

A. MAYER.

Relief-Valve for Fire-Engines.

No. 134,435.

Patented Dec. 31, 1872.

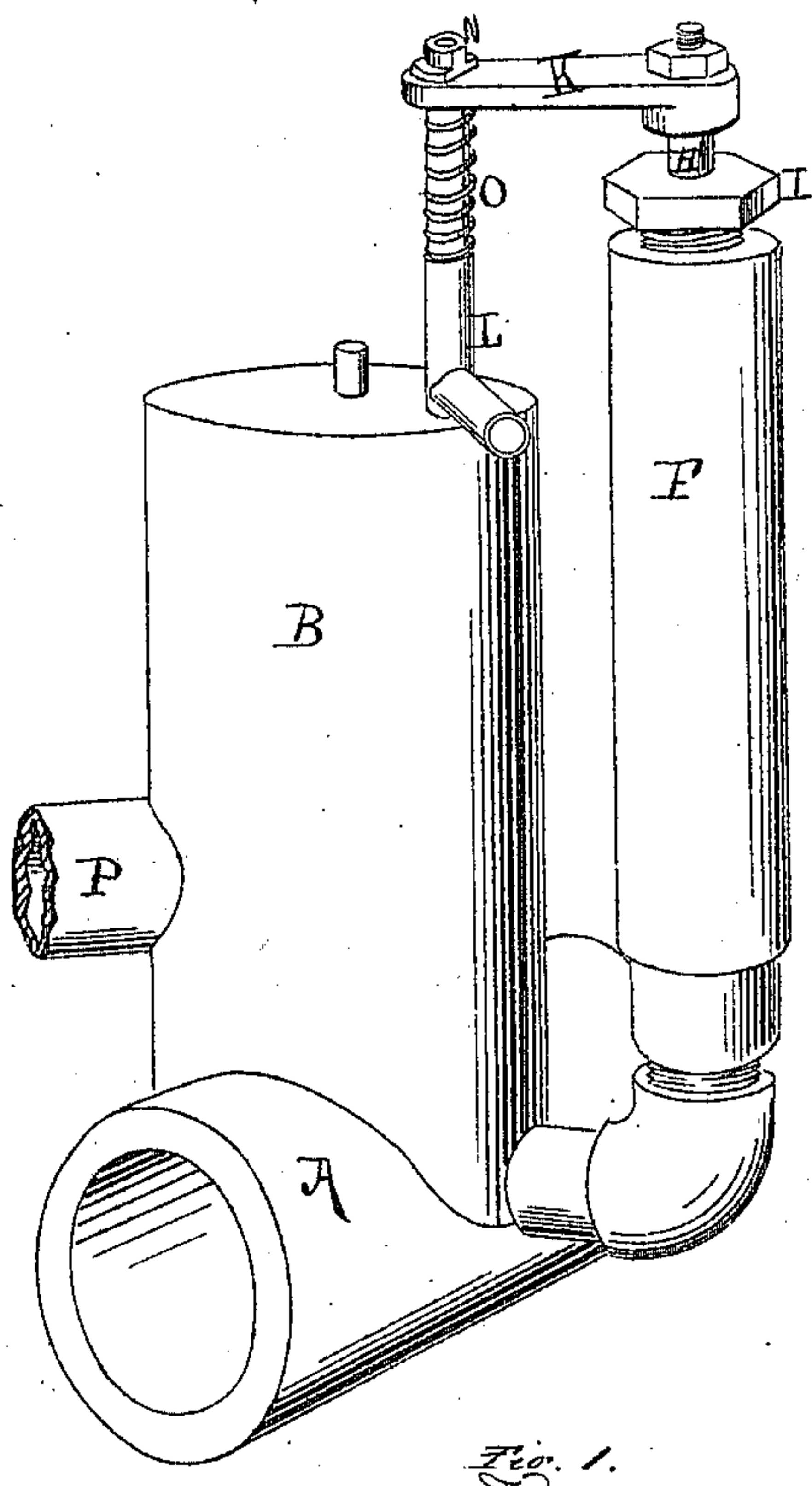


Fig. 1.

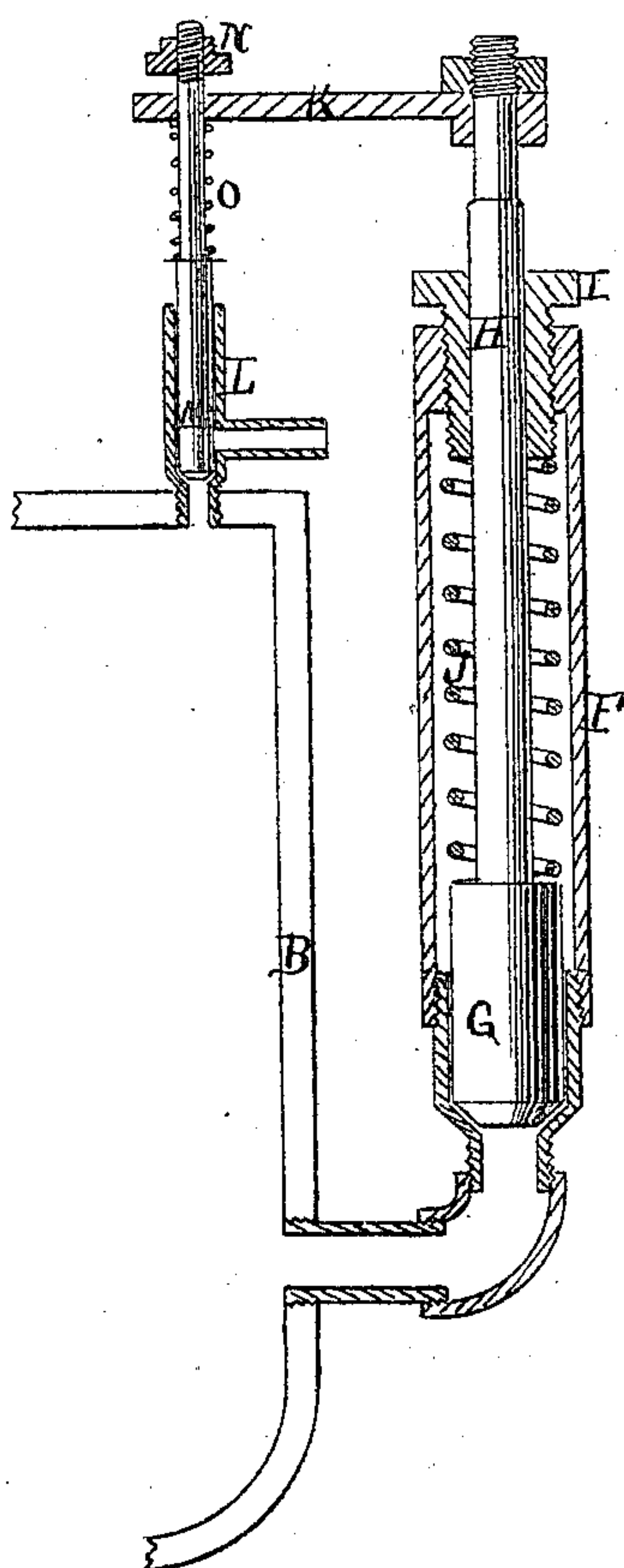


Fig. 2.

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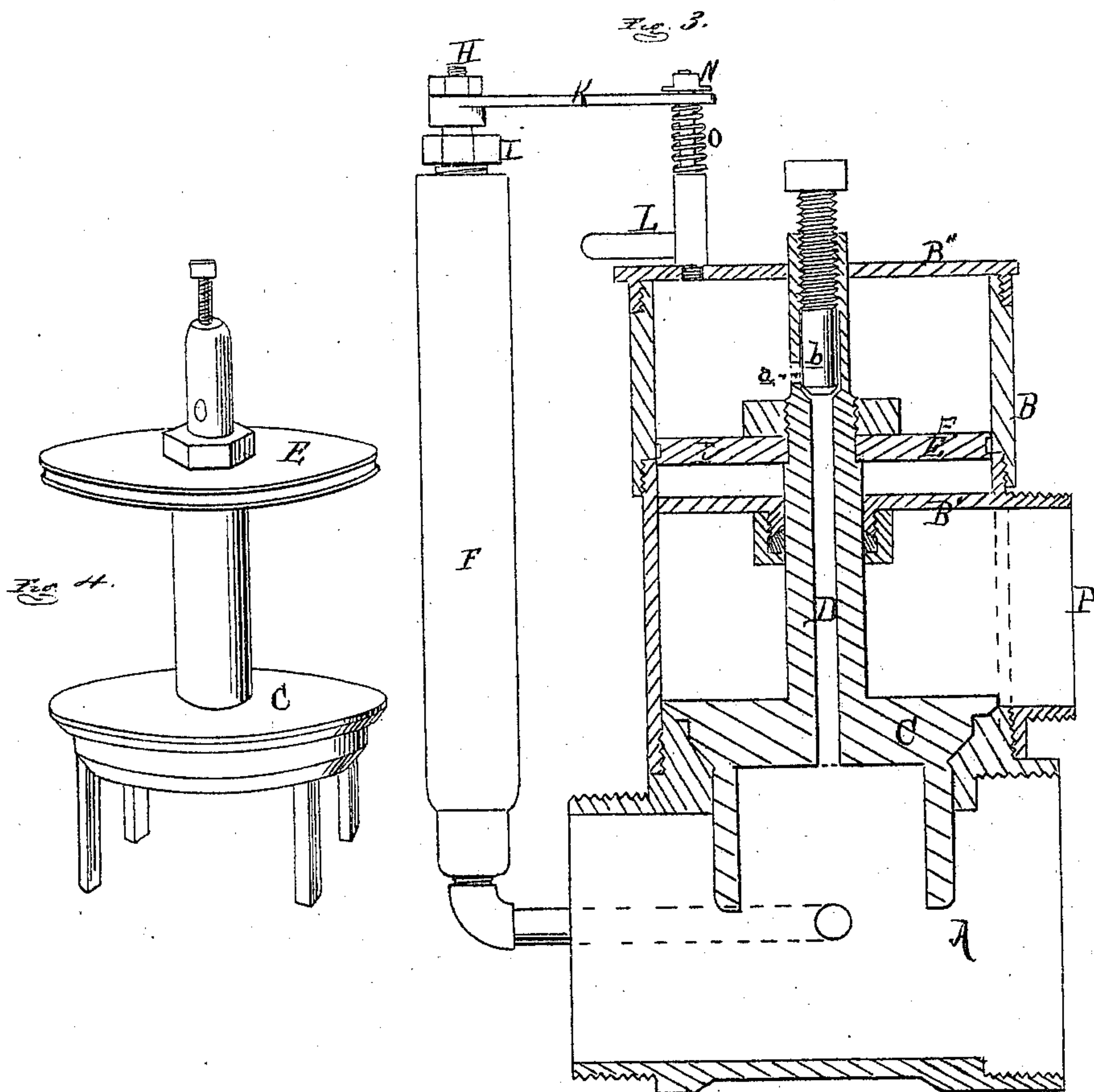
INVENTOR:
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By Atty -
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UNITED STATES PATENT OFFICE.

ALVARADO MAYER, OF DETROIT, MICHIGAN.

IMPROVEMENT IN RELIEF-VALVES FOR FIRE-ENGINES.

Specification forming part of Letters Patent No. 134,435, dated December 31, 1872.

To all whom it may concern:

Be it known that I, ALVARADO MAYER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Relief-Valves for Fire-Engines; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon and being a part of this specification, in which—

Figure 1, Sheet 1, is a perspective view of my device detached; Fig. 2 is a vertical section of the pressure-gage and a part of the relief-valve cylinder; Fig. 3 is a vertical section of the relief-valve and its cylinder, showing the pressure-gage in elevation; and Fig. 4 is a perspective view of the relief-valve and its piston.

Like letters refer to like parts in each figure.

The nature of this invention relates to a relief-valve, more especially designed to be applied to the pumps of fire-engines; its object being to enable the firemen to use a stop-cock or valve on the branch pipe, which may be closed at will without danger of bursting the hose, as the water forced into it by the pumps will be returned to their suction-pipes, and circulate in that way as long as the pumps are at work. The invention consists in the peculiar construction of the relief-valve at the lower end of a hollow stem, whose upper end carries a piston of greater diameter than the relief-valve, which it keeps closed by reason of the superincumbent pressure of the water, which fills the cylinder above the piston through the hollow stem; also, in connection therewith, a test-gage and a waste-valve, so arranged that when a given pressure is exceeded the water above the piston is allowed to flow away, allowing the relief-valve to raise, and thus opening a communication with the suction-pipe of the pump, through which the water circulates, until the valve of the test-gage closes from a reduction of pressure, when the water will again be forced through the hose.

In the drawing, A represents a water-way, which is screwed to one of the hose-gates of a fire pump or engine, its outer end being threaded to receive the coupling of a hose. From the water-way rises a cylinder, B, at the bottom of which is an opening, in which is seated a relief-valve, C, which may have guide-

wings, as seen in Figs. 3 and 4, or not. From the center of the valve rises a hollow stem, D, which plays through a diaphragm, B¹, in the cylinder, and also through its cover B², in both instances suitable stuffing-boxes being used to prevent leakage about the stem. In the upper compartment of the cylinder B a piston, E, is secured to the stem D; and above the piston a lateral opening, *a*, is made in the stem to communicate with the interior passage. A screw-valve, *b*, threaded in the top of the stem regulates the flow of the water from the interior of the stem through the opening *a* into the upper part of the cylinder above the piston. The piston being of greater area than the relief-valve, it is evident that the pressure of the water on the former will keep the latter seated. F is a small vertical cylinder whose lower end communicates with the water-way A. In the lower end of this cylinder is seated a valve, G, whose stem H projects up through a screw-gland, I, tapped into the top of the cylinder F. A strong spiral spring, J, is coiled about the stem between the gland and valve. By screwing down the gland the pressure on the valve is increased, requiring a greater pressure under the valve to lift it, the purpose of the gland and spring being to determine in advance, or from time to time, the pressure at which the valve will lift. K is an arm projecting horizontally from the top of the stem H over the top of the cylinder B, from the top of which cylinder rises a valve-case, L, in which is seated a valve, M, whose stem passes up through the end of the arm K, with an adjusting-nut, N, at the top. A light spiral spring, O, is coiled about the upper part of the stem, between a shoulder thereon and the under side of the arm K. P is a return-pipe, which enters the cylinder B below the diaphragm, and forms a communication with the suction of the pump.

The operation of the devices is as follows: The tension of the spring J is adjusted to the working pressure on the hose—say one hundred pounds per square inch. The pump being at work, water flows up through the hollow stem, and, exerting the full pressure upon the piston E, keeps the relief-valve closed. So long as this pressure is not exceeded, the water will be forced through the hose, and no action will result in the parts of my device,

except, perhaps, a slight jumping of the valve G on its seat as the full pressure is approximated; but should the pipeman shut off the discharge from the pipe at the end of the hose, the pressure is instantly increased, causing the valve G and stem H to rise, which, in turn, through the arm K, lift the valve M, and thus allow the water in the cylinder B to flow out at the valve-case L, from above the piston. The pressure under the relief-valve now raises the latter, when the water forced into the water-way and hose passes back through the return-pipe P to the suction, and so circulates until the cock in the branch-pipe is again opened, reducing the pressure in the hose, when the spring J again seats the valve in the test-gage F, the other valves closing at the same time, when the water from the pump is again forced through the hose. The nut N of the waste-valve stem allows the valve G to play more or less without relieving the piston and relief-valve of their pressure when adjusted to give the arm K a little play, as seen in Fig. 2, the spring O keeping the waste-valve closed during the play of said arm K. By means of the screw-valve *b* the flow of water through the hollow stem may be regulated to

close the relief-valve quickly or slowly, as desired.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement, with relation to the water-way A and cylinder B, provided with the diaphragm B', the said water-way being connected to the discharge-channel of a pump, and the cylinder B connected with the suction of the pump by the return-pipe P, of the relief-valve C, hollow stem D, piston E, pressure-cylinder F, pressure-valve G, stem H, gland I, spring J, arm K, valve-case L, and waste-valve M, all constructed substantially as and for the purposes set forth.

2. The screw-valve *b*, in combination with the stem D of the valve *a*, as and for the purpose set forth.

3. The spring O on the stem of the valve M and the nut N, arranged, as described, for allowing the valve G and its arm K to have a slight play without affecting the relief-valve, substantially as herein described.

ALVARADO MAYER.

Witnesses:

H. F. EBERTS,

EDWARD JOHNSTON.