

J. M. LOCKE.  
THREE-WAY BALANCED STOP-VALVE.  
No. 173,653. Patented Feb. 15, 1876.

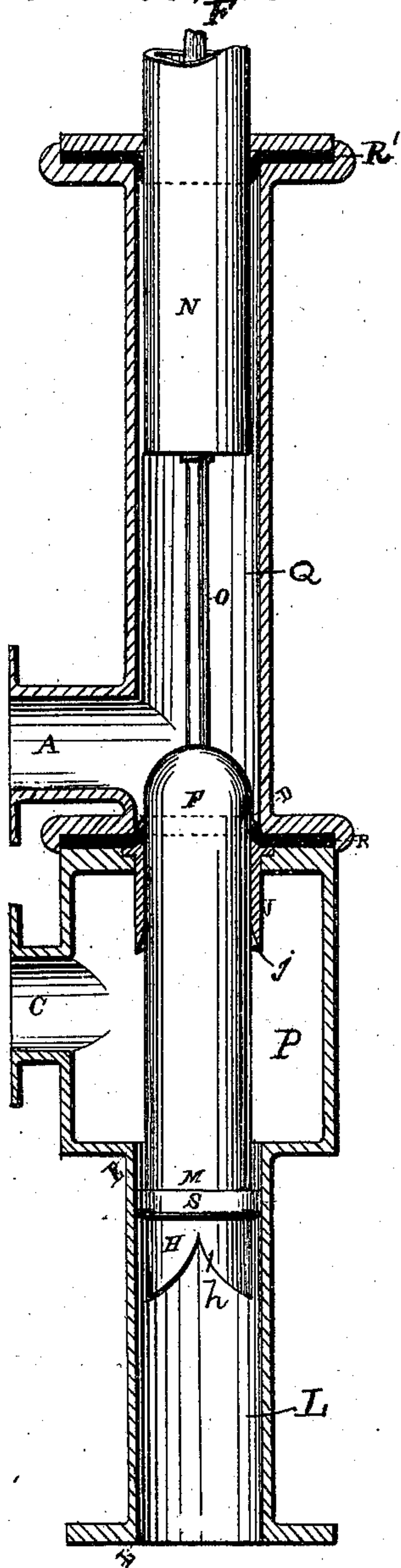


Fig 2

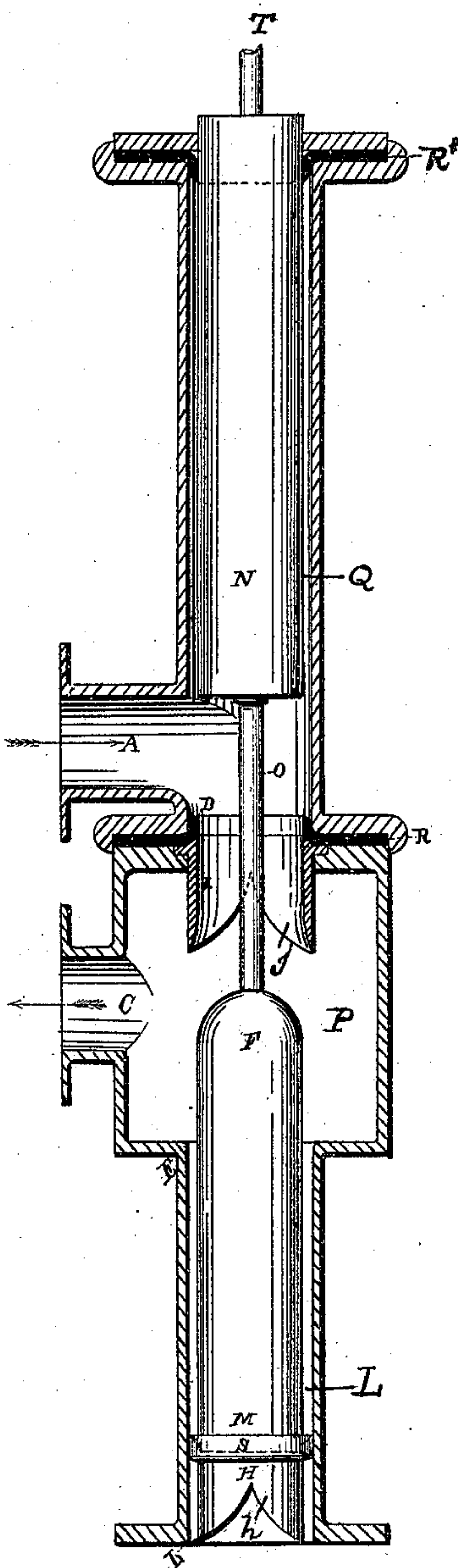


Fig 1

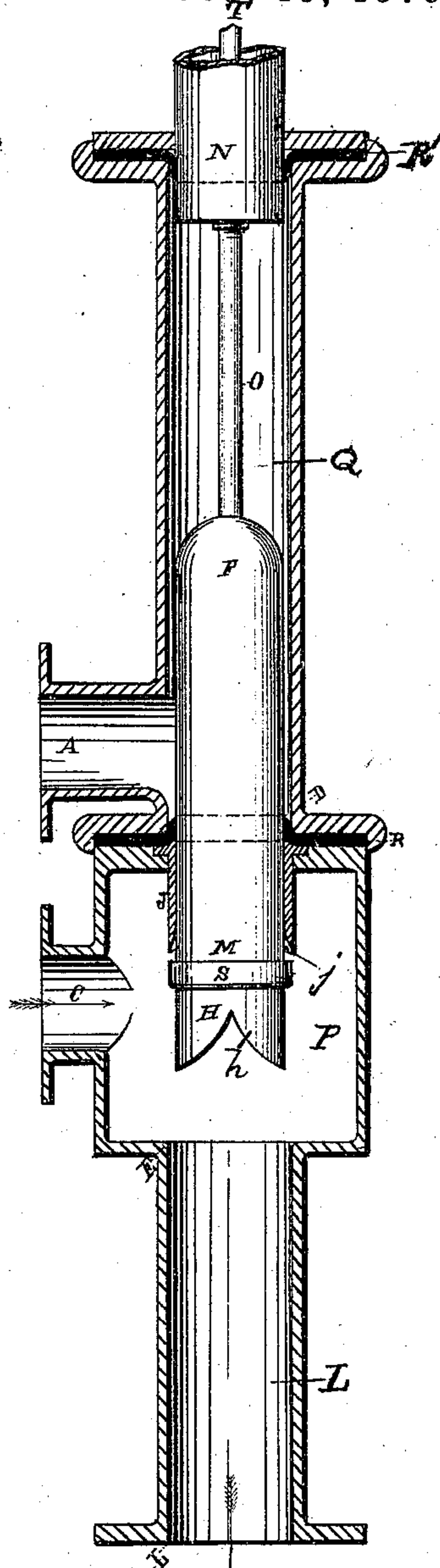


Fig 3

Witnesses  
Samuel Dg  
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# UNITED STATES PATENT OFFICE.

JOSEPH M. LOCKE, OF CINCINNATI, OHIO.

## IMPROVEMENT IN THREE-WAY BALANCED STOP-VALVES.

Specification forming part of Letters Patent No. 173,653, dated February 15, 1876; application filed May 27, 1874.

*To all whom it may concern:*

Be it known that I, JOSEPH M. LOCKE, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Cock for Hydraulic Elevators, of which the following is a specification:

My invention is primarily designed as a means of so controlling the supply and discharge of the water used for impelling hydraulic lifts or elevators as to enable their upward or downward motion or stoppage at any desired level, without such nice attention or manipulation as would be difficult or impossible to an ordinary operator, and without such sudden arrest or resumption of the flow as would endanger the walls of the conduits.

In the accompanying drawing, Figures 1, 2, and 3 are axial sections, representing the apparatus in the respective conditions of supply, of closure, and of obstructed or slow discharge.

Inasmuch as my improvements relate wholly to the cock or valve proper, the specifications will be restricted to this member.

P represents a supply and discharge chamber, which has, on one side of it, a service-pipe or passage, C, that affords permanent communication with the hydraulic motor or other engine to be impelled. The said chamber P communicates, at opposite ends, with two co-axial pipes, Q and L, of which the pipe Q receives, at one side of it, the inlet-passage A, and has a tubular prolongation, J, which enters the chamber P. The edge of this prolongation J has one or more scallops or indentations, which, narrowing inwardly, as at *j*, constitute graduated openings. The pipe Q has two cup-packings, of which the innermost one R is placed at the junction of the prolongation J with the lower end of the said pipe Q, and constitutes the seat of the inlet-valve, while the other packing R' occupies the outermost extremity of the said pipe, and incloses the balancing-piston to be presently described. The pipe L is ground out interiorly to form a true and smooth cylindrical pocket for my discharge-valve, hereinafter described. The operating-rod T terminates in a plunger, N O F M H, which consists of a long cylindrical piston, N, called the balancing-piston, whose inner end is, by means of rod O, connected to convex valve F, which constitutes my inlet-

valve proper, and which is prolonged downward so as to form a cylinder, M. Said valve F and cylindrical prolongation M enter and play within the packing R, which therefore serves as the inlet-valve seat. The said cylindrical prolongation M is, near its lower end, encircled by my packing and discharge-valve S, formed of some yielding and impervious material, such as india-rubber or leather, and of such dimensions as to be capable of filling the discharge-pipe L. The cylinder M is prolonged below the packing-valve S, and has one or more notches, *h*, that are similar in form and function to the notches *j* of the tubular prolongation J. The tubular prolongation J and the pipe L are interiorly of slightly greater diameter than the cylinder M. The distance between the valves F and S, or, in other words, the length of the cylindrical portion M, so much exceeds that of the chamber P as to secure a sustained or sensible duration, respectively, of the receiving, the closed, and the discharging conditions of the apparatus, so as to render unnecessary such nice movement of the operating-rod T as would become needful were the interval between the supply and the discharge only momentary or of but inappreciable duration. In the above arrangement the hemispherical member F constitutes, as before stated, the inlet-valve, the packing constituting its seat, and the cylinder F and tube J constituting prolongations of the said valve and seat, respectively. Again, the ring S and the upper extremity E of the pipe L constitute, respectively, the outlet-valve and seat, of which H and L constitute the respective prolongations. All those prolongations are in the direction of the flow. The soft or yielding packings R and S, being so arranged and secured relatively to the indented portions J and H that they can, by no possibility, come in contact with them, are free from liability to become torn or mutilated, as they would be were they subject to attrition with said indented portions.

The operation is as follows, the apparatus being supposed closed, as in Fig. 2: Should it now be desired to elevate the platform, the rod T is depressed until the convex portion F of the plunger, by receding from its seat R into the indented prolongation J, begins to



admit water to the engine, very slowly at first, and subsequently in greater abundance until fully open. All this time, occupation of the pipe L, by the packing-valve S, effectually closes the discharge so as to prevent any escape of water from the engine. If now it be desired to bring the platform to rest, it is merely necessary to reverse the rod so as to restore the parts to the position shown in Fig. 2. In passing to the closed condition the indented prolongation J again becomes useful by compelling the closure to take place gradually, and to thus avoid such abrupt suspension of the flow as would create "water-ram," and endanger the pipes. Re-entrance of the valve F to the seat R finally operates to shut off the supply, and this without opening the discharge-passage L, even if the operator do not succeed in stopping the rod at the precise central position. If, on the other hand, the operator seeks to lower the platform, he has but to elevate the rod T until, the narrow inner extremities of the indentations *h* beginning to emerge from the pipe L, the water begins, very gradually, to escape into said pipe, and subsequently escapes more rapidly, should the plunger be further elevated. By this means the operator is enabled to let down a heavily-loaded platform with perfect security, or a lighter one with any desired speed, which can be checked or reversed in a moment without danger to the containing passages, the indented prolongations preventing any such violent or abrupt check to the inertia of the hydraulic column as would be liable to rupture the pipes, no matter how quickly the rod may be operated. An internal downward flare of the tubular prolongation J, and a downward taper of the prolongation H, may be substituted for the indentations *j* and *h* in some situations, or the purpose may be accomplished by oblique terminations of said prolongations. It is manifest that the valve F, and the balance-piston N, being at all times subject to equal and opposing pressures in all conditions of the apparatus, and the same equality or balance of pressure taking place on the other parts of the plunger, prevents any movement thereof inde-

pendently of the impulses imparted by the operating rod T, and renders the said plunger of easy movement or detention by means of said rod.

I lay no claim to graduated valve-openings, broadly, nor to any specific form thereof, apart from my special combination with soft or yielding packing without contact, as hereinbefore set forth.

In the accompanying illustration of my invention the parts are so situated as to present the flow downward, but it is evident that the apparatus might be so placed as to discharge upward or laterally; but in whatever direction the discharge takes place it is essential that the prolongations H and J be in the same direction.

My device, although specially designed for hydraulic elevators, is obviously applicable to those driven by the agency of steam or other fluid, and it may be used in connection with other engines than those employed for lifting.

I claim as new and my invention—

1. The chamber P, having on opposite sides of a permanent service passage, C, two other passages, Q and L, having a common axis and terminating at said chamber in seats R and E, for supply and discharge valves F and S, whose distance apart is greater than that of said seats, said supply-valve and discharge-seat being prolonged in direction of the flow, so as to permit independent control of the supply and discharge, and their separation by a period of complete closure, substantially as and for the objects designated.

2. The tubular projection J, cylinder M, having graduations *j* and *h*, packing R, and packing-valves S, arranged to operate without attrition from each other, substantially as specified.

3. In combination with the duplex-valve plunger and the three-way passage, substantially as described, I claim the balancing-piston N, adapted to operate as set forth.

JOSEPH M. LOCKE.

Witnesses:

SAMUEL DAY,  
JAS. MORRIS.