(No Model.)

K. J. SMITH.

GAS PRESSURE EQUALIZER.

No. 456,238. Patented July 21, 1891.

Fig. 1.

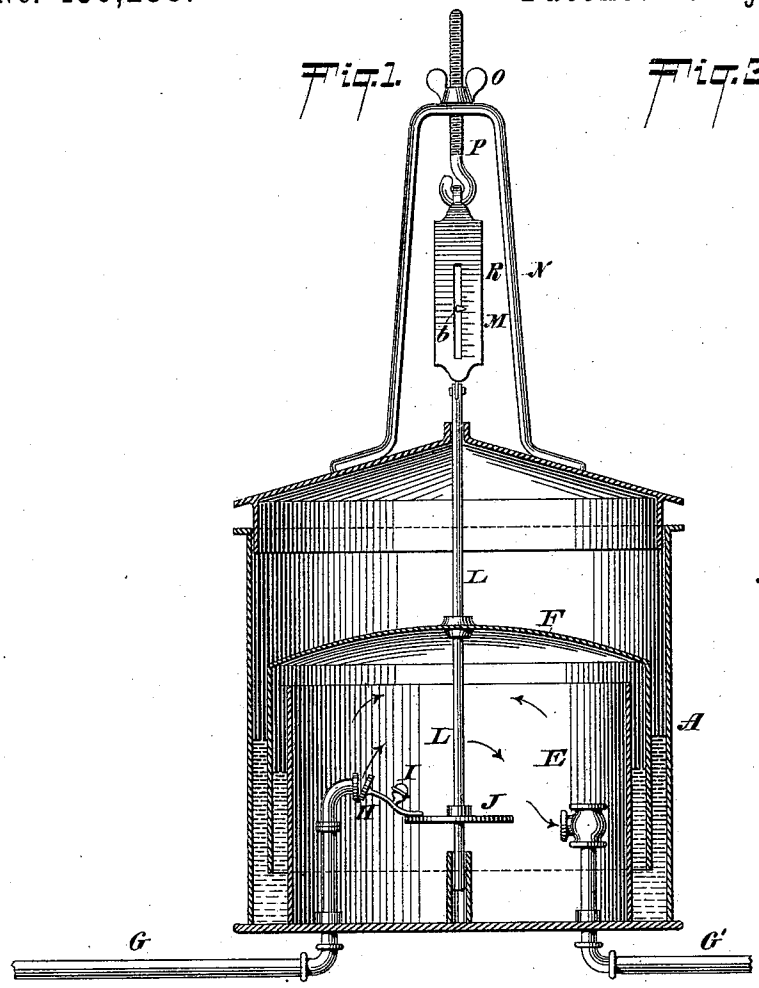


Fig. 3.

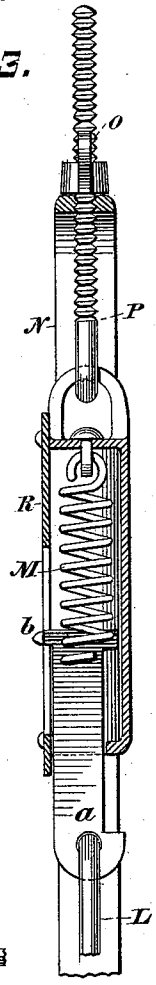
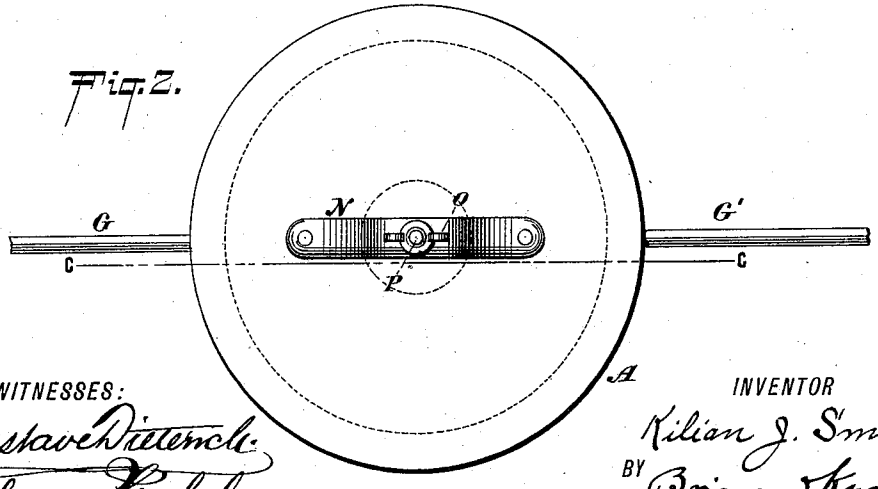


Fig. 2.



WITNESSES:

Gustave Dittenck.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

KILIAN J. SMITH, OF RUTHERFORD, NEW JERSEY.

GAS-PRESSURE EQUALIZER.

SPECIFICATION forming part of Letters Patent No. 456,238, dated July 21, 1891.

Application filed November 10, 1890. Serial No. 370,961. (No model.)

To all whom it may concern:

Be it known that I, KILIAN J. SMITH, of Rutherford, Bergen county, and State of New Jersey, have invented a new and useful Improvement in Gas-Pressure Equalizers, of which the following is a specification.

My invention relates to an improvement in gas-pressure equalizers—for example, of the kind shown in Patent No. 420,169; and it consists in combining the dome of such a structure with a suspension-spring and adjusting-screw, and also with a scale, as hereinafter more fully explained.

The object of my invention is to balance the dome and to prevent it from acting as a gas-expeller, leaving it to act simply as a pressure-regulator.

Reference is had to the accompanying drawings, wherein—

Figure 1 is a central vertical section of my improved equalizer. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged vertical cross-section of my dome-regulating spring-scale.

Similar letters refer to similar parts.

A is the exterior chamber having the inner open-ended cylinder E; G, the gas-inlet pipe; G′, the gas-outlet pipe; F, the dome dipping in liquid contained in the chamber A; L, the vertical dome-spindle; J, the disk thereon, and I the arm of the inlet-valve H. These parts, as far as described, are well known and are substantially as specified in Patent No. 420,169. I find that the device of said patent, however, serves more as a gas-expeller than as a regulator, because of the dead-weight of the dome F, and in fact more gas is consumed by the use of such a structure than would be if the structure were wholly omitted; but by adding to the dome the adjustable spring and screw hereinafter referred to, I am enabled to balance it and to adjust its weight in conformity with the varying degrees of gas-pressure, thereby reducing the quantity of gas consumed. To this end I connect the upper end of the spindle L above the chamber A by a link *a* or directly to a spring M, this spring being suspended from a screw P, which in turn is suspended in a frame N, which is supported on the cover of the chamber A. The height of the spring M can be regulated by a thumb-nut O, which plays on the screw P and bears on the frame N.

In operation, when gas under an excess of pressure enters through the pipe G into the cylinder E, the dome F rises, raising at the same time the disk J, upon which rests the valve-arm I. It will be seen that as the dome rises the valve H gradually closes, reducing thereby the supply of gas to the chamber. When the supply of gas is under insufficient pressure, the dome falls, and as it falls the valve H opens wider. Experience has proven that the weight of the dome F upon the therein-contained gas in most gas-pressure regulators has caused, rather than a regulation of gas, a very unnecessary waste, for, unless the weight of this dome is neutralized, it will cause an expulsion of gas from the chamber in the proportion to the amount of pressure caused by such weight, and will therefore upon its very face prevent the successful working of such a so-called regulator. By introducing the adjustable spring M and its screw P in combination with the regulating-dome applicant balances and neutralizes the weight of the dome F, so that it will be a regulator and not a gas-expeller. In case the pressure back of the supply-pipe G should be increased or diminished the height of the spring M may be regulated by the thumb-nut O, thereby adjusting the height of the dome F to accommodate the pressure through the pipe G. I prefer to connect the upper end of the spring M and the lower end of the screw P to an ordinary spring-scale having a suitably-graduated plate R, on which a pointer *b*, projecting from the link *a*, indicates the play of the balanced dome.

I do not wish to confine myself to the particular device J I for regulating the valve by the motion of the dome, as other well-known contrivances for the same purpose may be used instead.

Having thus described my invention, what I claim is—

The combination, in a gas-pressure regulator, of an exterior chamber A, containing the cylinder E, the gas-supply pipe G, extending into the cylinder E, the valve H on pipe G, having a laterally-extending arm, the disk

J, placed under the said arm of the valve H, the dome F, supporting the vertical rod L, carrying said disks J and connected with the cylinder E and extending upward therefrom, the discharge-pipe G′, leading from the cylinder E, the standard N, carried by the chamber A, screw P, carried by said standard, nut O, carried by said screw, and spring M, connecting the rod L with the scale R, the scale R, connecting the upper end of the spring M with the lower end of the screw P, substantially as described.

KILIAN J. SMITH.

Witnesses:
GUSTAV SCHNEPPÉ,
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