

J. EDSON.
GAS REGULATOR.

No. 35,146.

Patented May 6, 1862.

Fig. 2.

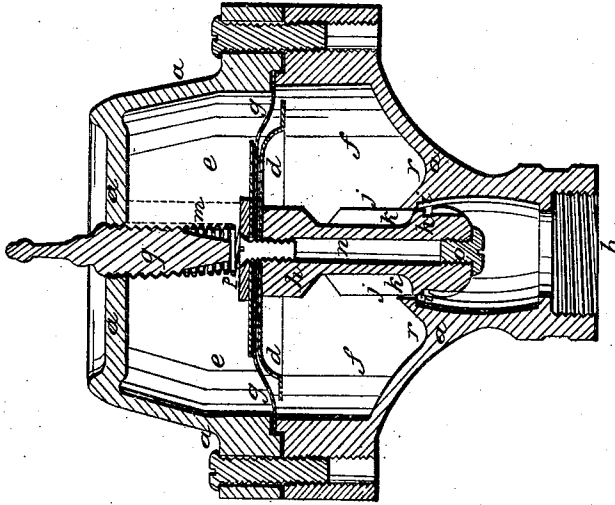
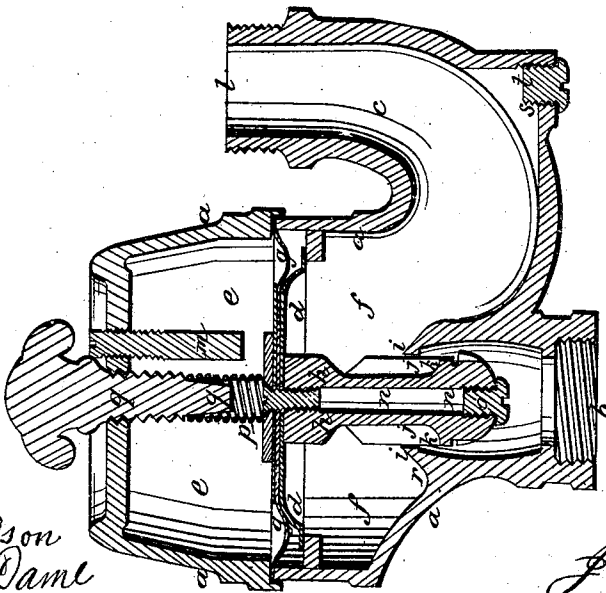


Fig. 3.



Fig. 1.



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IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. 35,146, dated May 6, 1862.

To all whom it may concern:

Be it known that I, JACOB EDSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Gas-Regulators; and I do hereby declare that the following description, taken in connection with the accompanying drawings hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

Owing to the very unequal and constant variation of the degree of pressure of the gas used for illuminating purposes, it has long been very desirable to provide an apparatus or arrangement of devices to be attached to the induction-pipe of buildings, &c., by means of which the pressure of the gas could be regulated or adjusted to any desired degree, and also continually maintained at the same, the most important advantages arising from which would be the securing of a steady and even flame to the burners and the producing of a great economy in the consumption of the gas.

The present invention therefore has for its object the accomplishment of the above-described result; and it consists in attaching to the induction-pipe of buildings, &c., a hollow globular or any other suitably-shaped receptacle or reservoir, in the interior of which and at or near its center a thin horizontal floating disk is placed and secured at its edges to the receptacle, thus separating the same into two distinct chambers by means of leather or any other suitable flexible material, or by floating them in a groove filled with mercury, or by any other means that while preventing communication between the two chambers will yet allow of the vibration or motion of the disk in a vertical plane. To the under side of this disk a hollow vertical valve-rod or die cut-off is secured, and, extending into and through the induction-aperture of the receptacle, is so constructed and arranged that when operated in a vertical or up-and-down direction it will close or open the said aperture

to the admission of gas to the receptacle. Thus the gas entering and filling the lower chamber of the receptacle, from which it passes to the distributing-pipes, serves as a medium for the disk to float or rest upon, and the disk, by floating upon the same, is therefore extremely sensitive to the least change or variation in its pressure, and being susceptible of operation thereby in a vertical direction consequently and instantly closes or opens the valve in direct ratio to the increase or decrease of the pressure, and, as is evident, will so regulate the admission of the gas to the receptacle as to constantly preserve its pressure at a uniform and equal degree.

To render the apparatus adapted to any and all degrees of pressure of the gas, I make the valve-rod or die cut-off hollow, so that by the insertion of small shot or other similar substances it may be increased or lessened in weight at pleasure and thus increase or decrease the amount of pressure of the gas necessary to operate the floating disk, as described.

I have also made several other improvements in the general arrangement and construction of my improved gas-regulator, which will be hereinafter described, and that are essential to its more perfect operation and adaptation to the purposes for which it is designed.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1 is a central longitudinal vertical section of my improved gas-regulator with the induction-aperture opened. Fig. 2 is a similar section representing the valve as closed. Fig. 3 is a detail view to be hereinafter referred to.

a a in the accompanying drawings represent a hollow globular or any other suitably-shaped receptacle or reservoir, attached at *b* to the induction-pipe of buildings, &c.

c is the induction-pipe of the same and to which the distributing-pipe is secured.

In the interior of the receptacle *a*, and at or near its center, a thin horizontal floating metallic disk, *d*, is placed and secured to the same, dividing the receptacle into two distinct and separate chambers, *e* and *f*, by means of a leather sheet, *g*, or by any other suitable

flexible material, or by floating its edges in mercury, or in any other proper way that will permit of a vibration or motion of the disk in a vertical plane, and also prevent the communication between the said chambers *e f*.

Attached to the under side of the floating disk *d* is a hollow vertical valve-rod or die cut-off, *h*, extending downward into and through the induction-aperture *i* of the receptacle *a*. In the outer periphery of the cut-off *h* radial wings or projections *j j*, &c., Fig. 3, are formed, that act as guides to steady the cut-off in its course, and between which, through the openings *k k*, &c., the gas from the induction-pipe passes to the lower chamber, *f*, of the receptacle, as represented by red arrows in the drawings, Fig. 1.

The gas from the induction-pipe, passing as above described, enters and fills the lower chamber, *f*, of the receptacle, from which it is conveyed to the various distributing-pipes through the eduction-aperture *l*. Upon this gaseous vapor in the chamber the disk *d* "floats" or rests, as it were, and is thus sensitive to the least variation or change of the pressure, be it either greater or less, and consequently rises or falls with the same, and as the cut-off *h* is attached thereto it also is raised or lowered, and thereby closes or opens the aperture to the admission of gas to the receptacle, as the case may be, the air in the air-chamber *e* of the receptacle by its compression and expansion from the upward and downward movement of the disk acting as an elastic cushion upon the same, and thus imparting a more steady and even motion thereto.

From the above description it will be seen that a uniform and equal pressure of gas in the receptacle is secured and maintained, as any change or variation in the same, be it ever so slight, immediately so affects the aperture through which the gas passes to the receptacle as to always allow of the passage of the same amount or quantity of gas, notwithstanding the pressure to which it may be subjected in the induction-pipe, as is apparent without further explanation.

m is an adjustable screw-rod in the chamber *e* of the receptacle *a* by means of which the upward movement of the disk, &c., can be regulated or limited at pleasure, and which, it is evident, should be so adjusted with regard to the same as to always permit gas to pass by the cut-off to the receptacle and thus prevent it from acting as a valve or being clogged by any substances, as would otherwise occur were the bearing-surfaces allowed to come in contact. The floating disk or cut-off by not operating as a valve, it is apparent, avoids the necessity of overcoming the pressure against the lower end of the cut-off in its operation, so that in fact its periphery may even be larger than the diaphragm or disk to which it is attached above, and yet be equally sensitive.

It is evident from the above description that to adapt the apparatus to various degrees

of pressure it is only necessary that the cut-off should be increased or lessened in weight and thus increase or lessen the pressure of gas requisite to operate the same, as described, and for this purpose the die cut-off *h* is made hollow, as represented, in the cavity *n* of which small shot or other suitable material can be inserted, as may be desired, a screw or stopper, *o*, preventing the falling out of the same.

p is a spiral spring wound around a screw-rod, *q*, and bearing upon the upper surface of the floating disk. This spring by its arrangement can be so adjusted that a greater or less degree of pressure will be brought to bear upon the disk, and thus correspondingly retard its upward movement, should it be desired upon special occasions, after the apparatus has been once set at a given degree of pressure, to slightly increase or decrease the same.

r is a groove or gutter formed in the lower portion of the receptacle *a*, into which the coal-tar, &c., condensed upon the sides thereof, fall and are then conducted or conveyed by the same to the outlet or opening *s* of the eduction-pipe *c*, by the unscrewing of the stopper or screw *t* of which they can be easily removed, the many advantages of which in the operation of the regulator are evident. In order to "shed" or conduct from the floating disk the coal-tar, &c., condensed upon the same in such a manner as to prevent their falling upon and into the induction-aperture, the edge of the disk or diaphragm is curved or bent down, as represented, which will thus conduct or convey the coal-tar, &c., from the same directly to the gutter or groove *r*, from which they pass and are removed, as described.

By arranging the die cut-off *h* in the induction-aperture of the receptacle in the manner described it will be observed, if the rod *m* limiting the upward movement of the disk be raised sufficiently and the pressure from the spiral spring upon the same be removed, that the gas in operating the disk, &c., will then by its pressure force or push the cut-off through the aperture and thus cleanse or scrape the same of all impurities or products that may be collected upon the surface thereof, whereby, when desired, the apparatus is readily made to cleanse itself, and by its own operation—a result never before accomplished in gas-regulators.

Among the many advantages arising from the arrangement of gas-regulators according to the above-described improvements I may enumerate the following, viz: first, that as no two surfaces come directly or indirectly in contact with each other the clogging or sticking of the apparatus that has rendered gas-regulators as heretofore made worse than useless is entirely obviated; second, that the air in the air-chamber above the disk, operating as an elastic cushion upon the same, steadies its motion and prevents its too sudden and quick operation, which would otherwise occur; third,

its simplicity, compactness of arrangement, and extreme sensitiveness of operation; fourth, its easy adjustment and regulation to any or all degrees of pressure, and, lastly, cleaning itself, or by its own operation, as described.

Having thus described my improvements, what I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. The combination of the floating disk or diaphragm *d* and hollow die cut-off or valved rod *p*, with any suitably-shaped receptacle or reservoir of the induction-pipe, for the purposes specified, and arranged therein and operating substantially as described.

2. Constructing the cut-off in a hollow shape,

by means of which it can be readily increased or lessened in weight at pleasure, for the purposes set forth.

3. The adjustable rod *m*, or its equivalent for the purpose described.

4. In so constructing the die cut-off and arranging it in the induction-aperture of the apparatus that when pulled or forced up through the same it will scrape or cut off the coal-tar, &c., deposited or collected upon their surfaces.

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