(No Model.)

T. H. LEE.

HYDRAULIC VALVE.

No. 524,721. Patented Aug. 21, 1894.

Fig. 2.

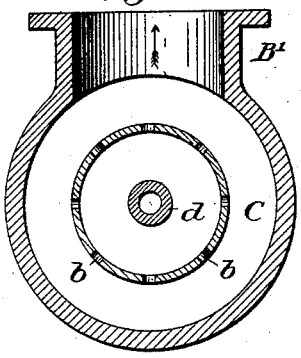


Fig. 3.

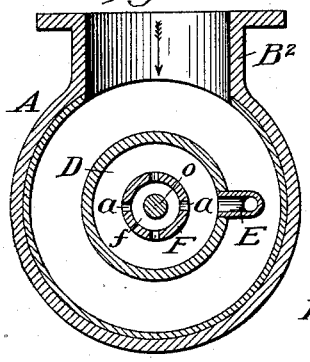
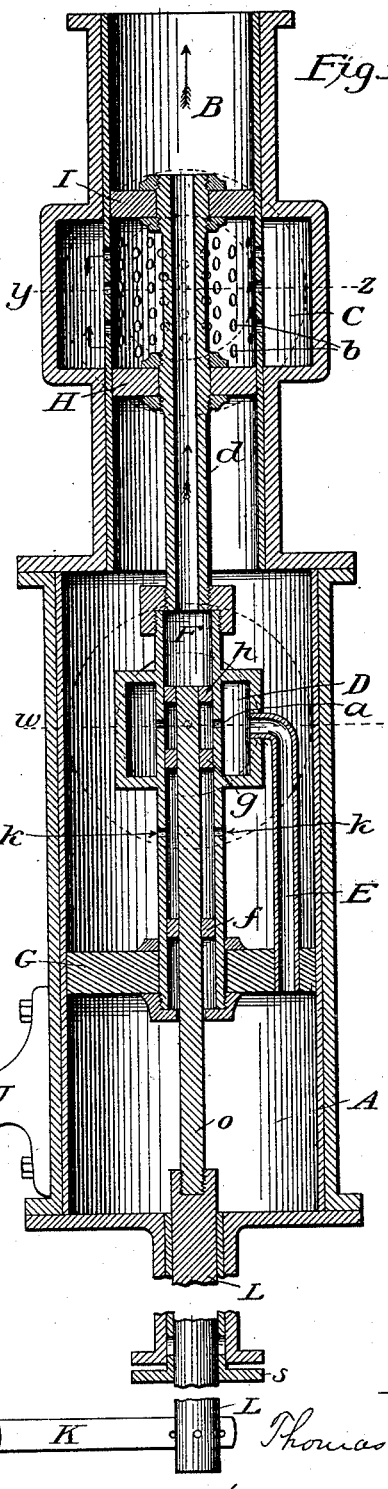


Fig. 1.



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UNITED STATES PATENT OFFICE.

THOMAS H. LEE, OF SEATTLE, WASHINGTON.

HYDRAULIC VALVE.

SPECIFICATION forming part of Letters Patent No. 524,721, dated August 21, 1894.

Application filed July 27, 1893. Serial No. 481,668. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. LEE, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Hydraulic Valves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in that class of hydraulic valves which are used in connection with elevators operated by hydraulic pressure and my object is to provide a more efficient and durable valve and one whereby the flow of water will be regulated in a more thorough manner than any heretofore known.

To these ends the invention consists of certain improved features of construction and arrangement of parts which will now be fully explained and finally embodied in the claims.

Referring to the accompanying drawings: Figure 1 represents a longitudinal section of my valve; Fig. 2 a section in the line *y—z*, and Fig. 3 a section on the line *w—x*.

The reference letter A, indicates the body or barrel of the valve which is cylindrical in shape and formed with two different sized bores, axially coincident and each designed for the reception of their respective pistons. The largest chamber or bore of the body is arranged below the smaller and has working therein the piston G, having the hollow piston rod F, to the upper end of which is rigidly attached the tube *d*. Secured at the end of the tube *d*, a small distance apart are the pistons H and I, which operate in the smaller chamber of the barrel A, and are normally arranged therein so that the perforations *b*, in the smaller bore will be shut off from the waste pipe B, and from the barrel. The perforations *b*, in the smaller portions of the barrel open first into the circumferentially enlarged portion C, and this portion opens into the outer pipe B′.

The hollow piston rod F, performs in addition to the function of the piston rod, the function of an auxiliary cylinder and it has working therein the rod *o*, which is in turn connected to the rod L, and this rod, L, is pivotally connected to the actuating lever K, fulcrumed at J. Arranged on the rod *o*, are the pistons *h*, *g* and *f*; the function of the piston *f* being to prevent the water from flowing into the rod F, by way of its lower end, while the pistons *h* and *g* are arranged at the upper end of the rod and near each other so that they can, when in their normal position, occur one on each side of the openings *a*, in the rod. The openings *a*, of the rod F, open into a second circumferentially enlarged opening D, formed integral with the rod, and this opening has in communication therewith the pipe E, which extends downwardly, through the piston G, and empties into the space therebelow. Emptying into the barrel A, at the upper end of the larger chamber is an inlet pipe B^2 through which the water passes to enter the valve. The rod F, has formed in it at a point below the portion D, openings K, through which the water passes to enter the rod.

The preferred construction of my invention having now been set forth, I will proceed to disclose its mode of operation and use. The pipe B^2 being in connection with any suitable source of water under continual pressure, the space between the pistons H, and G will always be full of water. Now when the valve is in the position shown in Fig. 1, the elevator is at a stand still and to raise the elevator the rod L—*o* is moved up, so that the piston *g*, will pass above the opening *a*. This will allow the water above the piston G, to pass *via* the opening K into the chamber D, and thence through the pipe E to the space below the piston G. Owing to the fact that the force occasioned by the pressure of the water below the piston G, on the bottom of said piston and the pressure on the bottom of piston H, is greater than the force occasioned by the pressure of water on top of the piston G, the pistons I, H and G, and their attached parts will move upward sufficiently to raise the piston H, above the perforations *b* and these allow the water from the pipe B^2 to pass out the pipe B′. As the pipe B′ is in connection with a cylinder by which the elevator is operated, this operation will be followed by the raising of the eleva-

tor. When it is desired to lower the elevator the movement of the rod L—*o* is reversed so that the piston *h* will pass below the openings *a*. This will be followed by the egress of the water below the piston G, out of the discharge B, *via* the pipes E, F and *d*. As the pressure below the piston G, is diminished the pressure above it will overcome that against the piston H and the pistons G, H and I will therefore move downwardly far enough to make it possible for the water in pipe B′, to escape by way of the perforations *b*, and discharge opening B. This will be followed by the emptying of the elevator cylinder and the consequent drop of the elevator; the elevator being, of course, attended by mechanism to regulate its downward movement. From this it will be apparent that the valve is operated principally by the pressure of the water in the cistern and that this pressure is regulated by the movements of the rod L—*o*.

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

1. A valve for hydraulic cylinders, comprising a casing having differential chambers in alignment, the larger chamber having an opening B^2 in connection with the fluid supply, the smaller chamber having an opening B′ in connection with the hydraulic cylinder, and having connection with a waste pipe B, a hollow piston rod provided with pistons I and H to work in the smaller chamber on opposite sides of the opening B′, and with pistons G to work in the larger cylinder, and having a chambered annular enlargement D about midway between the pistons G and H, and having lateral openings *a* opposite the enlargement D, and openings *k* at a point between the said chambered enlargement D and the piston G, a pipe leading through the piston G and communicating with the chambered enlargement D, and a hand operated rod provided with pistons *f* and *g* working in the hollow piston rod on opposite sides of the openings *k*, and with a piston *h* to comprise the openings *a* between it and the piston *g*, substantially as described.

2. In a hydraulic valve a casing having differential chambers, each provided with an opening, a hollow piston rod provided with pistons working in the chambers, and having an annular chambered enlargement D and lateral openings *a* and *k*, a pipe communicating with the chambered enlargement D and leading through the larger piston, and a rod working in the hollow piston rod and having a piston *g* to work between the openings *a* and *k*, and having pistons *h* and *f* to operate exterior to the said openings *a* and *k* respectively, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS H. LEE.

Witnesses:
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