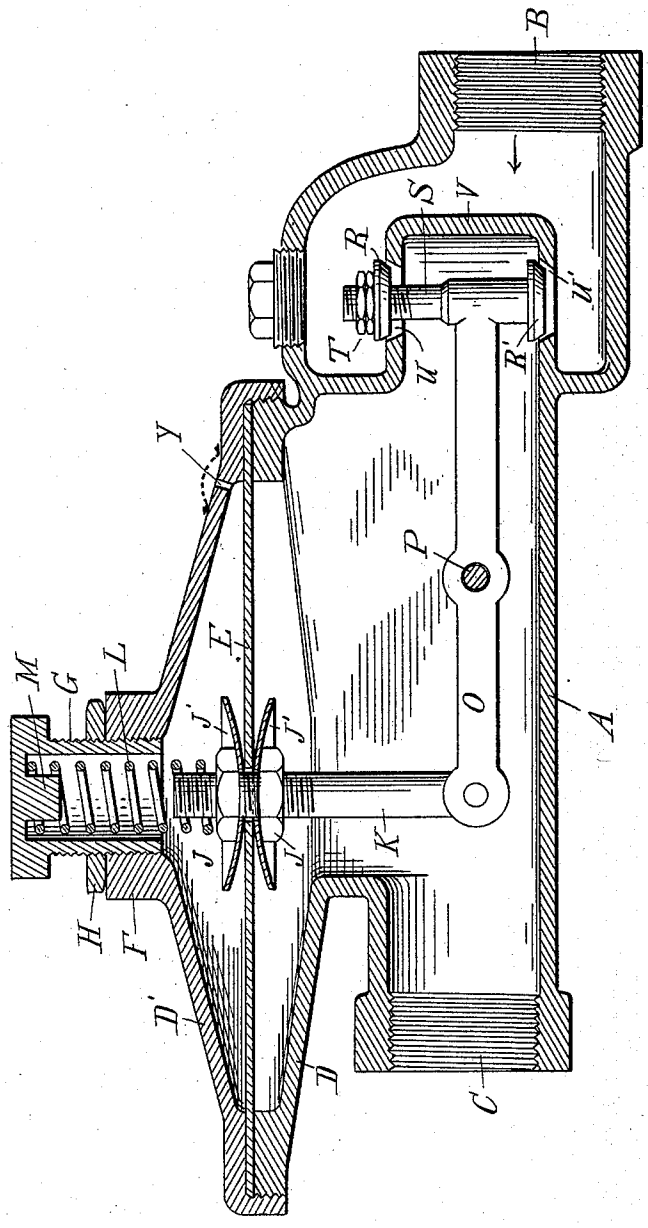
(No Model.)

J. F. McELROY.

PRESSURE REGULATOR.

No. 410,178. Patented Sept. 3, 1889.



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF LANSING, MICHIGAN.

PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 410,178, dated September 3, 1889.

Application filed March 1, 1889. Serial No. 301,629. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented certain new and useful Improvements in Pressure-Regulators, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to new and useful improvements in pressure-regulators; and the invention consists in the novel construction and arrangement of the parts regarding the general merits of the device as a steam-pressure regulator, and, further, in some specific features of construction, whereby the device is more particularly adapted for use in connection with steam-heating apparatus for railway-cars, all as more fully hereinafter described, and shown in the accompanying drawing, in which my device is shown in vertical central section.

The casing consists of a tubular portion A, provided at opposite ends with suitable pipe-connections B and C, and of a diaphragm-valve casing D and D′, in close proximity to the top of the tubular casing and connecting therewith, and preferably formed by casting the lower portion D integrally with the tubular casing, as shown. The upper portion or cover D′ of this casing is detachably connected with the lower portion D, with the edge of the diaphragm-disk E clamped between. The cover D′ is centrally provided with an upwardly-projecting boss F, which is interiorly screw-threaded to receive the hollow adjustment-nut G, which is adjustably locked in position by a jam-nut H. In the center of the diaphragm is adjustably secured by means of the nuts and washers J and J′ the screw-threaded stem K. The washers are preferably made of spherical shape, with corresponding spherical faces on the nuts, whereby the stem is firmly and adjustably secured to the diaphragm without reducing the elastic area of the same.

L is a regulating-spring interposed between the adjusting-nut and the diaphragm, and is preferably guided by means of a stud M, formed in the nut and projecting into one end of the spring, and by the free end of the stem K projecting into the other end thereof. The stem K projects with its lower end into the tubular casing A, and is there pivotally attached to one end of the lever O. This lever O is fulcrumed at P within the tubular casing and extends in the longitudinal direction thereof.

R and R′ are two valve-disks secured upon a common stem S, which is placed at right angles to the lever O and secured thereto, preferably, by being formed integrally therewith. The lower valve-disk R′ may also be formed integrally therewith; but the upper valve-disk R is adjustably secured to the stem and provided with suitable lock-nuts T.

U and U′ are the valve-ports, controlled by the valve-disks R and R′, and these valve-ports are formed by a partition V, which divides the high-pressure side from the low-pressure side of the device. Below the valve R′ and above the valve R the casing A is enlarged to form a free access of the steam to the valve-disks, and a screw-block is secured in the casing above the valve R to afford access to the side valve for the purpose of adjustment. The parts being constructed as shown and described, they are intended to operate as follows:

In the absence of any steam-pressure the adjustment of the regulating-spring L is such as to keep the valve-ports U and U′ normally open, and if steam is admitted through the inlet B it is free to enter through such ports into the low-pressure side of the device, which opens out underneath the diaphragm, and, acting against the same by its pressure, will distend the diaphragm against the action of the regulating-spring, and thereby, through its connection with the valve-stem K, the lever O, and valve-stem S, will absolutely control the position of the valves R and R′ in relation to the ports, and should the pressure upon the diaphragm exceed a certain limit, according to the adjustment of the spring L, both valves will be closed upon their seats until the pressure on the diaphragm is relieved. Thus it will be seen that the amount of steam admitted into the low-pressure side depends entirely upon the tension of the diaphragm through the regulating-nut G, and any desired fixed pressure, therefore, may be

maintained on the low-pressure side, no matter what the pressure of steam is on the high-pressure side.

To give the sole control of the valves to the diaphragm, it is absolutely necessary to balance the valve-disks R and R′ both on their high and low pressure sides. This is done by making the area of the high and low pressure sides of both valves alike. To prevent too quick a motion of the diaphragm, I provide a small vent or pin-hole Y through the cover D′ into the inclosed space above the diaphragm, and this I cover over with a screen to prevent dirt from entering.

My construction presents several advantages—such as great simplicity and compactness—when compared with other pressure-regulators of the same character. This is obtained by the general arrangement of the parts to which the tubular casing containing the steam inlet and outlet in opposite ends, the partition dividing the high and low pressure side near the steam-inlet, the lever-fulcrum in the tubular casing with the valves carried directly at one end thereof, the diaphragm arranged to form a wall in close proximity to the top of the tubular casing with the casing D formed integrally therewith, the stem K, connecting the diaphragm with the lever, and the hollow adjusting-nut with the regulating-spring. By balancing the valves on both the high and low pressure sides they cannot stick, and they render the regulation very sensitive, too quick a motion of the diaphragm being prevented by forming an inclosed space over the diaphragm with a pin-hole for a vent, and the manner of attaching the stem K to the diaphragm also preserves the sensitiveness of the diaphragm.

A specific advantage of my construction for car-heating is obtained by making the steam inlet and outlet into the tubular casing the full size of the casing itself, and by making the bottom of the tubular casing on a straight horizontal line without the presence of any pockets for water to accumulate and freeze up the device, which is the common trouble with devices of this kind in railway-car heating.

What I claim as my invention is—

In a pressure-regulator, the combination, with the casings A, D, and D′, the diaphragm, the pivoted lever O, the valves carried by one end of said lever, and the screw-threaded stem passed through said diaphragm, of the spherical washers on said stem upon opposite sides of the diaphragm, the nuts, the hollow adjusting-bolt, the nut H, and the spring within the hollow nut and bearing on one of the nuts on the stem, substantially as shown and described, and for the purpose specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 14th day of February, 1889.

JAMES F. McELROY.

Witnesses:

W. W. BATCHELDER,

EDWD. J. HUSSEY.