

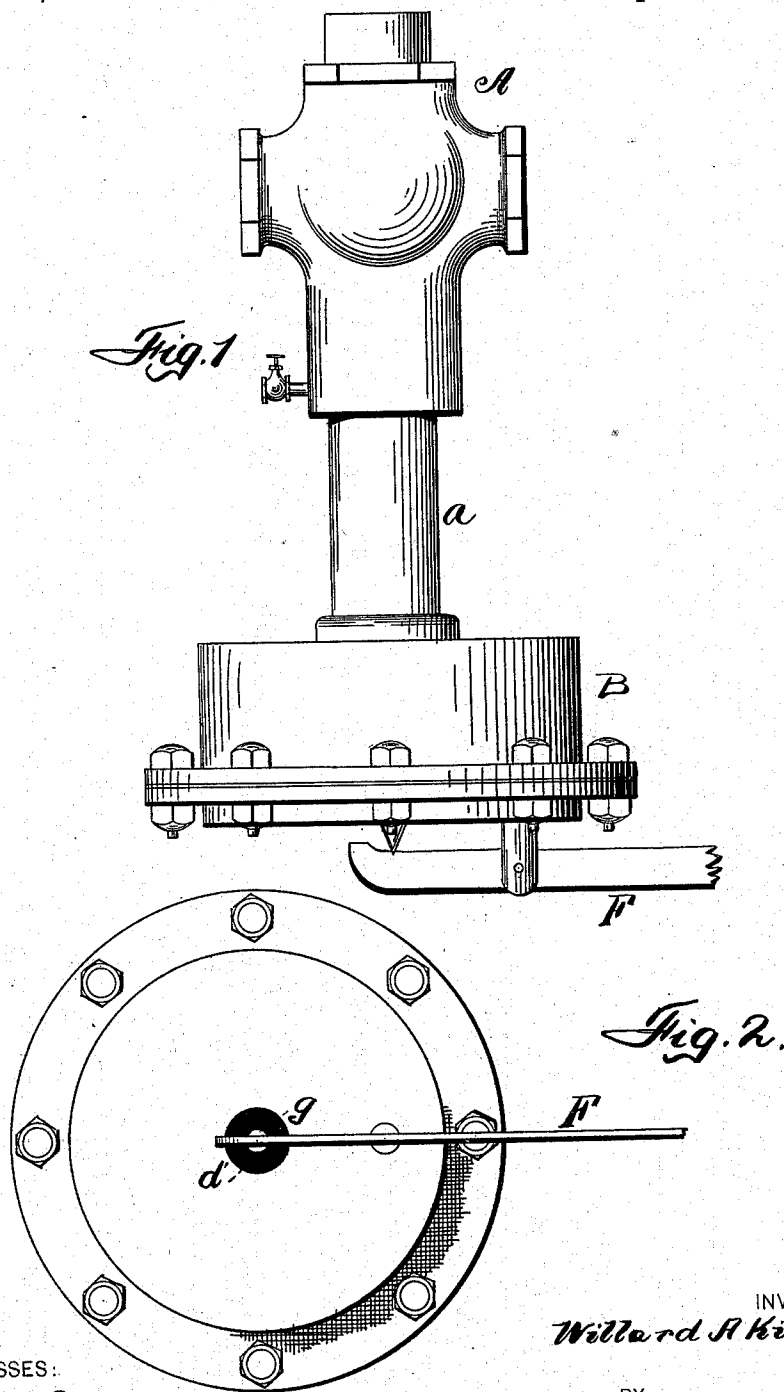
(No Model.)

2 Sheets—Sheet 1.

W. A. KITTS.
PRESSURE REGULATOR.

No. 568,029.

Patented Sept. 22, 1896.



WITNESSES:

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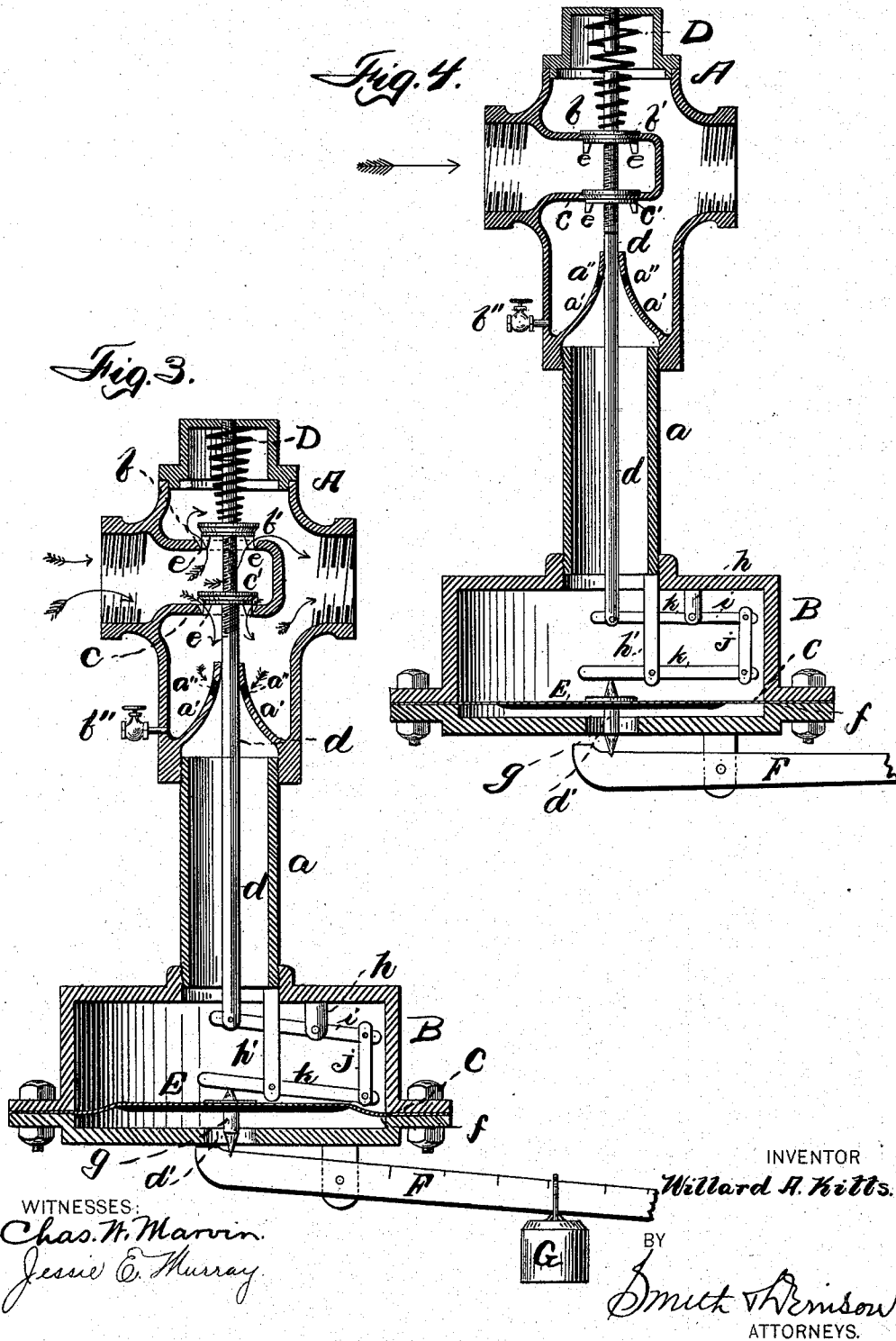
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UNITED STATES PATENT OFFICE.

WILLARD A. KITTS, OF OSWEGO, NEW YORK.

PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 568,029, dated September 22, 1896.

Application filed November 15, 1895. Serial No. 569,063. (No model.)

To all whom it may concern:

Be it known that I, WILLARD A. KITTS, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful
5 Improvements in Steam-Pressure-Regulators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to steam-pressure
10 regulators or equalizers.

My object is to produce an automatic regulator for the reduction of steam-pressure, so as at all times to regulate and maintain an even pressure upon a steam-line irrespective
15 of the pressure in the boiler, cheap and durable in its construction, positive in its operation, and of great utility; and to that end my invention consists in the several new and novel features and combination of parts
20 hereinafter described, and which are specifically set forth in the claims hereunto annexed.

It is constructed as follows, reference being had to the accompanying drawings, in which—

25 Figure 1 is a side view of the regulator complete, detached. Fig. 2 is a bottom plan view thereof. Fig. 3 is a vertical section showing the valve open. Fig. 4 is a similar view showing the valve shut.

30 Similar letters of reference indicate corresponding parts.

A is a three-way-pipe coupling, constructed substantially as shown, adapted to receive a conduit at either end, one leading to the
35 boiler and the other to the line.

a is a pipe extending from the lower port and is connected at its lower end with a drum B for the purposes hereinafter set forth.

Within the coupling-head are two valve-seats b and c, upon which are mounted the valves b' and c', said valves being mounted upon an upright d and adapted to rest upon valve-seats in the ordinary way, the adjacent faces of the said valves being equal in area,
40 so that the pressure of steam will act equally upon each. The said valves are also provided with downwardly-extending valve-guides e.

The drum B is provided with a port d', extending centrally through the bottom. The
50 upright d passes down through into the drum, substantially as shown. The bottom of the drum serves as a diaphragm-seat f, and g is

a post mounted vertically in said drum and passing down through said opening d' and mounted within the drum, and upon the post
55 g is the diaphragm C, adapted to move vertically within the lower part of the drum. Within the drum B, I mount brackets h h'. To the bracket h I pivot substantially central a lever i, one end of which is hinged to the
60 shaft j and the opposite end to the upright d. To the bracket h' I pivot a lever k, substantially central, and secure one end to the lower end of the shaft j and allow the free end to engage with the post g, upon which a diaphragm
65 is mounted, as shown.

D is a coil-spring mounted upon the upright d above the valve, as shown, and having its upper end bearing against the top of the cap of the coupling A and its lower end
70 against the top of the valve b' for the purpose of producing a tension upon the upright d for the purpose of holding normally the valves closed.

E is a diaphragm packing or gasket as secured loosely across the lower face of the diaphragm C, and F is a lever pivoted, substantially as shown, to a bracket extending from the lower side of the drum and having one end adapted to engage with the post g and
80 its other end being marked or graduated and provided with a weight G.

In the lower extension of the three-way-pipe coupling I construct an upward and inwardly extending bottom a', having ports a''
85 and a draw-off cock b''. The object of this is to allow the sediment to drop down into this pocket, thus constructed, where it may be readily drawn off by the cock b'', at the same time allowing the steam to pass down
90 through the ports a'', down into the drum, and also forming a guide for the upright d.

My invention is operated as follows: The steam passes from the boiler into the coupling from the left, the valves being raised a given
95 distance by the weight G upon the lever F to allow the steam to pass down through the pipe a into the drum B and also out through the pipe extending from the right-hand side of the coupling to the line. When the pressure
100 from the boiler increases sufficiently on the diaphragm, the diaphragm yields and the valves close and shut off the steam till the pressure is equalized by the weight G on the

lever F. As the diaphragm C and the post *g*, upon which it is mounted, are depressed the upright *d*, upon which the valves are mounted, is forced downward by the spring above described, so as to shut off or diminish the supply of steam, thus regulating the amount of steam-pressure which is carried to the line. It will thus be observed that the pressure upon the line may thus be regulated by the movement of the weight G one way or the other upon the lever F. It will be readily seen that the construction of this valve is such that in case dirt or scale becomes lodged under the valve-disks, the said disks can be easily taken out and the obstruction removed by unscrewing and taking off the cap A, said disks not being connected to the upright *d*, but only resting thereon, as shown. It will also be seen that by the use of the compound levers the movement of the diaphragm is multiplied on the valve-disks. The object of this is to produce a sensitive and quick-acting valve and also to prolong the life of the diaphragm by reducing its movement to a minimum, and also to prevent the valve-disks from jumping and hammering (a common fault with all other reducing-valves) by the friction produced upon the compound levers by the tension of the spring D against the weighted lever F, thus doing away with a dash-pot, sometimes used to accomplish this

result. It will also be seen that in case it becomes necessary to replace the diaphragm-packing E the same can readily be done by removing the cover on the bottom of the pot B without disconnecting or disturbing the levers or internal parts, as set forth.

What I claim is—

In a pressure-regulator, the three-way pipe provided with two valve-seats, a vertical rod having two valves secured thereto, and a spring applied to the upper end of the rod to hold the valves normally closed, combined with a drum mounted on the lower end of said pipe, a diaphragm placed in the drum and provided with a post which has its lower end to project through the bottom of the drum, a weighted lever applied to the outer side of the drum and having one end to bear against said post, the two levers pivoted in the drum and connected by a rod at their outer ends; the inner end of the upper lever being connected to the lower end of the valve-rod, and the inner end of the lower lever being made to bear against the top of the diaphragm-post, substantially as shown.

In witness whereof I have hereunto set my hand this 29th day of October, 1895.

WILLARD A. KITTS.

In presence of—

JESSIE E. MURRAY,
HOWARD P. DENISON.