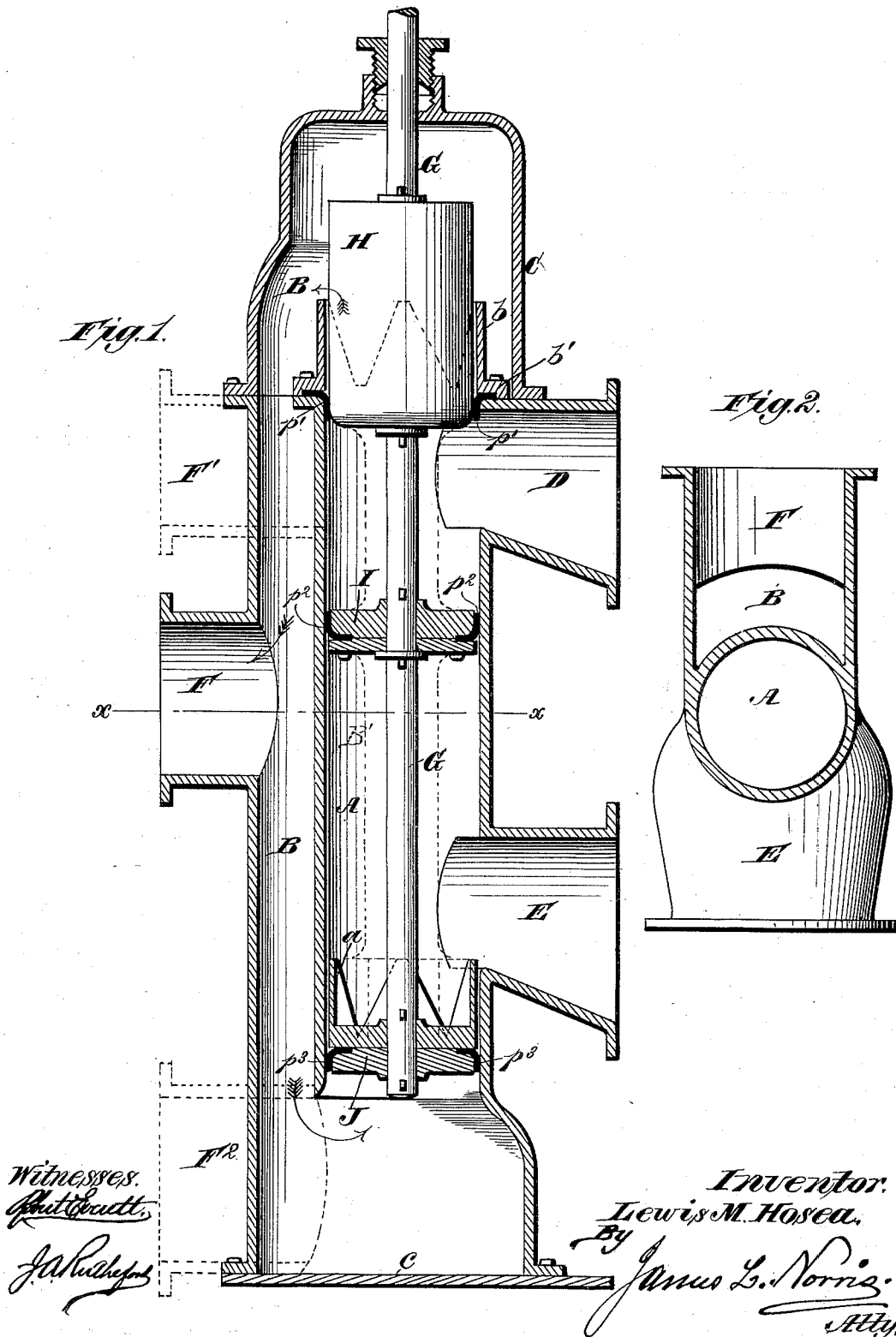


(No Model.)

L. M. HOSEA.
HYDRAULIC VALVE.

No. 423,256.

Patented Mar. 11, 1890.



UNITED STATES PATENT OFFICE.

LEWIS M. HOSEA, OF CINCINNATI, OHIO.

HYDRAULIC VALVE.

SPECIFICATION forming part of Letters Patent No. 423,256, dated March 11, 1890.

Application filed April 16, 1889. Serial No. 307,426. (No model.)

To all whom it may concern:

Be it known that I, LEWIS M. HOSEA, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Hydraulic Valves, of which the following is a specification.

My invention relates to the class of "piston-valves" employed as controlling-valves for hydraulic engines, having reference particularly to their use for hydraulic elevators. For such use the piston-valve is preferable, in that among other advantages it permits the use of flexible cup-packings held to seats by the pressure of water.

My invention is designed to provide a valve possessing also certain other specific advantages equally desirable, in brief as follows: first, to be self-balanced in all positions; second, its packings to be accessible without disconnecting the pipe-joints; third, an integral construction of few parts with a view to economy of manufacture and maintenance; fourth, having all its valve-seats entire circles transverse to the axis of movement to economize wear of packings and maintain tight closure.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which—

Figure 1 is an axial elevation of my improved valve and casing complete, and Fig. 2 a plan section of the casing on the plane α of Fig. 1.

Referring now to the drawings, A designates the valve-cylinder, having at one side the supply-opening D and the discharge-opening E, and at the other side a passage B, which is practically a bifurcated service-passage having a pipe-connection F to the working-cylinder. These are conveniently and preferably cast as one piece, as indicated, open at the ends above and below, and the cylinder bored out or lined, as desired. The entire casing is closed at the bottom by a base-plate c , to which it is bolted, and at the top by a hood or cap-plate C, bolted to the casing. The piston-rod G enters through the top of the hood C through a suitable stuffing-box, and carries in order, first, a short plunger H, fitting the cylinder A closely, but with easy play; second, a central balancing-piston I, and, third, a discharge-piston J, all being keyed or otherwise secured to the pis-

ton-rod G, (or cast together as a single plunger, as indicated by dotted lines.)

The plunger H enters the mouth of the cylinder A through a cup-packing p' , flaring downward and secured to the marginal flange or edge of the cylinder A by a ring b' , flanged upward into a "crown" b , provided with suitable wings or "points" and openings of any desired size and form.

The central balancing-piston I is formed of two disks (or a disk or ring) clamping between them a cup-packing p'' , flaring upwardly. The lower or discharge piston J is formed in the same manner, but has its cup-packing p''' flaring downwardly and its upper disk extended upward in a crown a , similar to the crown b . (Where all these parts are formed as a single plunger, the crown is formed as an enlargement with suitable indentations.)

The lower end of the cylinder A flares somewhat outwardly and opens below into the outlet portion of the service-passage B, while at the opposite end of the cylinder A a similar connection with the inlet portion of the service-passage B is formed by the hood or cap-plate C, which is sufficiently elevated to permit the upward play of the plunger H. Thus the cylinder A practically terminates in a service-passage at both ends; and it may be convenient at this point to note that instead of the passage B and single service-opening F, cast integrally with the cylinder A, separate service-openings F' F'' (indicated by dotted lines) may be cast with the cylinder A at the respective ends and the central portion of the passage B omitted. In such case the main service-pipe B' (indicated by dotted lines) opens into both the orifices F' F'' .

The operation is as follows: In the position of the parts shown in the drawings the valve is closed both to the supply and discharge, and the back-pressure of water from the working-cylinder in the service-passage B acts downwardly upon the plunger H and upwardly upon the discharge-piston J, (in opposite directions,) while the pressure from the inlet D acts upwardly upon the plunger H and downwardly upon the balancing-valve I, (in opposite directions,) all packings being held seated by excess of water-pressure against their flaring sides. If, now, the valve is elevated, the plunger H unseats from its pack-

ing p' , and admits the flow of water from the supply-inlet D into the service-passage B F, (or B F') at the same time acting downwardly upon the balancing-piston I within the cylinder A and upwardly in the lower portion of the service-passage B upon the discharge-piston J, thus balancing pressures and holding packings tight, as before. If, now, the valve be lowered to its lowest position, the plunger H becomes again seated in the packing p' , the discharge-piston J unseats its packing p^3 from the cylinder A below, and the flow from the service-passage B is outward through the lower end of the cylinder and discharge-outlet E, while the valve remains balanced by equal pressures upward upon the plunger H and downward upon the balancing-piston I.

The function of the crowns b and a is as follows: The crown b being stationary, as the plunger H unseats from its packing upwardly, the flow of water outward from the cylinder A into the service-passage B is retarded by the crown-points b until the bottom of the plunger rises above their limit. Similarly the crown a , in descending with the discharge-valve J in the opposite movement, throttles the lower opening of the cylinder A until, in the gradual descent of the valve, the crown is carried below the margin of the cylinder proper.

It will be observed that the valve-cylinder A, with its service-passage, supply-orifice, and outlet-orifice, is cast entire in one piece without joints. The base-plate connection and the pipe-connections at D E F are all permanent, while by loosening the fastening-bolts of the hood C and slipping the hood upward on the piston-rod the packing p' , which is the most important of all, is conveniently accessible, and the other packings $p^2 p^3$, being attached to the piston-heads upon the rod G, are all accessible upon lifting out the rod. To get at all the packings, therefore, requires no disturbance of the pipe-joints D E F (or D E F' F³) or of the valve-cylinder A, all disturbance of the water-connections being con-

finied to one joint—to wit, that of the hood C. It will be observed, also, that none of the packings passes over or across any side openings, which are so destructive to cup-packings, but all open directly from entire circumferential seats transverse to the axis of movement, thus insuring minimum and uniform wear.

I have herein shown and described the valve and casing as vertical; but it will be obvious that it may be placed in any desired position whatever.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In hydraulic-valve mechanism, a cylinder having lateral inlet and discharge orifices and opening at each end into a service-passage through terminal valve-seats, in combination with valves seated outwardly at one end in the inlet service-passage, inwardly at the other end in the outlet service-passage, and a balancing-piston carried centrally between the inlet and discharge orifices, substantially as set forth.

2. The combination of the cylinder A and its openings, as described, the three-piston plunger-valve, and the packings arranged upon the balancing-piston and discharge-valve and upon the marginal seat of the supplying-plunger, respectively, to be held in contact by the water-pressure, substantially as set forth.

3. In hydraulic-valve mechanism of the character described, the construction and arrangement of the valve-casing embodying a cylinder A, provided with inlet and discharge orifices D E and open at either end into a service-passage B, with a removable hood or cap-plate C, substantially as specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LEWIS M. HOSEA.

Witnesses:

DAVID DAVIS,

D. D. WOODMANSEE.