 37, and into this recess and the similar recess 41, on the opposite side of the post, the screw-plugs 42 and 43 extend, respectively, from the ring 17, the plug 42 forming a valve which normally closes the passage 39. The wall of the hole 33 is threaded next to the end 34 of the ram-post, and the tubular screw-plug 44, open at both ends, fits in this hole. The packing 45 surrounds this plug and is clamped between the end 34 of the post and the block 46, which surrounds the plug and is pressed against the packing by the nut 47, kept tight on the plug by the lock-nut 48.

The ram comprises the cylinder 49 and the head 50 covered by the cap 51, which is hollow and internally threaded and surrounds and engages the threaded central portion of the head. The hole 52, in which is the screw 53 and which extends through the head, is a vent which may be closed or the effect of which may be varied by adjusting the screw. The cylinder 49 fits on the ram-post, as shown, the packing 45 being compressed between the block 41 and the surrounding wall of the cylinder.

The pump-cylinder extends from the screw-plug 9 into the ram-post 22. This cylinder comprises the piston-cylinder proper 54, the larger cylinder 55, and the annular wall 56 connecting the cylinders 54 and 55 together, each of which is an extension of the other and open at both ends. The piston-cylinder fits in, and extends nearly to the inner end of, the recess 31 in the ram-post, the external diameter of the cylinder next to its inner end being enough less than the diameter of the recess to enable fluid to

pass through the recess from the hole 30 to the port 32. The cylinder 55 fits in the inwardly extending portion 11 of the wall 7 and in the ring of packing 57, and the screw-plug 9 acting on this cylinder holds the shoulder 58 of the cylinder 54 firmly in contact with the packing 59, compressed between this shoulder and the shoulder 60 in the post 22. The lug 61 on the ring 17 extends between the lug 62 and another similar lug on the wall 56, so that the pump-cylinder is prevented from turning. In the upper side of the cylinder 55 is the opening 63 and in its lower side are the holes 64. The piston comprises the head 65 and stem 66, and on the stem is the block 67 which fits loosely in the cylinder 55, the block and stem being formed in one piece and the block containing the recess 68. The arm 69 extends through the opening 63 and into the recess 68, from the short rock-shaft 70, on the squared portion 71 of which the arm is mounted. This rock-shaft extends through the wall 4, gland 72, packing 73, and block 14, and across and through the opening 63 in the cylinder 55, and into the hole 74 in the block 15, and the screw 75, the inner end of which is in the groove 76 in the shaft, prevents any endwise movement of the shaft. The rock-shaft and the lever-socket on its outer end are formed in one piece.

To the lugs 78 formed on the cap 51 of the ram the bar 79, which extends between these lugs, is attached by means of the pin 80, passing through the lugs and bar. This bar reaches nearly the whole length of the ram and is close to the head and cylinder 49 of the ram, and in it are the holes 81. The bar 79 fits loosely in the slotted part 82 of the claw which comprises also the hollow part or eye 83 and the toe 84 and loosely surrounds the cylinder 49, which passes through the eye 83, the claw being movable lengthwise of the ram, on the cylinder and bar 79. The claw may thus be adjusted at different distances from the base, or at different elevations. The pin 85 passing through the part 82 of the claw and through one of the holes 81 in the bar 79 supports the claw in its adjusted position on the ram.

The port 28, chamber 27, holes 25 and 30, recess 31, port 32, hole 33 and interior of the tubular plug 44 form a fluid-passage extending through the ram-post from end to end thereof and communicating at one end with the fluid-chamber of the reservoir, and at the other end with the interior of the ram-cylinder 49; and between the valves 29 and 35 with the interior of the piston-cylinder at its inner end. The hole 39, recess 40 and grooves 37 and 38 form a release-passage extending from this fluid-passage above the ram-valve 35 to the fluid-chamber of the reservoir. The jack is operated by means of a hand-lever inserted in the socket 77. By the

action of this lever on the rock-shaft 70 and arm 69 these are rocked so that the arm imparts a reciprocating movement to the piston. The projection 10 on the screw-plug 9 and the wall 56 of the pump-cylinder form stops which limit the movements of the piston when the block 67 makes contact with these stops. Fluid is drawn by the piston past the suction-valve 29 and into the recess 31 and is forced thence past the ram-valve 35 and into the ram so that the fluid acts on the head of the ram and forces it upward or from the end 34 of the ram-post. When the ram is to be lowered the valve 42 is turned so that the fluid in the ram is allowed to flow back to the reservoir through the release-passage.

The pump-cylinder or piston or both may be inserted in and removed from the reservoir by passing it or them through the opening which is normally closed by the screw-plug 9, the ram may be pushed on and lifted from the ram-post, the lower end of the ram-post may be pushed into and drawn out of the reservoir to and from the seat of the post on the ring 12, and the shaft 70 may be inserted in its bearings and in the piston-operating arm 69, and be withdrawn from them, by moving it endwise. It will be seen, therefore, that not only can the parts of the jack be readily assembled, but one or more of them can readily be removed to afford access to the packings, valves and other internal portions of the jack, and then be replaced, and that for any part unfit for use a new part can readily be substituted.

It will be understood that the invention can be embodied in jacks differing more or less in details of construction from the particular jack shown by the drawings of this application and specifically described above.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A hydraulic jack comprising a reservoir at the base, an upright ram-post projecting from the base, the lower part of the post being within the reservoir and the post being removable from the base and reservoir and containing a fluid-passage which extends lengthwise thereof, a ram into which the post extends and which is vertically movable thereon, a suction-valve in the post at its lower end, a horizontal pump, the cylinder of which extends into the ram-post above the suction-valve, the interior of the cylinder communicating with the fluid-passage, and a ram-valve in the post above the pump-cylinder.

2. A hydraulic jack comprising a reservoir, a hollow vertically movable ram, a horizontal pump, a suction-valve, and a ram-valve, and containing a vertical fluid-passage which communicates with the reservoir and extends upward therefrom to the interior of the ram and includes vertical ports

normally closed by said valves and communicates with the pump-cylinder between the valves, the suction-valve being at the lower end of the fluid-passage and the ram-valve being above the other.

3. A hydraulic jack comprising a reservoir at the base, a ram-post mounted on the base and extending through the top of the reservoir and removable from the base and reservoir, a ram on the ram-post, a pump, a suction-valve and a ram-valve, the post containing a fluid-passage which extends lengthwise thereof and from the reservoir to the ram and includes vertical ports normally closed by said valves, and the interior of the pump-cylinder being in communication with the fluid-passage between the valves.

4. A hydraulic jack comprising a ram-post mounted on and removable from the base, a ram on this post, a pump, a suction-valve and a ram-valve, the ram-post containing a fluid-passage, the valves being in that passage, and the interior of the pump-cylinder being in communication with the passage between the valves.

5. In a hydraulic jack the combination with the ram of a claw movable lengthwise of the ram, and means for securing the claw on the ram at different distances from the head of the ram, said means including a fastening composed of two parts, one of which is engageable with the other at different places.

6. In a hydraulic jack the combination with the ram of a claw movable lengthwise of the ram, and means for securing the claw on the ram at different distances from the head of the ram, said means comprising a bar and a pin, the bar extending from the head of the ram to the claw and having in it a series of holes in which the pin loosely fits.

7. A hydraulic jack comprising a post mounted on the base, a ram having a tubular portion surrounding the post, a bar attached to the head of the ram and extending therefrom toward the base, and a claw attached to the bar and loosely surrounding said tubular portion, the toe of the claw being on the opposite side of the ram from the bar.

8. A hydraulic jack comprising a post mounted on the base, a ram having a tubular portion surrounding the post, a bar attached to the head of the ram and extending therefrom toward the base and having in it holes at different distances from the base, a claw loosely surrounding the bar and said tubular portion of the ram and movable on them toward and from the head of the ram and having in it holes which register with the holes in the bar successively when the claw is so moved, and a removable pin which fits in the holes and by which the claw is connected to the bar.

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9. A hydraulic jack comprising a fluid-reservoir, and a pump by which fluid is drawn from the reservoir and forced to act on the ram, one wall of the reservoir including a removable plug which normally closes an opening in the wall, and the cylinder of the pump being secured in the reservoir and supported at one end by said wall and that end being normally covered by said plug, and the cylinder being movable endwise from and into the interior of the reservoir through said opening.

10. A hydraulic jack comprising a fluid-reservoir and a pump by which fluid is drawn from the reservoir and forced to act on the ram, the cylinder of the pump being secured in the reservoir and extending from one of the reservoir-walls to a support within the reservoir, that wall including a removable plug which normally closes an opening in the wall and makes contact with one end of the pump-cylinder, and the cylinder being movable endwise from and into the interior of the reservoir through said opening, and the cylinder and said support having contacting shoulders which prevent the inward movement of the cylinder beyond its proper position.

11. A hydraulic jack comprising a fluid-reservoir, and a pump by which fluid is drawn from the reservoir and forced to act on the ram, the cylinder of the pump being secured in the reservoir and including a piston-cylinder and a larger cylinder each of which is an extension of the other, the piston of the pump having on it a block which fits in the larger cylinder, and the pump including an operating-arm which extends through an opening in the larger cylinder and engages with said block.

12. A hydraulic jack comprising a fluid-reservoir, and a pump by which fluid is drawn from the reservoir and forced to act on the ram, the cylinder of the pump being secured in the reservoir and including a piston-cylinder and a larger cylinder and an annular connecting wall, each of these two cylinders being an extension of the other, and the piston of the pump having on it a block which fits in the larger cylinder, and the pump including an operating-arm which extends through an opening in the larger cylinder and engages with that block, said annular wall being at one end of said larger cylinder, and a wall of the reservoir including a plug which makes contact with the other end of the larger cylinder and on which is an inwardly extending projection, said annular wall and said projection forming stops which limit the reciprocating movements of the piston.

13. A hydraulic jack comprising an oblong reservoir on the base, a ram-post fitting in and extending from the reservoir near one end thereof, a ram on the ram-post, a pump-

cylinder fitting in the wall of the reservoir at the other end of the reservoir and extending from this end into the ram-post, that wall including a plug and one end of the cylinder being in contact with and covered by the plug and the other end being in the ram-post and being open, a piston in the cylinder, an operating-arm connected with the piston, a suction-valve, and a ram-valve, the ram-post having in it a fluid-passage which communicates with the interiors of the reservoir and pump-cylinder and through which fluid is conducted to the ram, and the valves being in that passage.

14. A hydraulic jack comprising an oblong reservoir on the base, a ram-post fitting in and extending from the reservoir near one end thereof, a ram on the ram-post, a pump-cylinder fitting in the wall of the reservoir at the other end of the reservoir and extending from this end into the ram-post and including a piston-cylinder, a larger cylinder and an annular connecting wall, each of these two cylinders being an extension of the other, said wall of the reservoir including a plug and that end of the pump-cylinder which is also an end of the larger cylinder being in contact with and covered by the plug, and that end of the piston-cylinder which is the other end of the pump-cylinder being in the ram-post and being open, a piston having on it a block, this block being in the larger cylinder, an operating-arm connected with the piston, a suction-valve, and a ram-valve, the ram-post having in it a fluid passage which communicates with the interiors of the reservoir and piston-cylinder, and through which fluid is conducted to the ram, the valves being in that passage, and said plug having an inwardly extending projection, and said annular wall and said projection forming stops which limit the reciprocating movements of the piston.

15. A hydraulic jack comprising a ram-post mounted on the base, a hollow ram into which the ram-post extends and which covers one end of the post, a packing-ring affixed to that end of the post, a suction-valve and a ram-valve, the post having in it a fluid-passage which extends through it lengthwise, the suction-valve being in that passage close to the base, and the ram-valve being in that passage between the suction-valve and the above-mentioned end of the post, and the post having in it a recess which extends into it from one side and forms part of said fluid-passage and in which the pump-cylinder of the jack fits, the valves being on opposite sides of that recess.

16. A hydraulic jack comprising a ram-post mounted on the base, a hollow ram into which the ram-post extends and which covers one end of the post, a packing-ring affixed to that end of the post, a screw-plug extending into the post from its other end, a

suction-valve and a ram-valve, the post having in it a fluid-passage which extends through it lengthwise and through said screw-plug, and the valves being balls and
5 one being in the screw-plug and the other in the fluid-passage between the screw-plug and the other end of the post.

17. A hydraulic jack comprising a ram-post mounted on and removable from the
10 base, a hollow ram into which the ram-post extends and which covers one end of the post, a packing-ring affixed to that end of the post, a suction-valve and a ram-valve, the post having in it a fluid-passage which
15 extends through it lengthwise, the suction-valve being in that passage close to the base, and the ram-valve being in that passage between the suction-valve and the above-mentioned end of the post, and the post having

in it a release-passage which extends to the
20 exterior of the post from the aforesaid fluid-passage which it intersects between the ram-valve and the aforesaid end of the post.

18. A hydraulic jack comprising an upright post, a horizontal pump-cylinder, a
25 piston therein, a suction-valve and a ram-valve, the post containing a fluid-passage including a recess extending to the exterior of the post, one end of the pump-cylinder being in said recess and being open, and the
30 valves being in said passage, the suction-valve being below and the ram-valve above the pump-cylinder and said recess.

CARL WIGTEL.

In presence of—

J. M. SNEIDER,
ROSS R. HARRISON.