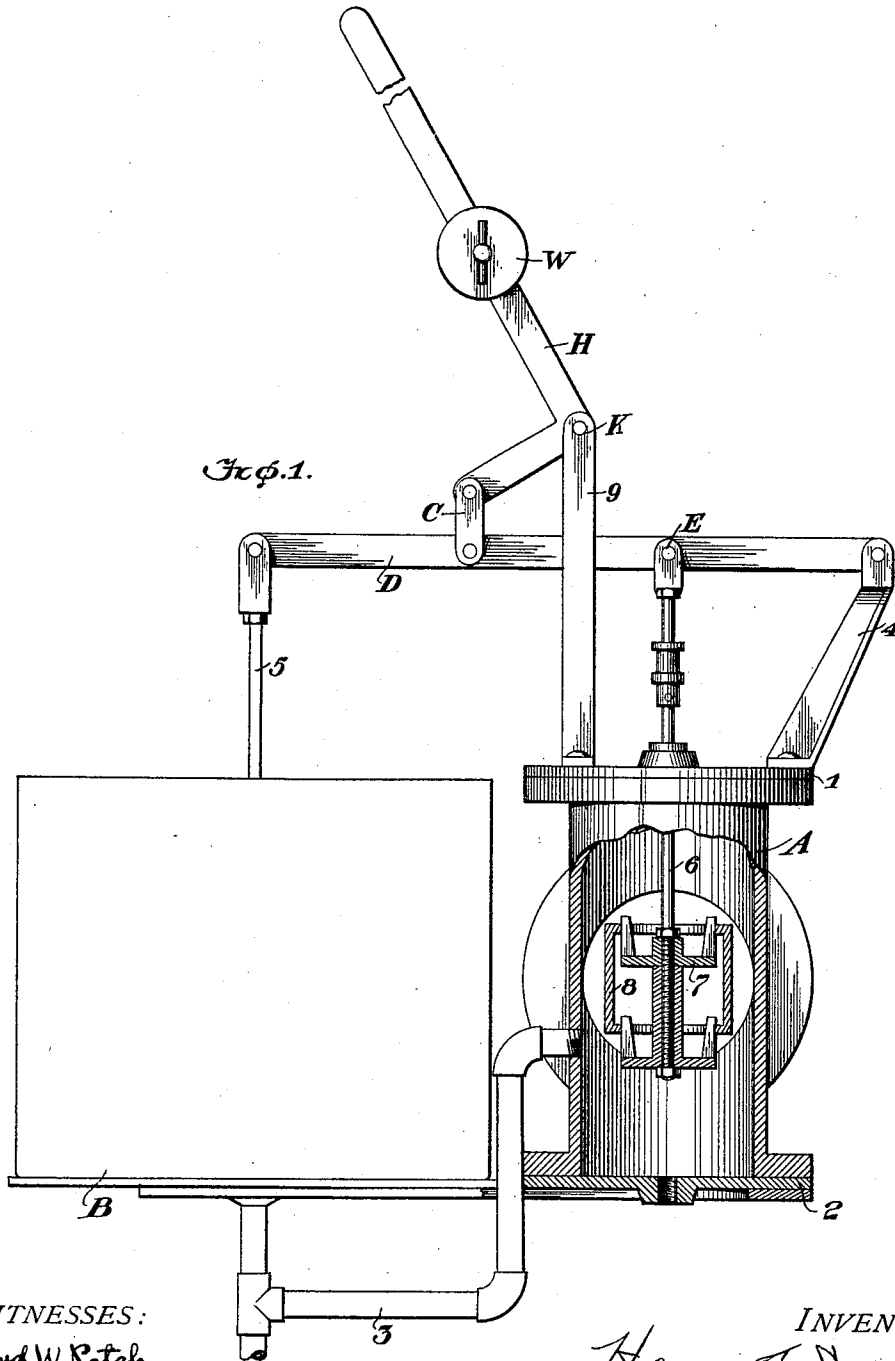


H. F. SMITH.
PRESSURE REGULATOR.
APPLICATION FILED APR. 29, 1909.

938,346.

Patented Oct. 26, 1909.
2 SHEETS—SHEET 1.



WITNESSES:
Gloyd W. Patch
M. H. Freeman

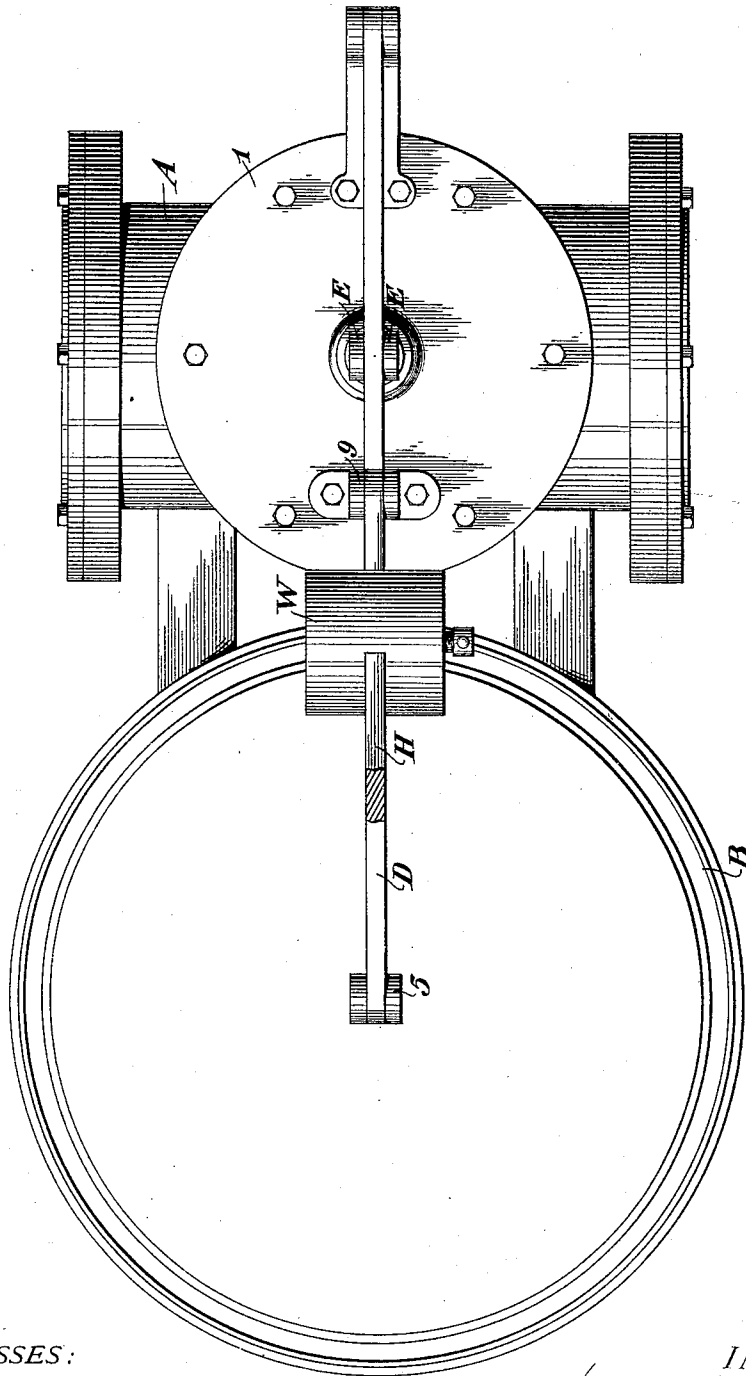
INVENTOR
Harry F. Smith
BY
Louis Baggett
his Attorneys

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Fig. 2.

INVENTOR

BY

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UNITED STATES PATENT OFFICE.

HARRY FORD SMITH, OF LEXINGTON, OHIO.

PRESSURE-REGULATOR.

Specification of Letters Patent.

Patented Oct. 26, 1909.

938,346.

Application filed April 29, 1909. Serial No. 492,923.

To all whom it may concern:

Be it known that I, HARRY F. SMITH, a citizen of the United States, residing at Lexington, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Pressure-Regulators, of which the following is a specification.

My invention relates to an improvement in pressure regulators for gas delivered from positive or non-positive blowers.

When gas is delivered from a source of variable resistance, as for instance through a centrifugal exhauster, the pressure on the discharge side of the exhauster will vary as the pressure on the inlet side varies. For example, when the centrifugal gas exhauster is taking gas from a suction producer, the resistance or vacuum on the suction side will vary with the condition of load and also with the operating condition of the producer. As a general rule, it may be stated that when the load decreases, the resistance or vacuum on the suction side of the exhauster will also decrease, and on account of this decrease in vacuum, there will also be a corresponding tendency for the pressure on the discharge side of the fan to increase. The same is true where the gas is handled by positive exhausters, but for different reasons. The positive exhausters deliver into the discharge line a definite, fixed quantity of gas. When the amount of gas being used in the discharge main decreases, there is on this account, a strong tendency for the pressure in the discharge line to increase since the volume of gas delivered by the blower is constant. In order to secure a uniform discharge pressure when positive or non-positive gas exhausters are used, it is therefore necessary to introduce some means of overcoming the variations above referred to. In the case of non-positive exhausters, this can be readily accomplished by providing means for throttling the discharge from the centrifugal exhauster. The way in which this is usually done is to introduce into the discharge line a throttling valve connected to a gasometer by a simple mechanical means, so that when the pressure on the discharge main rises above a certain predetermined limit established by the load on the gasometer, the latter will rise, and by its movement close the throttling valve thereby preventing a rise in pressure

on the discharge side of the valve. When the gas demand on the discharge side increases, thus creating a tendency in the gas pressure to fall, the reverse action takes place. In consequence, the gasometer settles, thereby opening the throttle valve, and permitting more gas to pass through into the discharge line. Practically the same method applies to non-positive exhausters, except that in this case the gasometer is connected to a valve located in a by-pass so that when the discharge pressure becomes abnormally high, this valve opens, and a part of the gas is by-passed into the intake side of the exhauster. Where very accurate regulation is required, this apparatus as described is not adequate for the gasometer in rising to close the throttle valve, it becomes less and less submerged in the fluid in which it is immersed, and consequently becomes continually heavier. The reverse of this takes place when the gasometer is more deeply submerged. This feature, with the friction of the several parts, results in a lag or lack of sensitiveness which it is the object of this invention to overcome.

Briefly therefore, my present invention consists in a gas pressure controlling apparatus, comprising a gasometer and pressure regulating valve in connection with a weighted lever so arranged as to automatically vary the loading of gasometer in such a manner as to compensate for the variations in weight of the gasometer due to its submersion, whereby to provide greater sensitiveness in governing the gas pressure.

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

In the accompanying drawings Figure 1 is a view in side elevation the parts being broken away, and Fig. 2 is a plan view.

A, represents a casing and is in effect a four-way union or coupling closed at the top and bottom by means of plates 1 and 2 securely bolted thereon, and B is an ordinary form of bell or gasometer, and a pipe 3 leads from the casing at a convenient point and discharges into the gasometer.

A lever D is pivotally supported at one end to the upper end of an arm 4 erected on the top plate 1 of the casing, and the other end is pivotally connected with a rod 5,

which rod is secured at its lower end to the bell of the gasometer. Links E, E, are pivotally connected at the upper end to the lever D, and at the lower end to a rod 6, and this rod carries a throttle valve 7 at its lower end which operates in the valve seat 8, within the casing A, where it controls the flow of gas and regulates its pressure. A bell crank or L-shaped lever H is fulcrumed at K on the post 9 mounted on the top plate 1 of the casing, and the short arm of this lever is connected by means of links C, C, with the lever D, preferably at a point approximately midway between the rods 5 and 6. A weight W is adjustably secured on this bell crank or L-shaped lever. It is at once seen that by means of this construction the adjustable weight W will exert a downward pressure upon the gasometer through the lever D which is proportional to the displacement of the lever from its vertical position. This displacement varies with the position of the gasometer, and consequently with the degree of immersion. As the immersion becomes less, and the gasometer thereby heavier, the active working leverage of the weight W also becomes less, and it exerts thereby a smaller downward pressure on the lever D. By adjusting the weight W, on the arm H, a point can be readily found where the decrease in weight due to the movement of the weight W just counterbalances and equalizes the increase in weight of the gasometer as it rises from the liquid seal. Contrariwise, as the gasometer is further submerged by its downward motion, the weight W by its displacement adds just as much weight as is lost through the submersion of the gasometer, and a condition of equilibrium is thereby established. By this method, therefore, a perfect equilibrium can be established and

maintained, and a very close and accurate control of pressure brought about.

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

1. A gas pressure controlling apparatus comprising a gasometer and pressure regulating valve in connection with a lever carrying a weight thereon, said lever connected to the valve and gasometer to automatically compensate for vibrations in the weight of the gasometer due to its submersion, whereby to provide greater sensitiveness in governing the gas pressure.

2. A gas pressure controlling apparatus comprising a gasometer and pressure regulating valve, and a lever connected near its fulcrum end to the valve, and its outer end to the gasometer, and a weighted lever so connected with the first-mentioned lever that greater or less weight is applied thereto, according to the position of the weight on the lever.

3. A gas pressure controlling apparatus consisting of a gasometer, a gas main or pipe in communication with the gasometer, a valve seat in the pipe or main, a valve for controlling the passage of gas therethrough, a lever pivotally supported at one point and connected with the valve and the bell of the gasometer, and a weighted lever pivotally supported and pivotally connected with the first mentioned lever, said lever being a bell crank or L-shaped lever, and its weight being adjustable thereon.

In testimony whereof I affix my signature, in the presence of two witnesses.

HARRY FORD SMITH.

Witnesses:

WM. H. EARHART,
S. L. EARHART.