(No Model.)

W. S. PAYNE.

AUTOMATIC PRESSURE REGULATOR.

No. 332,747. Patented Dec. 22, 1885.

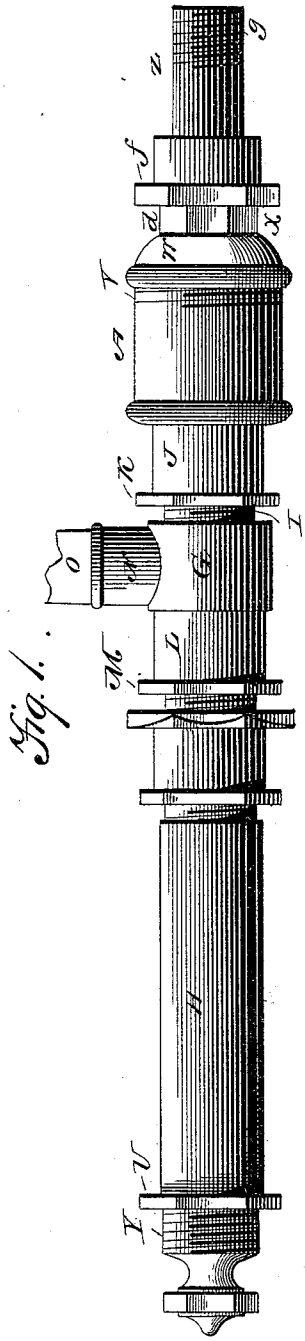


Fig. 1.

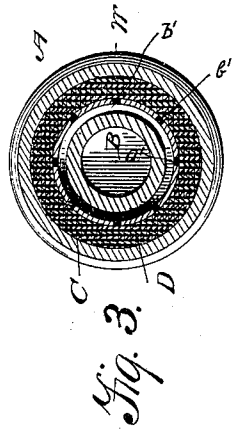


Fig. 3.

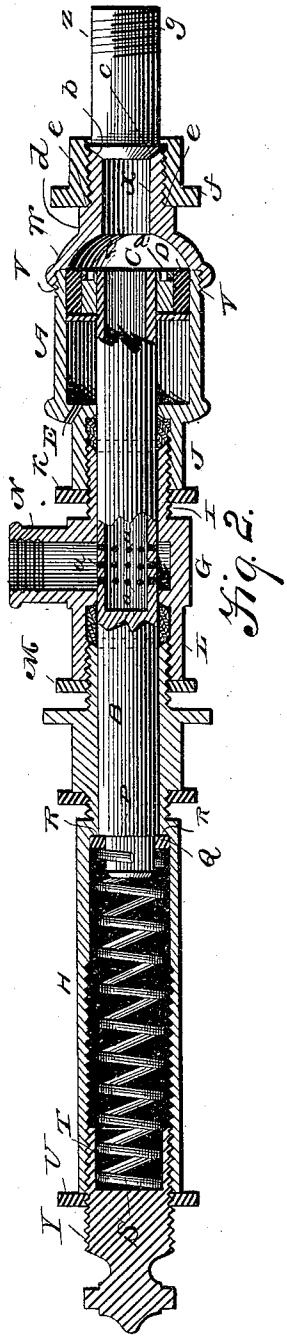


Fig. 2.

Witnesses
E. G. Siggers.

Inventor
Walter S. Payne.
By his Attorneys
C. A. Snow & Co.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WALTER S. PAYNE, OF FOSTORIA, OHIO, ASSIGNOR TO WALTER S. PAYNE & CO., OF SAME PLACE.

AUTOMATIC PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 332,747, dated December 22, 1885.

Application filed November 3, 1885. Serial No. 181,776. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. PAYNE, a citizen of the United States, residing at Fostoria, in the county of Seneca and State of Ohio, have invented a new and useful Improvement in Automatic Pressure-Regulators, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to automatic pressure-regulators for steam or water, or for any other purpose to which it could be adapted where it is required to have different pressures; and it has for its object to provide a device of this character which will be simple in construction, inexpensive to manufacture, convenient in its application, efficient in operation, and automatic in its working actions, so that when the pressure reaches above a certain point the device will operate to exclude the further admission of steam or water.

With these and other objects in view the said invention consists in certain details of construction and combination of parts, as hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view illustrating my invention. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a transverse sectional view.

Like letters refer to corresponding parts in the several figures.

Referring to the drawings, A designates the cylinder, B the hollow piston, and C the piston-head carried by the piston and working in the cylinder. The piston-head C is formed with an annular groove to receive a packing-ring of leather, rubber, or other material, as at D, and the head of the cylinder has an opening, E, communicating with the outer air, and thus should any steam or water escape back of the piston-head it will be forced out through said opening by the backward movement of the same. The front or lower face of the piston-head C is annularly grooved at *a'*, and through the outer wall of the piston-head surrounding this groove is provided a series of perforations, *b'*. The steam which escapes from the piston is caused to fill the groove *a'* and to work through the perforations *b'* against the packing D, and thus provide a steam-packing which will insure a tight connection and prevent the escape of any steam in rear of the piston-head. The piston B is provided with a series of perforations, *a*, near the central portion of its length, and passes through a cylindrical casing, which consists of a main branch, G, and a secondary branch, H. The main branch G is externally threaded at one end, I, to screw into an internally-threaded box, J, projecting from the head of the cylinder, said box being filled with suitable packing material, and a clamping-collar, K, working on the end I against the end of the box J, so as to preserve a water-tight connection and prevent the escape of steam or water. The other end of the main branch is provided with a stuffing-box, L, having packing arranged therein, the threaded end of the secondary branch H screwing into the box against the packing, and a clamping-collar, M, working on the threads against the end of the box, to guard against the passage of water or steam. An interiorly-threaded extension, N, projects from the main branch to receive a pipe, O, which communicates with a source of water or steam supply. In its ordinary position the perforations in the hollow piston come on a line with the extension or inlet N, so that the water or steam delivered by the pipe O into the latter passes through the perforations into the hollow piston, travels its entire length, and discharges at the head thereof into the cylinder. The rear end of the piston passes into the secondary branch H, and is reduced to provide an annular shoulder, P, which receives a thimble or collar, Q, resting on the shoulder, and also on a shoulder, R, projecting inwardly from the branch H. A coiled spring, S, is located within the branch H, and has one end fitting over the end of the piston and bearing against the thimble or collar Q, and the other end received by the recess T of an exteriorly-threaded adjusting-cap, Y, the latter screwing into interior threads formed at the end of the branch H. A clamping-collar, U, works on the threads of the adjusting-cap to preserve an air and water tight connection.

It will be seen that by tightening or loosen-

ing the cap Y the tension of the coiled spring may be regulated to increase or diminish the pressure necessary to force the piston backward. It will also be seen that the clamping-collar U serves to hold the cap Y in the desired adjustment by working down over the threads of the cap against the end of the branch H, so as to prevent the loosening or turning of the cap until the collar U has been withdrawn away from the branch H.

The outer end of the cylinder A is threaded at V to receive a cap, W, provided with an externally-threaded tubular extension, X, the end of which is beveled inwardly, as at *b*. A branch pipe, Z, has one end beveled at *c*, to fit within the correspondingly-beveled end of the extension X. A collar, *d*, is formed on the extension and provides an abutment for the shoulder *e* of the packing-nut *f*. When the said nut *f* is screwed tight over the threaded end of the extension X, it joins the branch pipe Z thereto and provides a tight connection. The other end of the branch pipe Z is threaded at *g* for the attachment of a pipe, (not shown,) which distributes the steam or water to the desired point.

The operation of my invention will be readily understood from the foregoing description, taken in connection with the annexed drawings. First adjust the tension of coiled spring so that it bears against the piston at a pressure of, say, twenty pounds to the square inch. Now suppose there is from twenty to two hundred pounds pressure of steam or water coming in at N. This steam or water passes through the perforations of the hollow piston and discharges at the head into the cylinder. If the outlet at the cap W is closed, the back-pressure on a piston-head containing three square inches, when the pressure reached twenty pounds to the square inch, would give a pressure on three square inches of sixty pounds, which will be sufficient to overcome the coil-spring at the other end of the piston, and allow the latter to yield under the pressure of the steam or water—that is, the piston will be pushed back so that its perforations will no longer register with the inlet-opening, and thus exclude the admission of any further supply. Then, if from any cause the pressure gets below twenty pounds to the square inch in the cylinder, the spring exerts its power and moves the piston forward to open part or all of the perforations, and the pressure is immediately brought up to the amount to which the regulator has been set to carry.

A steam-boiler carrying one hundred and fifty pounds to the square inch may be employed to carry low pressure for heating purposes from the same boiler by the use of my improved pressure-regulator. You can carry any desired pressure on the opposite side of the regulator from the boiler down to one-fourth to one-half pound to the square inch.

The device is simple, inexpensive, efficient, and will not get out of order. By means of the same any desired pressure may be obtained and will be automatic in its action, so that when the pressure reaches above a certain point the device will act to shut off a further supply.

Having described my invention, I claim—

1. In an automatic pressure-regulator, the cylinder and its outlet, in combination with the piston-head working in the cylinder, the hollow piston-rod, the inlet, and perforations or openings provided in the piston-rod, the latter having said perforations normally registering with the inlet, as set forth.

2. In an automatic pressure-regulator, the cylinder and its outlet, in combination with the piston-head, the hollow piston-rod having one end discharging into the cylinder, and provided with inlet-openings for the entrance and passage of the steam or water, as set forth.

3. In an automatic pressure-regulator, the cylinder and its outlet, in combination with the piston-head working in the cylinder, the hollow piston-rod discharging at one end into the cylinder, an adjusting-spring acting against the other end of the piston-rod, an perforations or openings provided at an intermediate portion of the same piston-rod, as set forth.

4. In an automatic pressure-regulator, the combination, with the cylinder, piston-head, and piston-rod, of a spring acting against the piston-rod, an exteriorly-threaded adjusting-cap, and a clamping-collar engaging with the threads of the cap to hold it to the desired adjustment, as set forth.

5. The cylinder having its outlet end beveled and threaded, in combination with the branch pipe Z, having one end beveled to correspond to the beveled end of the cylinder, and a nut, *f'*, carrying the branch pipe and working over the threaded outlet end of the cylinder, as set forth.

6. The piston-head having the packing D fitted to its periphery, the annular groove *a'*, and the perforations *b'* in the outer wall of the piston-head surrounding this groove, as set forth.

7. The piston-head having the steam-passages *b'*, and the packing D, secured over the said passages, for the purpose set forth.

8. The cylinder A and the branches G H, in combination with the piston-head C, working in the cylinder, the hollow piston-rod discharging therein, the perforations or openings in the piston-rod, the inlet N, provided in the branch G, the spring inclosed in the branch H, and the adjusting-cap closing the open end thereof, as set forth.

9. The cylinder A and branches G H, detachably fitted together and provided with suitable stuffing-boxes, the branch G having the inlet N, in combination with the piston-head working in the cylinder, the piston, the spring located in the branch H, and the adjusting-cap Y, as set forth.

10. In an automatic pressure-regulator, the combination, with the cylinder A, of a cap,

W, provided with an extension, X, having its end beveled inwardly, a branch pipe, Z, having its end correspondingly beveled to fit within the end of the extension X, an annular collar on said branch pipe, and a packing-nut connecting the said pipe to the extension, for the purpose set forth.

11. In a pressure-regulator, the cylinder, in combination with the piston-head formed with an annular groove to receive suitable packing, the hollow piston, an inlet communicating with the piston, an outlet for the steam or water in the cylinder, and an opening in the cylinder back of the piston-head, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

WALTER S. PAYNE.

Witnesses:
WM. JAEGER,
FLEMING W. MUSSETTER.