

UNITED STATES PATENT OFFICE.

THOMAS R. MORGAN, OF ALLIANCE, OHIO, ASSIGNOR TO HIMSELF AND
CHAS. E. MARCHAND, OF SAME PLACE.

IMPROVEMENT IN STEAM-PRESSURE REGULATORS.

Specification forming part of Letters Patent No. **184,542**, dated November 21, 1876; application filed
October 17, 1876.

To all whom it may concern:

Be it known that I, THOMAS R. MORGAN, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Steam-Pressure Regulator; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make use of it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to certain improvements in steam-pressure regulators.

The drawings represent a vertical section of my improved valve.

My invention consists in certain details of construction, as will hereinafter be described, and pointed out in the claims.

A and B are the respective inlet and outlet openings of the valve. C is the valve-stem, provided with piston-valves D E, which are constructed of equal areas, and adapted to snugly fit the valve-seats *a b* formed in the walls *c d* of the dividing-partition. F and F' are steam-chambers above and below the valve, and through which the steam escapes into the outlet-opening B. The valve-stem C projects above the upper valve D and enters the cap G, which is bored out at *e* to receive the stem. To the upper end of valve-stem C is keyed the lower end of a rod, *f*, which passes upwardly through a stuffing-box, H, formed in the cap G, and is keyed to a plate, I, the latter constructed with elongated bearings *h*, to slide on the guides or standards J J'. The upper portion of plate I is provided with a raised portion, K, to which is fitted the lower weight L. A rod, M, internally threaded at its lower end, is screwed onto the upper end of the rod or stem *f*, and serves to retain in place one or more weights, N, placed on the weight L.

In order to render the action of the valve constant and uniform, and prevent sudden movement of the same, spiral springs *g g'* are placed on the standards J J', above and below the bearings *h*, and the superposed weight is adjusted to any required tension between said springs by means of the nuts *i* and set-nuts *i'*.

It is obvious that, instead of using the weights L and M, a lever and weight, or a heavy spring, may be employed for the same purpose.

In the drawings the stuffing-box is closed by a gland, *k*, and separate follower *l*, which latter may be formed as a part of the gland, if desired.

The operation of the valve is as follows: Steam from the generator enters the valve-box through inlet A, and exerts an equal pressure against the opposing faces of the piston-valves D E, and hence produces no effect on the valve. The steam on the working side of the valve, or at B, exerts its pressure both above and below the valves D E; but the pressure on the lower valve is equal to the given pressure of steam multiplied by the square inches of valve-surface, while the downward pressure on the upper valve is lessened by the area of the valve-stem, and hence, the outer surfaces of the valves D E being of differential areas, the tendency of the steam is to keep the valve in a closed position. The weights employed thus work through the piston-valves against the preponderance of steam-pressure against the lower valve on the outlet side of the valve-chamber. When the pressure at that point falls below the desired pressure, and at which the valve is loaded, the valve will fall and admit steam from inlet A, until the steam-pressure below the valve is sufficient to raise it and cut off the entrance of steam.

The valves are preferably formed with wings or projections to serve as guides and direct the valves to their seats.

A regulator constructed as above set forth is economical in manufacture and simple in construction. It takes but little space for its free operation, and the parts are not readily worn or impaired by wear, and it may be applied to any of the ordinary uses of a steam or liquid governor.

The regulator is adapted to can-driers, slashers, paper-driers, and also is specially applicable in the manufacture of rivets of various sizes.

Heretofore the pressure applied to rivet-machines varied with the varying pressure of

steam in the boiler, and hence the same pressure has been used to make light and heavy rivets.

By applying my improved steam-pressure regulator, the pressure of steam may be regulated and adjusted as desired, so that the pressure may be accurately adjusted for different classes of work, and more perfect results accomplished in a more economical manner.

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

1. The combination, with the valve-casing, piston-valves, and stem, of the rod *f*, plate I, and standards *J J'*, substantially as and for the purpose set forth.

2. The combination, with the valve-casing, piston-valves, and stem, of the rod *f*, plate I, standards *J J'*, and springs *g g'*, substantially as and for the purpose set forth.

3. The combination, with the valve-casing, piston-valves, and stem, of the rods *f M*, plate I, standards *J J'*, and weights *L N*, substantially as and for the purpose set forth.

In testimony that I claim the foregoing, I have hereunto set my hand this 10th day of October, 1876.

THOS. R. MORGAN.

Witnesses:

A. L. JONES.

J. R. MORGAN.