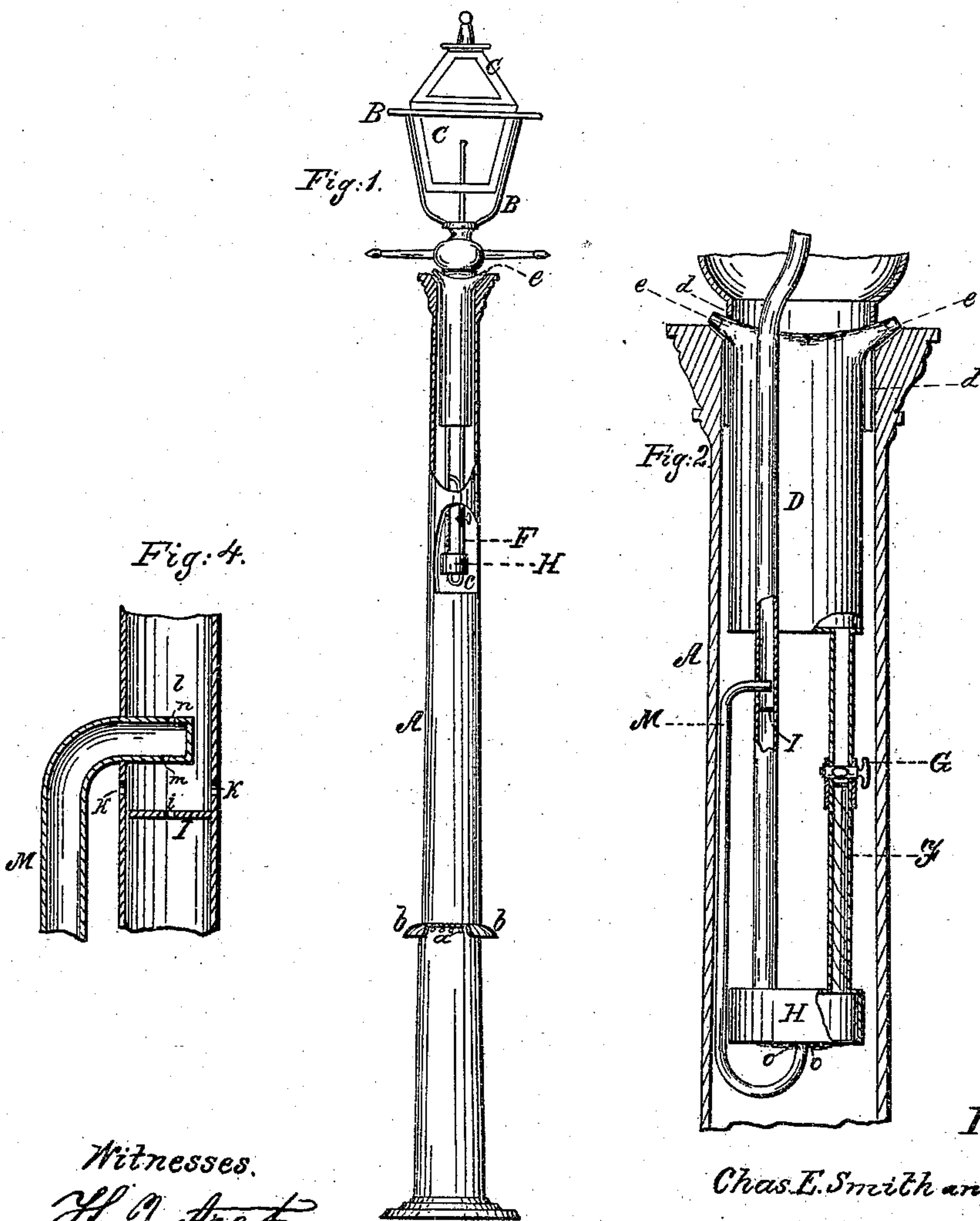


SMITH & RICE.

Vapor Burner.

No. 106,630.

Patented Aug. 23, 1870.



Witnesses.  
*H. J. Arretz*  
*J. A. Deale*

Inventors.  
*Chas. E. Smith and H. J. Rice.*  
*by Crosby, Halsted and Gould.*  
their Attorneys.



# United States Patent Office.

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

Letters Patent No. 106,630, dated August 23, 1870.

## IMPROVEMENT IN VAPOR-BURNING STREET-LAMPS.

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 the city of Columbus and State of Ohio, have invented certain Improvements in Street-lamp Vapor-Burners; 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.

The objects of our improvements are to construct the post of a street-lamp, and the lamp itself, and put them together so that the gas may be generated within the lamp-post; the apparatus for holding the fluid, and generating the vapor or gas therefrom, being removable, and capable of being replenished with fluid without danger while the lamp is burning, the whole having the appearance of city lamp-posts which are supplied with gas through pipes leading from distant gas-works.

Our improvements consist in a special construction and mode of sustaining the reservoir within the post, in the arrangement of the same, and the heating and generating apparatus, all within the post, and so that the jet of the latter may be readily accessible; in the construction of the post to admit rising currents of air to keep the reservoir cool, and in other details hereinafter stated.

Figure 1 represents a lamp-post made in accordance with our improvements, and with the generating apparatus of our present invention applied thereto.

Figure 2 is a sectional view, on a larger scale, of that part of the post which contains the gas or vapor-generating apparatus, with such apparatus in place.

A is the post, having at *a* a series of holes serving as air-inlets, to supply uprising currents to keep the reservoir of fluid cool, as hereinafter stated, and furnish oxygen to the heating-burner, and to be intermixed with the gas as generated.

A ring, *b*, having a downward projection, as seen, serves to conceal these holes, and to aid in insuring an upward current.

An opening, *c*, in the side of the post, provided with a hinged or removable cap or cover, gives ready access to the "heating-jet," when the gas or vapor is to be generated preparatory to lighting the lamp.

The frame *B*, which supports the hanging shade *O* that surrounds the illuminating-burner, to protect it from the wind, is provided at its bottom with a socket-piece, *d*, which fits and drops snugly into the top of the post, as in a socket, and is thus firmly held in place; it is slotted on opposite sides, as seen, so that it may straddle the hollow arms *e e*, by which the lamp is suspended within the post, and it is also provided with the usual cross-piece against which to rest a ladder, when necessary.

We will now describe the construction and operation of the vapor-generating and burning apparatus.

The reservoir or fluid-chamber is shown at *D*, and is provided with two opposite tubular arms *e e*, long enough to rest upon the top of the post, project a little therefrom, and hold the remainder of the apparatus suspended within the post.

*F* is the wicking-pipe.

*G*, the oil-cock, which regulates the flow of the oil or fluid to the burner.

*H*, the gas-chamber.

*I*, a light brass plate or partition, having a small hole in its center, through which the gas passes and becomes oxygenized before it reaches the burner, by intermixing with the air entering at the oxygen or air-holes *k k*.

*l* is the gas passing up to the flame.

*M* is the jet or heating-pipe for imparting the heat which generates the vapor, and aids in oxygenizing it in its passage to the "burner;" it is open at its lower or jet end, and closed at its upper end, which, as seen, is inserted in the side of the lower end of the burner-tube.

Two openings, *m* and *n*, are made in this closed end or receiving-chamber, which becomes, when the apparatus is in operation, a hot-air chamber; the lower one, *m*, of these openings is made larger than its opposite and upper one, in order that, when the stream of vapor emitted through the hole *i* enters the lower and larger opening, a part only so entering escapes through the smaller opening, the excess, of course, remaining and accumulating in the heating-tube, and, therefore, becoming steadily pushed through and down this tube, to supply the heating-jet at *o*, this latter acting directly upon the bottom surface of the circular or broad part of the gas-chamber.

The air or oxygen-holes *k k* admit air long before the vapor reaches the tip of the illuminating-burner, and at that juncture where the heating-tube is about to receive its supply, so that great economy is secured by the plentiful admixture of oxygen with the vapor just before the same enters such heating-tube.

By reason also of the close proximity of this tube with the main generating-tube, which becomes highly heated, and for the distance of some two feet or less, and of the heated condition of the partition *I*, and of the heating-tube *M*, the air entering the holes the more readily gives off its oxygen. This supply of oxygen to the heating-flame results in a great economy in the amount of fluid consumed for heating.

The tubular arms *e e* are for the following purpose, in addition to serving as a means for suspension:

Through one of them the reservoir may be supplied with oil without danger, while the lamp is burning, by merely inserting therein the nozzle of the oil-can and



filling the reservoir, the mouth of the tube being made somewhat conical, that the tapering nozzle may fit it snugly; the distance of the burner from this mouth also precluding all danger of explosion while filling.

During the act of filling, the opposite arm freely allows the exit, in a direction away from under the lamp, of air and any vapor rising from the oil, and thus hastens and facilitates the filling, as well as prevents risk of explosion. These arms we designate "safety-arms," because of the safety with which the lamp may be filled when the oil gets low, as at midnight, or otherwise.

These feeding-holes at other times should be kept closed.

The air which enters the openings *a a* in the lamp-post, not only supplies with pure air, as stated, the heating-jet, but passes up and around the reservoir on all sides, cooling it with a continuous current, and makes its exit at the top of the post. It also, by being in constant and equal circulation, prevents any sudden gust of wind from blowing out the heating or generating jet; nor is this jet exposed to rain or snow, or any other of the causes which have heretofore caused so serious a difficulty in making a vapor-burning street-lamp a practical success.

The separation of our reservoir from the lamp-post is a matter of great value, as heretofore they have been cast in one piece, presenting an unsightly appearance, and the reservoir was liable to become heated from the jet below, as there was no passage-way for the cold air to pass; and, moreover, there was always

going on a chemical action between the iron and the fluid, which injured the quality of the latter to a great extent. Our construction obviates all these difficulties, and we make our reservoir of sheet brass, and silver soldered.

The reservoir, it will be seen, is, with all its attachments, free to be lifted out of the post at any time for repairs, or any other purpose, not being secured to it in any way.

We claim—

The combination with the removable reservoir *D*, of the tubular arms *e e*, serving as a means for suspending the reservoir, and also for filling the same, substantially as shown and described.

Also, the combination with the reservoir and its arms, of a gas-generating apparatus, the whole adapted to be applied within a hollow lamp-post, as shown and described.

Also, the arrangement, within a lamp-post, of a removable reservoir and gas-generating apparatus, suspended therein in such manner that the air admitted into the post below the reservoir shall, in rising, afford a continuous current, serving as a cooling medium on all sides of the reservoir between it and the post, and then escape at the top of the post, substantially as shown and described.

CHAS. E. SMITH.  
HENRY J. RICE.

Witnesses:

E. T. DELANEY,  
EDWARD BIRD.