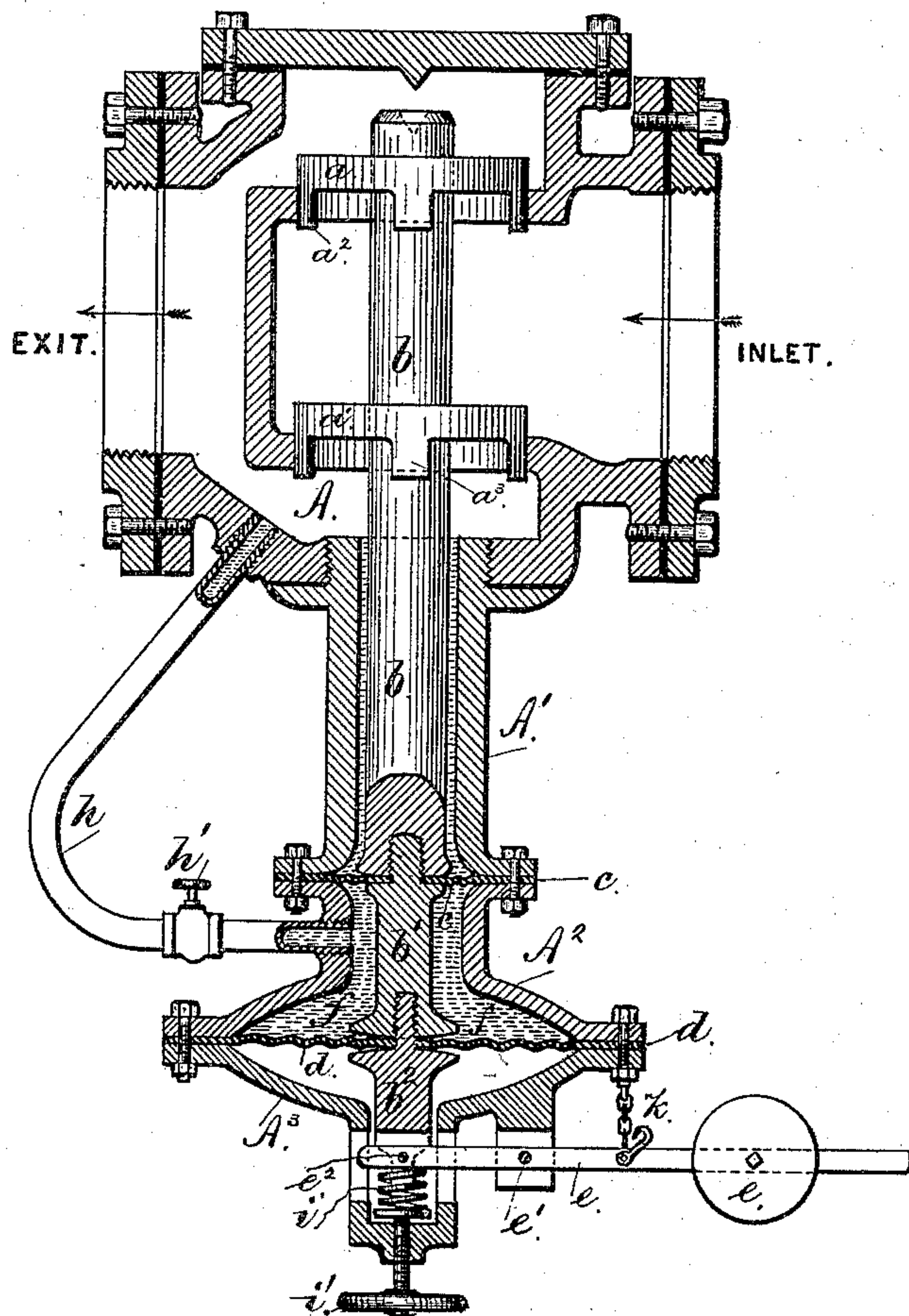


(No Model.)

J. ACTON.  
PRESSURE REGULATOR.

No. 335,734.

Patented Feb. 9, 1886.



Witnesses  
Harold Serrell,  
Chas H Smith

Inventor,  
per John Acton  
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Atty.



# UNITED STATES PATENT OFFICE.

JOHN ACTON, OF NEW YORK, N. Y.

## PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 335,734, dated February 9, 1886.

Application filed December 21, 1885. Serial No. 186,258. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN ACTON, of the city, county, and State of New York, have invented a new and useful Improvement in Pressure-Regulators, of which the following is a specification.

Pressure-regulators are generally employed in connection with heating buildings by steam, and the same are placed on the line of steam-pipes between the source of supply and the radiators, and difficulty has been experienced in keeping the regulators steam-tight and in proper working order.

My invention relates to a regulator having diaphragms which are sealed by water or other liquid, and thus protected from direct action of the steam, and in which the opening and closing of the piston-valves are regulated by the diaphragm and weighted levers.

In the drawing I have represented my improved pressure-regulator by a vertical section in which the steam "inlet" and "exit" are lettered and accompanied by arrows.

The case of the pressure-regulator is made of metal, with the various parts bolted or otherwise connected together.

$a a'$  are the piston-valves upon the stem  $b$ , and said valves are made with guides  $a^2 a^3$ , that project as segments of rims that prevent the valves moving laterally. The stem is made in three parts,  $b b' b^2$ , which are preferably screwed together, and the diaphragms  $c d$  are held between the parts  $b$  and  $b'$  and  $b'$  and  $b^2$ , and the outer edges of said diaphragms are secured between the sections  $A' A^2$  and  $A^2$  and  $A^3$ , respectively, of the case of the regulator.

The weight and lever  $e$  are pivoted at  $e'$  to the regulator-casing, and connected at  $e^2$  in a slot in the stem  $b^2$ ; and the action of said weight and lever is to raise the stems  $b b' b^2$  and open the valves  $a a'$  and admit steam to pass through the regulator to the radiators. The spring  $i$  and wheel  $i'$  serve to adjust the parts so that they act under the desired pressure.

Within the case  $A'$ , above the diaphragm  $c$ , and around the stem  $b$ , there is water or other liquid, and the chamber  $f$  above the diaphragm  $d$  is also filled with water, and there is a pipe,  $h$ , connecting the chamber  $f$  with the steam-chamber  $A$  at the exit side of the regulator, and said pipe  $h$  also becomes filled with water or other liquid, and there is a valve or cock,  $h'$ , that can be closed to shut off the pressure when desired. The chamber

beneath the diaphragm  $d$  is open to atmospheric pressure.

The operation is as follows: Supposing the valves  $a a'$  to be opened by the action of the weight and lever  $e$ , the steam passes freely to the radiators. If the pressure becomes excessive, the same, acting through the medium of the water in the chamber  $f$ , forces down the diaphragm  $d$  and draws down the diaphragm  $c$ , and through the stem pulls down the valves  $a a'$  and shuts off the supply of steam. As soon as the steam-pressure in chamber  $A$  falls by the cooling and condensing of the steam the pressure upon the water and diaphragm  $d$  is lessened, thus allowing the weight and lever  $e$  to again act and raise the valves  $a a'$  and admitting steam to pass to the radiators.

If the diaphragm  $d$  should break, the valve  $h'$  can be closed and the escape of steam be prevented; and if the diaphragm  $c$  should break the diaphragm  $d$  will prevent the escape of water and steam; and if both diaphragms should break, or it should become necessary to shut off the supply of steam, the chain  $k$  can be employed to hook up the lever  $e$  and keep the valves  $a a'$  closed.

I claim as my invention.

1. The combination, in a pressure regulator, with the valves  $a a'$  and weight and lever  $e$ , of the stem  $b b' b^2$ , the liquid-sealed diaphragms  $c d$ , and a connection from the chamber  $f$  to the steam-chamber  $A$ , substantially as set forth.

2. In a pressure-regulator, the valves  $a a'$  and weight and lever  $e$ , in combination with the stem  $b b' b^2$ , the liquid-sealed diaphragms,  $c d$ , a pipe,  $h$ , and valve  $h'$ , the parts being so constructed that there is a liquid-chamber around the stem  $b$  above the diaphragm  $c$ , and a liquid-chamber,  $f$ , around the stem  $b'$ , and above the diaphragm  $d$ , and communicating by the pipe  $h$  with the chamber  $A$ , for the purposes and substantially as set forth.

3. In a pressure-regulator, the valves  $a a'$  and stems  $b b' b^2$ , in combination with a weight and lever,  $e$ , and hook and chain  $k$ , whereby the lever can be hooked up and the valves  $a a'$  closed, substantially as set forth.

Signed by me this 17th day of December, A. D. 1885.

JOHN ACTON.

Witnesses:

GEO. T. PINCKNEY,  
WILLIAM G. MOTT.