

T. CRITCHLOW.
Hydraulic Valves.

No. 136,489.

Patented March 4, 1873.

Fig 1

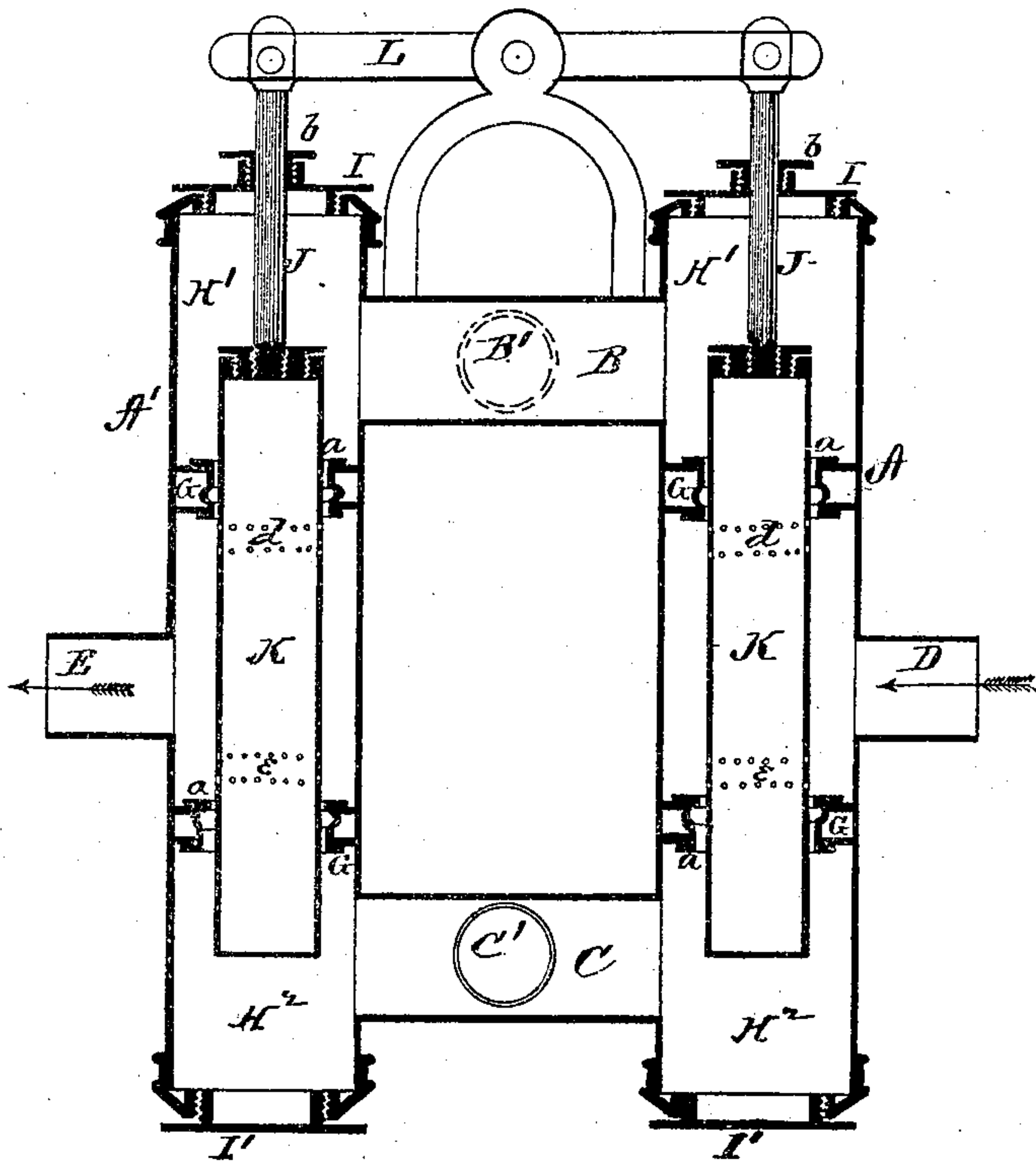
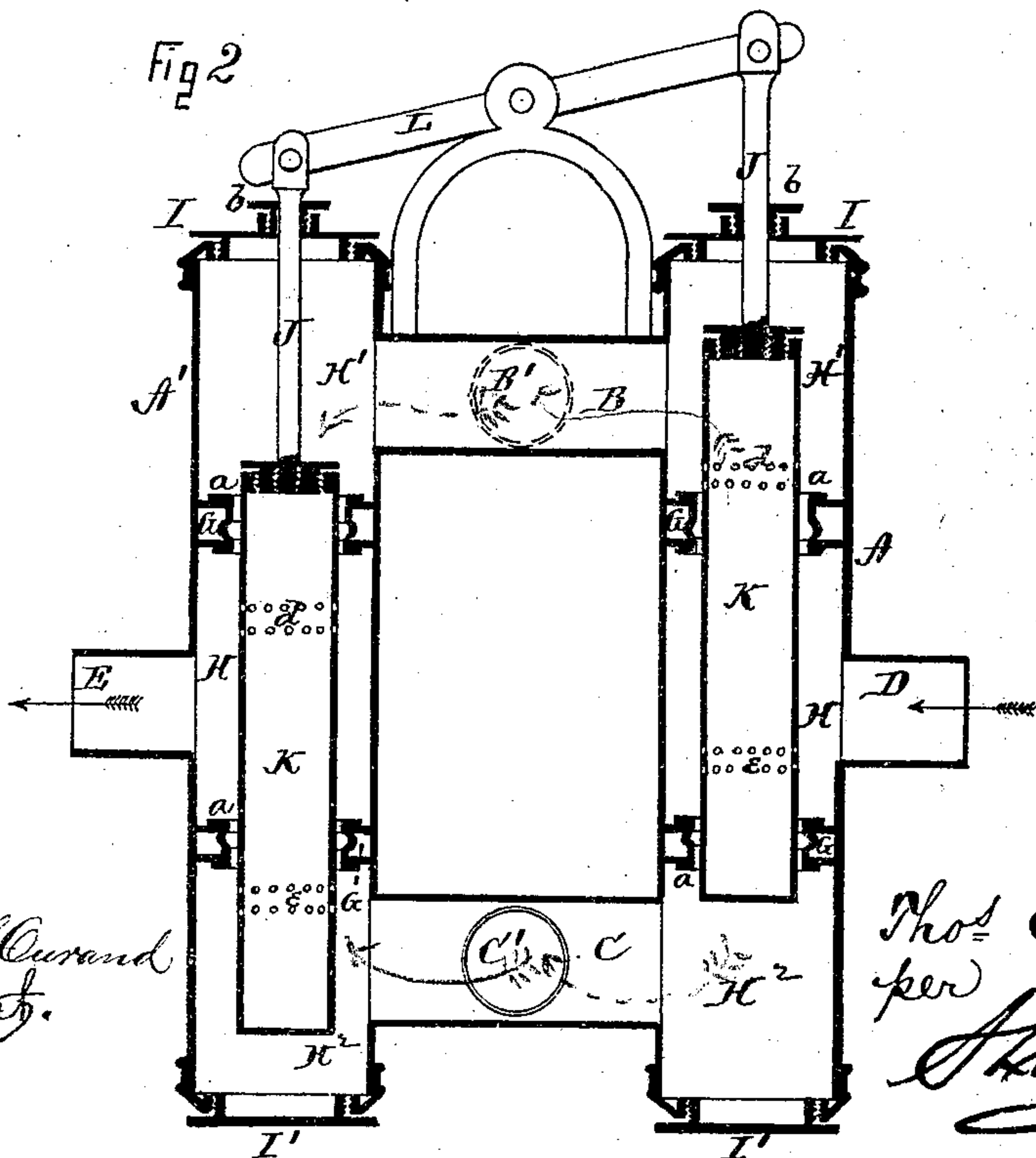


Fig 2



Witness:
Frank L. Curand
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per
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UNITED STATES PATENT OFFICE.

THOMAS CRITCHLOW, OF BALDWIN, PENNSYLVANIA.

IMPROVEMENT IN HYDRAULIC VALVES.

Specification forming part of Letters Patent No. 136,489, dated March 4, 1873.

To all whom it may concern:

Be it known that I, THOMAS CRITCHLOW, of Baldwin, in the county of Dauphin and in the State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Valves; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of my invention consists in the construction and arrangement of a hydraulic valve, for operating machinery by hydraulic or hydrostatic power—such as, for instance, the machinery of a Bessemer-steel plant, which performs all the heavy lifting and revolving.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a longitudinal vertical section of my valve, showing the same in a dormant or inactive position; and Fig. 2, is a similar view, showing the valve in an active position.

A A represent hollow cylindrical castings, connected near their ends by pipes or passages B and C. The cylinder A has a central inlet, D, and the cylinder A' a central outlet, E. Each cylinder is provided with two stuffing or packing boxes, G G, cast with the cylinder, a suitable distance above and below the openings D and E, respectively, forming in each cylinder a central chamber, H. In each of the stuffing or packing boxes G is fitted a screw or stud gland, *a*, to tighten the packing, or to hold an ordinary hydraulic packing, although I prefer to use the ordinary hemp packing. The extreme ends of the cylinders have detachable covers I and I', which can be removed to enable the stuffing-boxes G G to be repacked at any time. The covers I I are provided with ordinary stuffing-boxes *bb*, through which the valve stems or rods J J pass and work. Attached to the lower end of each stem J is a hollow perforated piston, K, having its extreme ends closed so as to be perfectly water-tight. The ends of the piston may be screwed in, or cast, or held in by the stem J passing clear through both

ends and secured by a nut or key, or both. Each piston K is provided with two sets of perforations, *d* and *e*, each set consisting of one or more rows of holes extending around the piston. These perforations are so placed that when the pistons are in a central position, as shown in Fig. 1, the perforations will be inclosed in the central chambers or compartments H H, and thus, by the stuffing-boxes G G, closing all means of communication with the chambers H¹, and H² above and below the chambers and the passages B and C. By operating the lever L, which may be attached to the valve-stems by suitable joints and pin, to allow for the vibration of the lever on its central pivot, the pistons K K are moved, and thereby a means of communication is opened with the chambers H and H², and the passages B and C, as shown in Fig. 2, allowing the water to pass through the perforations *e* and *d* into the chamber H of the receiving-cylinder A, and out through the passage B and pipe B' to the machine or vessel to be operated upon, which machine, if it be double-acting, will also have a return pipe, the water so returning finding its way through the pipe C' and passage C into the chamber H² of the discharge-cylinder A', and then through the perforations *e d* in the piston of the same, and out through the outlet E.

By simply reversing the lever L the pressure is reversed, and the machine or vessel operated moved in the opposite direction.

When the pistons K K are in the central position, shown in Fig. 1, all communication with the passages B and C is entirely closed so that no pressure can escape beyond the chamber H in the receiving-cylinder A; neither can the pressure escape which may have been previously let out into the passages, as the outlet communication is also closed; and hence the machine or vessel operated upon will remain stationary in the position to which it had been moved.

If the valve be required to operate a plunger, crane, or press, then it would only require one pipe to lead the water to it, because on lowering the crane or press the water would return through the pipe by which it was conveyed; the hollow perforated piston, being reversed, would open a means of es-

cape, and at the same time shut off the water communication.

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

1. The hollow piston K, closed at both ends and provided with perforations *d* and *e*, substantially as and for the purposes herein set forth.

2. The cylinders A A', connected by pipes B C, and each provided with stuffing or packing boxes G G, to form interior compartments H, H¹, and H² in each cylinder, substantially as and for the purposes herein set forth.

3. The combination of the cylinders A A' with connecting-pipes E C, inlet D, outlet E, and interior boxes G G, and the hollow pistons K K, closed at both ends, and provided with perforations *d e*, all constructed and arranged to operate substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of November, 1872.

THOS. CRITCHLOW.

Witnesses:

C. L. EVERT,
A. N. MARR.