C. E. SMITH & H. J. RICE.

VAPOR CHANDELIER.

No. 106,629. Patented Aug. 23, 1870.

Fig. 2

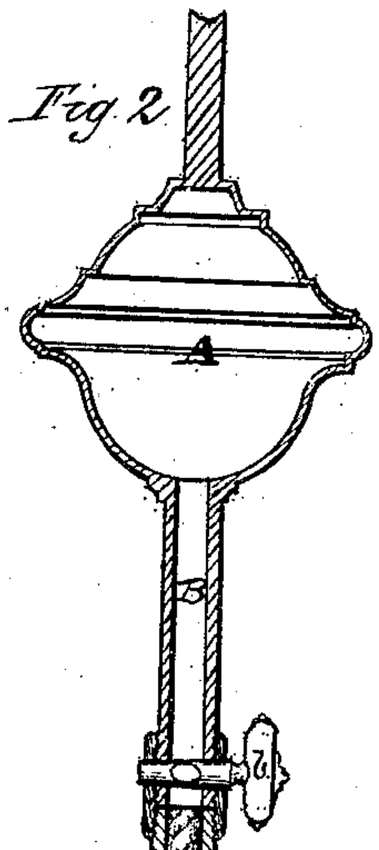


Fig. 1

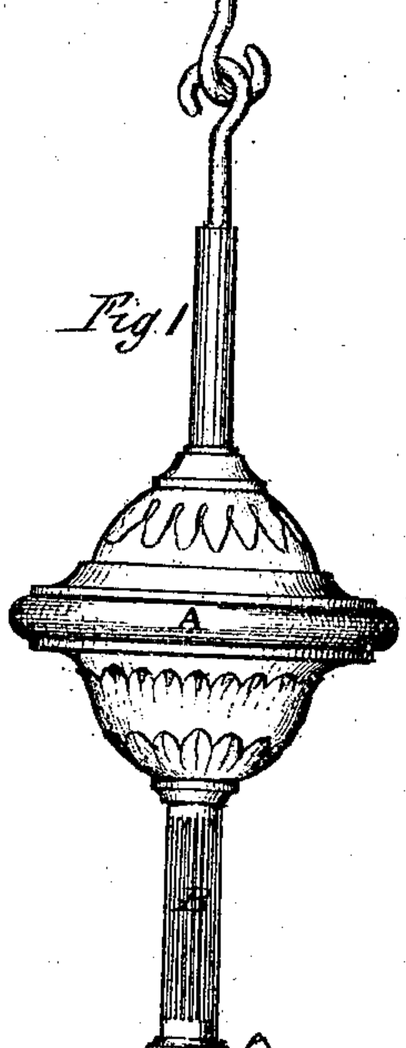
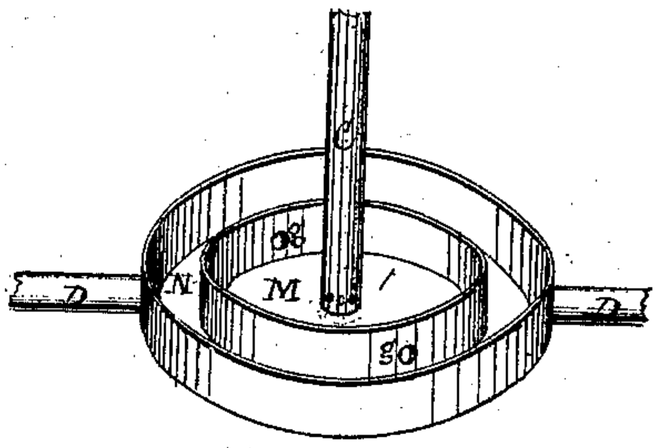


Fig. 4.



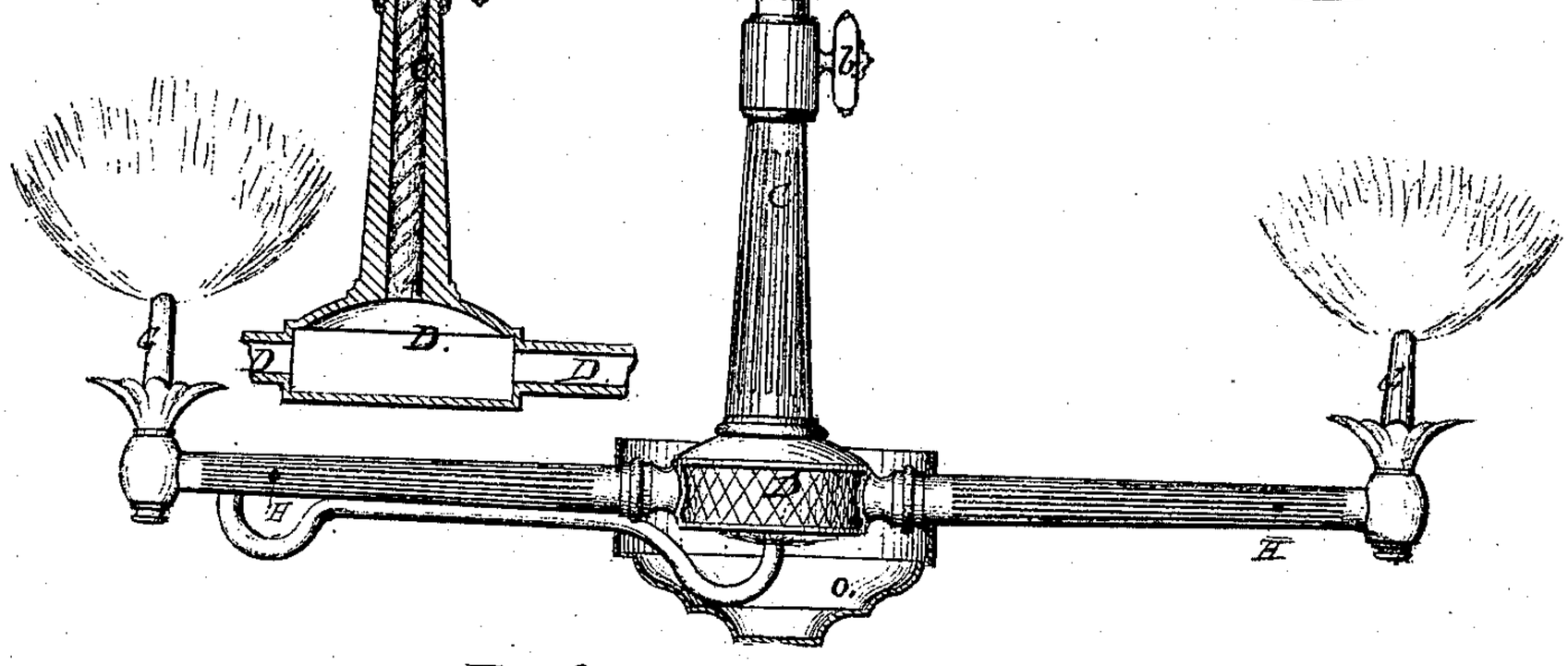
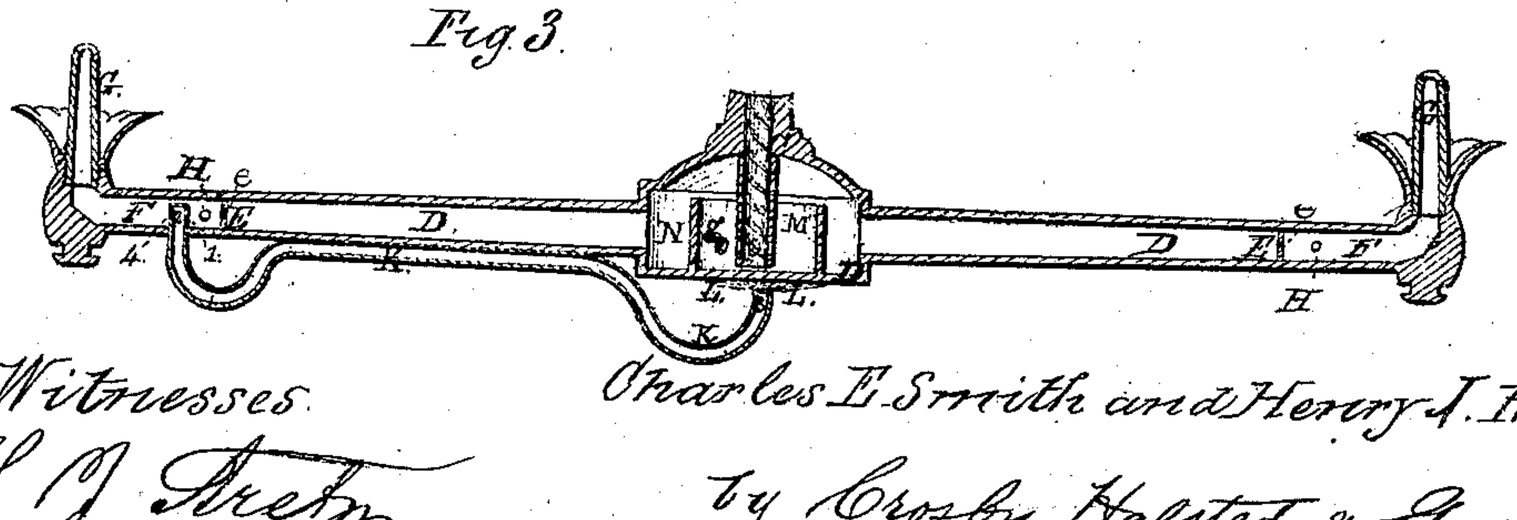


Fig. 3.



Witnesses.

H. J. Steers

J. A. Beale.

Charles E. Smith and Henry J. Rice.

by Crosby, Halsted & Gould,

their Attorneys.

United States Patent Office.

CHARLES E. SMITH AND HENRY J. RICE, OF COLUMBUS, OHIO.

Letters Patent No. 106,629, *dated August* 23, 1870.

IMPROVEMENT IN VAPOR-CHANDELIERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, CHARLES E. SMITH and HENRY J. RICE, both of Columbus, in the county of Franklin and State of Ohio, have invented certain Improvements in Vapor-Chandeliers; and we do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of our invention sufficient to enable those skilled in the art to practice it.

Figure 1 is a side elevation of a chandelier made with our improvements applied thereto, the cap *o* being shown in section, to display the auxiliary jet beneath the generating-chamber;

Figure 2 is a vertical section of the upper part of the chandelier;

Figure 3, a similar section of the lower part; and

Figure 4, a perspective view of a modified form of the generating-chamber.

A is the vessel or reservoir for supplying the liquid to be vaporized, a pipe, B, extending beneath the same, and furnished with a stop-cock, *b*.

Below this stop-cock is a wick-pipe, C, filled with wicking or other appropriate material, this pipe communicating with a gas-chamber, D, which contains the body of the gas, as it is generated by the means hereinafter described.

E E are brass plates or partitions in the tube or chamber D, serving to separate the gas-chamber from an air-receiving and heating-chamber, F F, these partitions each having a small central hole, *e*, to permit the passage outward of the gas, that it may, before reaching the illuminating burner G, commingle with the oxygen of the atmosphere, which is free to enter at the openings H H.

Before doing this, however, a portion of the gas, as it makes its exit, under pressure, through the central openings *e* in the partitions, is driven into the side orifice 1 in the tube K.

This tube is made about two feet or somewhat less in length, and is closed at its inner end 2 and open at its outer end 3, which is located outside the generating-chamber, and serves to afford a heating-jet, L, as seen, to generate the gas for the supply of both burners, the flame of this heating-jet coming directly beneath the center of the chandelier, and, thereby, in the most favorable location for action upon the fluid, as it descends through the wick or drops therefrom, and also so that one tube like K may perform duty for as many radial branches, with a burner to each, as may be made upon the chandelier.

The orifice 1 is made somewhat larger than its opposite orifice 4, in order that more gas shall be made to enter at 1 than can make its exit at 4, the excess serving to fill to overflowing the tube K, and thus feed the flame at L.

The remainder of the superheated gas forced through the openings *e* commingles with the oxygen of the air entering at H, and serves for illuminating purposes.

By this construction and mode of operation it is not necessary to have the orifice through which the auxiliary or heating-jet makes its exit so excessively minute and almost invisible as has heretofore been the case, such orifices requiring much skill to make, and easily becoming clogged or gummed up, and with difficulty cleaned.

In our present invention the generating-burner or tube get its supply from a fair-sized opening, consumes the difference between what enters at 1 and emerges at 4, and has no need of so very minute an outlet at its outer or burning end.

The construction of generating-chamber shown in figs. 3 and 4 is for the purpose of avoiding the liability of an overflow of the oil or fluid into the conducting-tubes or chambers, and also for the purpose of facilitating the heating action in generating the gas.

It is formed with one open-topped chamber, M, inside the generating-chamber N, small openings *g* communicating from one to the other.

Now, it is apparent that M must become full enough to overflow at the openings *g*, before N and the conductors leading therefrom could receive any of the oil, and under ordinary circumstances this is never likely to occur.

The length of the tube K, and its direct contact with the main tube or gas-chamber, is a feature of great importance.

It will be observed that, excepting where the bends are necessary, at either end, to carry the closed end up into the air-chamber, or to carry the jet or outer end to a proper position for its flame, this tube lies close against the gas-chamber, and on its under side, for a distance of some two feet or less, according to the size of the chandelier, thereby, with its heat, superheating the vapor which may have been already generated, and with much economy, as more of the oxygen of the air is consumed at the illuminating flame, and a better light and more heat produced.

It will also be seen that the oxygen of the atmosphere mingles with the gas or vapor which enters the pipe K, and is consumed with it at the generating-flame, thus conducing to economy in a great degree.

The inner end of pipe K forms, it will be seen, a chamber, which may be appropriately termed an oxygenizing-chamber, the pipe itself thereby becoming an oxygenizing-pipe, for the mixing of oxygen with the unoxygenized vapor which comes from the chamber D into the hot-air chamber F.

The heated condition of the oxygenized gas entering the pipe K serves also to give pressure to force back this gas the distance of the two feet or so, to ex-

pel it at L, where it is to be burned, and immediately beneath where its jet first converted the fluid into vapor.

It is found by experience that, by our construction and operation of this heating-tube, we get about one hundred per cent. more heat from it than from the same amount of gas in its crude or non-oxygenized state, and with less expense, saving a large amount of gas, a chamber constructed substantially as shown and described, and serving to convey the gas thus oxygenized back two feet, or thereabout, to the point where its flame first causes the gas to be generated.

Also, the combination, with the generating-chamber, of a smaller chamber within the same, the two communicating by holes or openings, as and for the purpose described.