(No Model.)

E. A. McLAUGHLIN.

SELF ACTING OR AUTOMATIC PRESSURE REGULATOR.

No. 383,314. Patented May 22, 1888.

Fig. 1.

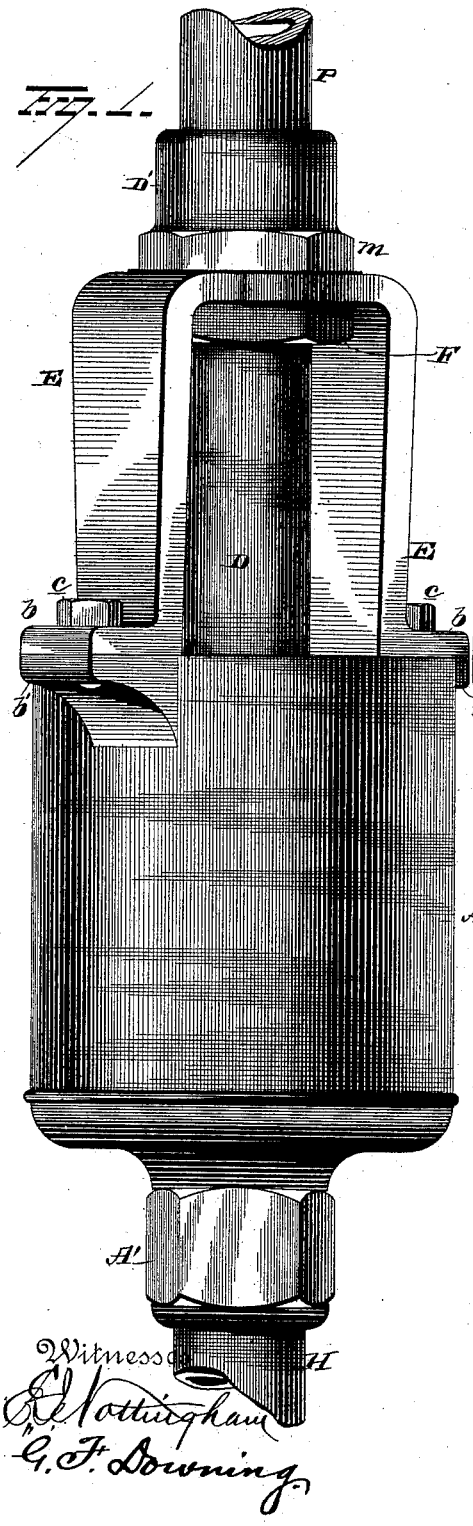
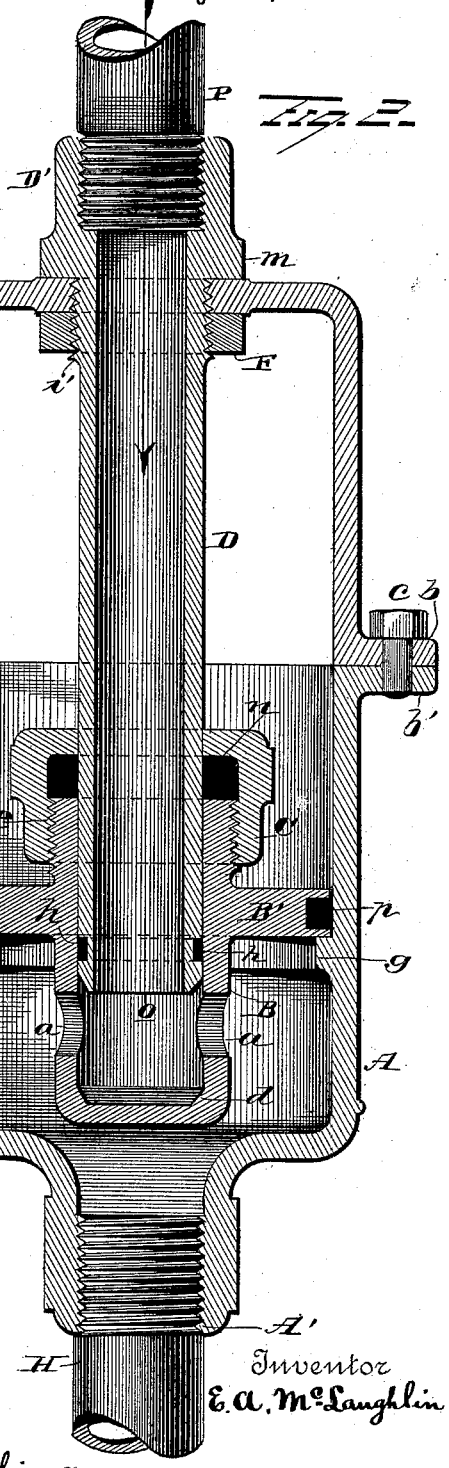


Fig. 2.



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UNITED STATES PATENT OFFICE.

EDGAR A. McLAUGHLIN, OF HORSEHEADS, NEW YORK, ASSIGNOR OF ONE-HALF TO HORACE J. WELLER, OF SAME PLACE.

SELF-ACTING OR AUTOMATIC PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 383,314, dated May 22, 1888.

Application filed December 1, 1887. Serial No. 256,668. (No model.)

To all whom it may concern:

Be it known that I, EDGAR A. McLAUGHLIN, of Horseheads, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Self-Adjusting or Automatic Pressure-Regulators; 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 appertains to make and use the same.

My invention relates to an improvement in self-adjusting or automatic pressure-regulators for steam, water, or gas service.

The object of my invention is to provide an improved device of this type which will automatically reduce extreme high pressure in a main-conduit pipe to any predetermined low pressure in a service-pipe to which the pressure-regulator is attached, the regulation being effected by the relative proportion of the parts of the device and the direct impact of the high-pressure fluid, steam, or gas upon these parts without the adjunctive service of springs or similar appliances.

With this object in view my invention consists in certain features of construction and combinations of parts, that will be hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation in perspective of the device. Fig. 2 is a side elevation in section of the pressure-reducing valve, taken on an axial line.

A is the outside shell of the valve, which is made of any suitable metal, cylindrical in form, and terminating at its lower end in a reduced portion, A′, which is threaded for the attachment of a service-pipe in which the fluid, steam, or gas is introduced after it has passed through the reducing-valve.

In the interior of the shell A a shoulder, *g*, is formed, that projects into this cylindrical chamber, and above the shoulder *g* the shell is rendered true by any proper means, so that its interior will be of equal diameter from the shoulder *g* to the upper end of the shell.

Two lugs, *b′*, are formed on the upper extremity of the shell A diametrically opposite each other and adapted to receive similar lugs or ears, *b*, made to project at right angles from the yoke E, which is secured to the shell A by screw-bolts *c*, which are inserted through holes in the ears *b* of the yoke and enter threaded holes in the lugs *b′*, as shown in Fig. 2. The yoke E will be further described in its proper order.

Within the shell A the piston-valve B is located. This valve is made tubular, as shown in Fig. 2, and has a flanged enlargement, B′, formed on its body, near the upper end, this flanged portion being of such a peripheral diameter that it will be adapted to rest on the shoulder *g* of the shell A. The flange B′ is intended to act as a piston-head and slide with a tight joint against the inner surface of the shell A, the edge of the flange being preferably grooved, as at *p*, to receive flexible or spring metallic packing, as may be preferred, which when inserted will insure an exact sliding fit of the parts together.

The inner surface of the tubular valve B is bored out to render it a true cylinder, and a bevel-joint, *d*, is made at the lower end of this cylinder near its closed lower end.

At a central point in the top surface of the yoke E a perforation is made to receive the true cylindrical tube D and afford a seat on its top surface for the enlarged integral portion D′ of this tube, which is squared or given a hexagonal form to receive a wrench, its lower offset shoulder, *m*, having a bearing contact with the yoke.

The portion of the tube D that extends below the shoulder *m* is threaded for a proper distance to receive the nut F, and below this thread *i* the body of the tube is reduced to allow the nut to be removed after it passes the lower termination, *i′*, of the thread. The part of the tube D that extends below the thread *i* is made of equal diameter throughout its length and of a size to slide neatly in the piston-valve B, the lower end of the tube D having a bevel-seat, *o*, formed on it to fit with a tight joint the seat *d*, made in the bottom corner of the valve B.

Above the piston-head or flange B′ of the piston-valve B a threaded projecting collar, *e*, is formed, which is provided with a cap-nut, C, to afford a means for forming a tight joint at the upper end of the collar *e* by the introduction of any suitable packing, *n*, between the collar and nut, and thus permit the piston-valve B to slide vertically within the shell A

and maintain a tight joint with the wall of the tube D. At any proper point between the lower surface of the piston-head or flange B′ and the seat *d*, that is formed in the tubular valve-chamber B, two holes, *a a*, are cut through the wall of the valve at opposite points to permit a free discharge through them of fluid, steam, or gas under pressure, that flows from the pipe P in the direction indicated by the arrow in the tubular valve D.

The tube or piece D, which is shown and has been described as forming a joint with the seat *d*, may also be grooved, as at *h*, to afford a means for the introduction of packing in this channel, and thus form a tight joint at any point with the wall of the tubular valve B.

In operation the high-pressure fluid, steam, or gas, which is introduced through the pipe P, will fill the tube D and escape into the cavity or chamber formed between the outer surface of the tubular valve B and the inner cylindrical surface of the shell A. The high pressure will also for a brief period of time be exerted in the service-pipe H, which is attached to the lower end of the shell or case A, and then, by its pressure on the lower side of the piston-head or flange B′, the valve B is elevated and the piston-head raised off of the shoulder *g*, which will cause the tubular piece D to cover the outlet *a a*, and thus cut off the passage of steam, gas, or water through them. When pressure in the service-pipe H is diminished, the piston-valve B will fall a sufficient distance to open the orifices *a a* properly and establish exact equilibrium, so as to afford a steady flow of the fluid or gas into the service-pipe with a reduction of pressure in the latter, which, when compared to the high pressure of the feeding-service P, will be in exactly the same ratio as the difference of areas between the interior lower surface of the tubular valve-chamber B and the superficial area of the piston head B′ added to the area of the outer surface of the lower end of the tubular valve B.

It is evident that the diametrical size of the shell A and orifices *a a* may be varied as to relative proportion and the reducing capacity of the valve be thus increased or diminished as may be desired.

In case it is necessary to effect a reduction in the pressure of fluid, gas, or steam, where a very high initial pressure is maintained in a conduit-main, it is preferred to employ two or more of the pressure-reducing valves herein described, as better results may thus be attained than would be afforded if one valve is used, which latter would require a greater change in relative dimensions of the working parts, that in some cases might be considered objectionable.

Many slight changes might be made in the form and combinations of parts of this pressure reducing and regulating valve without departure from the spirit or exceeding the scope of my invention; hence I do not desire to limit myself to the exact forms or combinations of parts shown; but,

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

1. The combination, with a chamber, a high-pressure pipe terminating within said chamber, and a service-pipe leading from said chamber, of a sliding piston mounted on the high-pressure pipe within the chamber and closely fitting said chamber, and a valve carried by said piston for closing the end of the high-pressure pipe.

2. The combination, with high and low pressure pipes and an intermediate chamber, of a piston located within the chamber embracing the discharge end of the high-pressure pipe, and a valve carried by said piston for closing the discharge end of said high-pressure pipe.

3. The combination, with a chamber, a low-pressure pipe in communication therewith, and a high-pressure pipe discharging into the same, of a piston mounted on the discharge end of the high-pressure pipe and fitting closely within the chamber, and a valve carried by said piston for closing the lower end of the high-pressure pipe.

4. The combination, with high and low pressure pipes and an intermediate chamber, of a piston closely fitting the chamber and loosely mounted on the high-pressure pipe, a hollow perforated stem attached to the piston, and a valve on the end of the stem for closing the discharge end of the high-pressure pipe, the area of said valve being less than the area of the piston, substantially as set forth.

5. The combination, with high and low pressure pipes and an intermediate chamber, of a piston closely fitting within the chamber, a hollow stem secured to the piston and provided with a closed lower end forming a valve, and with orifices formed therein at a point above said closed lower end, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDGAR A. McLAUGHLIN.

Witnesses:

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C. S. DRURY.