

Strong & Reid,
Hydrocarbon Gas Appls.

No. 112,981.

Patented Mar. 21, 1871.

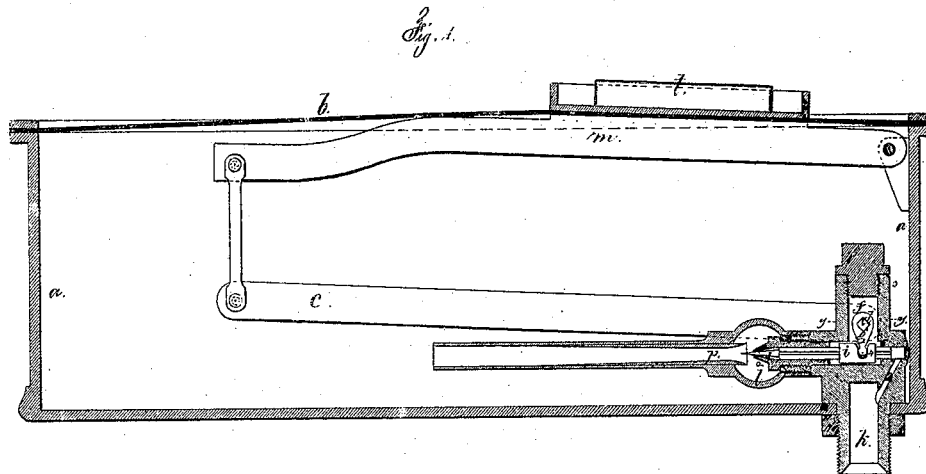



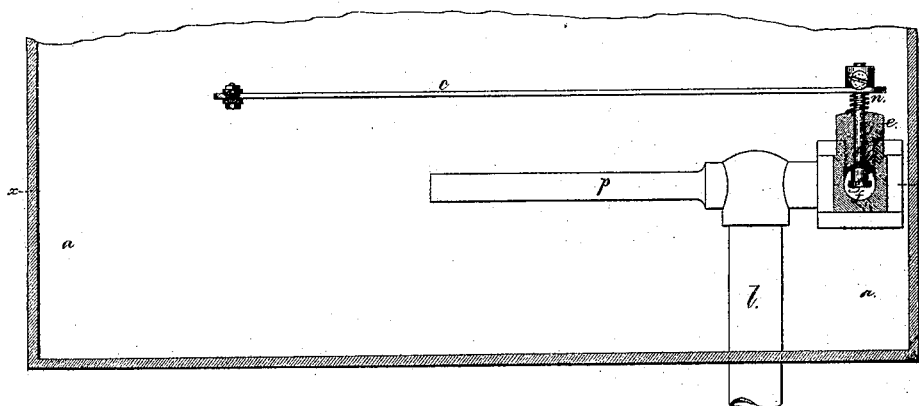
Fig. 3. 

Fig. 2.



Witnesses,

Chas. H. Smith
Geo. B. Walker

Myron H. Strong
William J. Reid
per Lemuel W. Terrell
att'y.

UNITED STATES PATENT OFFICE.

MYRON H. STRONG AND WILLIAM I. REID, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HYDROCARBON-GAS APPARATUS.

Specification forming part of Letters Patent No. **112,981**, dated March 21, 1871.

To all whom it may concern:

Be it known that we, MYRON H. STRONG and WILLIAM I. REID, of Brooklyn, in the county of Kings and State of New York, have invented and made an Improvement in Gas Apparatus; and the following is declared to be a correct description thereof.

This improvement is applicable in that class of gas-machines where the gasoline or liquid hydrocarbon is vaporized by heat and issues in a jet, and commingles with atmospheric air that is drawn in by the issuing jet, and passes to the burners. In apparatus of this character a diaphragm has been employed that rose and fell by the slight difference of pressure, and let on the gasoline vapor, or shut the same off, by the action of a valve or cock; but this constant movement of the diaphragm is objectionable, and it is difficult to properly shut off the gasoline vapors when the apparatus is not in use, or to regulate the action of the diaphragm so as not to produce a variation in the lights that are burning, especially when several are either lighted or extinguished while others remain burning.

Our invention relates to a double-acting valve controlled by a diaphragm or its equivalent, and acting to check the flow of the gasoline vapor as the diaphragm rises or is inflated, or close the escape entirely at the extreme movements, either when the diaphragm is at its highest or its lowest point. Thus a regulated flow of gasoline vapors is maintained, regardless of the number of burners that are lighted; and if the pressure accumulates beyond a given point the gas will be entirely shut off at the issuing jet, and, on the other hand, the gasoline vapors will also be shut off when the apparatus ceases to be operative. By this means great safety is insured, and there is no risk of the gasoline vapors being supplied when the pressure is too great, or when the apparatus stops from any cause, such as shutting off the supply of heat to the apparatus, or the accidental escape of gas from the holder, causing the diaphragm to descend when there is no heat acting upon the gasoline.

In the drawing, Figure 1 is a vertical section at the line *x x*, Fig. 2; and Fig. 2 is a plan of the apparatus, partially in section, at

the line *y y*; and Fig. 3 is a cross-section of the valve-stem.

The inclosure formed of the box *a* and diaphragm *b* is to be of any desired size or construction; and in place of a diaphragm an inverted cylinder or gas-holder may be employed, the apparatus being so constructed that an excess of the gaseous hydrocarbon shall lift the moving end of the lever *c*, and when the quantity of gas becomes less through its escape to the burners, or otherwise, the lever *c* will be depressed.

The lever *c* is fastened to the end of a rock-shaft, *d*, that passes through the cap *e* into the chamber *f*, and within that chamber is the crank-arm *g*, or similar device, to give an end motion to the valve-stem *i*.

The tube *k* is connected with any suitable apparatus for generating hydrocarbon vapors from gasoline or other liquid hydrocarbon; and a tube, *2*, or passage passes from *k* into the space in which the valve-stem *i* slides, and this valve-stem *i* is grooved, as in Fig. 3, with one or more channels for the gaseous hydrocarbon to travel freely from one end of the stem *i* to the other, and issue from the jet-nozzle *o* into the pressure and commingling tube *p*, the jet of vapors drawing in atmospheric air through the tube *l*, mixing therein in *p*, and thence passing to the holder *a b*.

There may be a valve or register to regulate the amount of air admitted to the tube *l*, and a check-valve may be used to prevent the escape of gaseous vapors when the issue of gaseous vapors from the jet is stopped.

Within the jet-nozzle is a tapering plug, 3, upon the end of the stem *i*, that acts as a valve within said nozzle to regulate the quantity of gaseous vapors issuing therefrom in proportion to the quantity consumed; for if the diaphragm *b* descends the valve 3 will be opened wider, and if it rises the valve 3 will be partially or entirely closed. Hence the apparatus is automatic, and the supply is made equal to the demand.

If from any cause the diaphragm falls below a given point, the part 4 of the spindle *i* acts as a valve, closing against the seat 5, so that at the extremes of movement, both up and down, the supply of gasoline-vapor is ef-

fectually shut off, and at the intermediate points the supply is equal to the greater or lesser quantity of gas that is burned.

The spring *n* around the rock-shaft *d* causes the same to make a tight joint by drawing the shoulder 3 against the inner face of the socket or cap *e*.

The hinged lever *m* and weight *t* are shown in connection with the diaphragm *b* for moving the lever *c*.

We are aware that the admission of gasoline vapors into a chamber has been regulated by a cock moved by a diaphragm and lever, as shown in the patent of J. Kidd, granted August 23, 1870; and jets or nozzles have been employed for the issuing vapor, so that the atmosphere is drawn in by the jet and commingles with the hydrocarbon vapors, as in the patent of Maxim and Lockwood, June 2, 1868.

If the issuing jet is regulated by a cock or valve that is separate from the jet itself, the speed of the issuing jet will be so much lessened as not to draw in the atmosphere properly, and the pressure of the vapors in the holders will be lessened.

By applying the conical plug or valve to the nozzle the quantity of vapor issuing will be regulated by decreasing the opening; but the speed of the jet will not be materially lessened. Thereby uniformity of action is maintained when the apparatus is working at its full capacity, or at any less point.

We claim as our invention—

1. A double-acting valve-stem, combined with a nozzle and tube, supplying gasoline or other hydrocarbon vapors, and automatic mechanism for moving such valve-stem, substantially as set forth, so that the said hydrocarbon vapors are supplied in the proportion required for consumption, or stopped off at the extreme movement in either direction.

2. A nozzle for a jet of hydrocarbon vapor to issue and commingle with atmosphere, in combination with a conical plug or valve acting within said nozzle, and means for moving said valve and regulating the escape of such gaseous hydrocarbon in proportion to the amount consumed, substantially as set forth.

3. Two valves actuated by a moving diaphragm, to close the escape for the gaseous hydrocarbons into the gas-holder at the extreme movements in each direction of said diaphragms, substantially as set forth.

4. The rock-shaft *d* for the lever *c*, provided with a shoulder, 8, and spring *n*, as and for the purposes set forth.

Signed by us this 23d day of August, A. D. 1870.

MYRON H. STRONG.
W. I. REID.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.