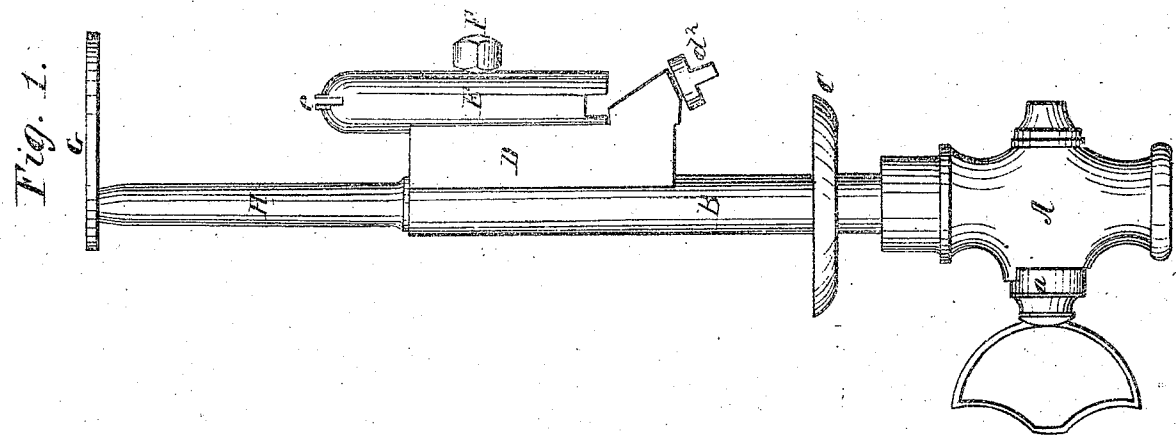
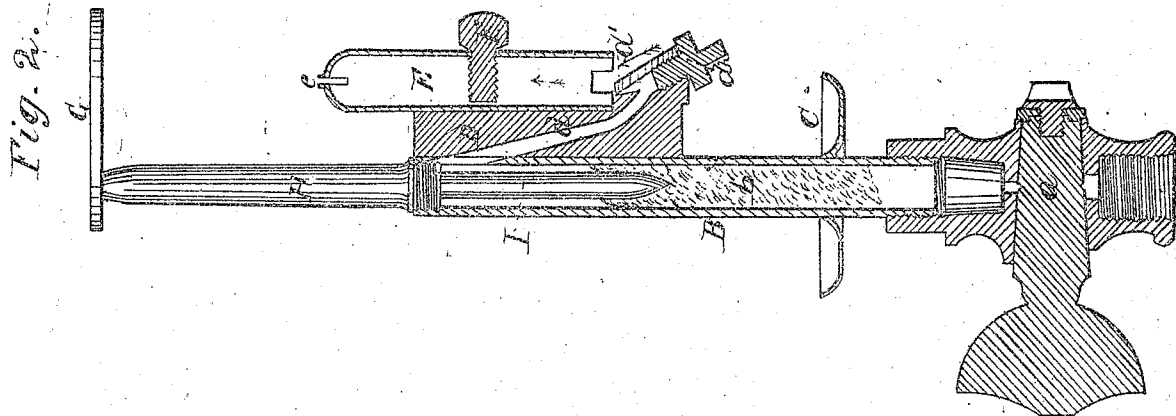


*J. S. Gray*

*Vapor Burner.*

*N<sup>o</sup> 36,404.*

*Patented Sept. 9, 1862.*



*Witnesses*  
*J. Snowden*  
*Wm. T. Talcott*

*Inventor*  
*James S. Gray*  
*by his Attorney*  
*Wm. W. Baldwin*

# UNITED STATES PATENT OFFICE.

JAMES S. GRAY, OF NEW YORK, N. Y.

## IMPROVEMENT IN SELF-GENERATING VAPOR-BURNERS.

Specification forming part of Letters Patent No. 36,404, dated September 9, 1862.

*To all whom it may concern:*

Be it known that I, JAMES S. GRAY, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Self-Generating Vapor-Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view in elevation of one side of a self-generating vapor-burner embracing my improvements; and Fig. 2, a vertical longitudinal section through the same, a portion of the burner being shown in section.

My invention relates to that class of burners in which the jet is situated at a distance from the reservoir which contains the fluid, in order to guard against the danger of explosions, and is adapted more especially for burning coal-oil, naphtha, and other similar fluids.

In the accompanying drawings, which represent a convenient arrangement of parts for carrying out the objects of my invention, the supply-pipe A is shown as provided with a stop-cock, *a*, to control the flow of the fluid. It has also a wick-tube, B, screwed into it, which tube is partly filled with cotton wick or other suitable and well-known equivalent material. An igniting dish, C, encircles the lower part of the tube, while a bracket or nib, D, is attached near its upper end. A channel, *d*, leads from the upper part of the wick-tube down through the bracket to its lower end, where it terminates in a jet, *d'*, which opens into the lower end of a mixing-tube, E, which is secured to or forms part of the bracket, and terminates in a burner-tip, *e*. An adjusting-screw, F, serves to regulate the size of the aperture in the mixing-tube.

A heater-cap, G, which projects over the burner-tip, is mounted upon a stem, H, which screws into the upper end of the wick-tube, and is provided with a conducting-rod, I, which extends down to the wick. By unscrewing the supply-pipe A and stem H access can readily be had to the several parts to cleanse them. Both the channel *d* and jet *d'* can in like manner readily be cleansed by removing the screw-plug *d'* in the bottom of the bracket and inserting a small wire.

The operation of the burner is as follows:

As the vapor only is burned in this class of lamps, and not the fluid itself, and as but little, if any, evaporation takes place when the parts are cold, it becomes necessary to heat them before the burner will ignite. This is usually done by pouring a small quantity of alcohol into the dish C and inflaming it. The stop-cock *a* is then turned so as to permit the fluid to rise up into the wick-tube B from the reservoir, which is usually placed above the level of the burner. As the fluid rises through the wick *b*, it is vaporized, passes down through the channel *d* and escapes through the jet *d'*. By reference to Fig. 2 of the drawings it will be seen that the jet is inclined at such an angle that the vapor escaping from it impinges directly upon the back of the mixing-tube E, by which means the hissing noise usually attendant upon the escape of vapor from burners of this class is avoided. As the vapor escapes from the jet, it is mixed with air, which rushes in at the open bottom of the tube E, and then escapes through the burner-tip *e*, where it is ignited. In order to vary the relative proportions of air and vapor escaping through the tip, I insert a set-screw or screw-plug, F, into the mixing-tube above the jet *d'*. By moving this screw in or out the space left for the passage of vapor and air is correspondingly increased or diminished; and as the volume of vapor escaping from the jet may practically be considered invariable, and as it is driven into the mixing-tube with a velocity due to the pressure of the gas generated behind it in the wick-tube, it follows that as the screw F is intruded into the mixing-tube the quantity of air admitted is diminished, and vice versa, which is a great advantage in adapting burners of this kind to the varying conditions under which they are required to operate. The flame from the burner-tip quickly warms the cap G, the heat from which is conveyed by the stem H and conducting-rod I to the fluid in the wick-tube, which is thereby vaporized and driven out through the jet into the mixing-tube. This process of self-generation continues as long as the lamp is heated. When the stop-cock *a* is shut, the flame is not immediately extinguished, but continues to burn until the fluid in the wick-tube is all vaporized and that vapor exhausted. Having thus fully described the construction

and operation of my improved self-generating vapor-burner, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a wick-tube, a heater-cap, a conductor, a jet, and a mixing-tube, when arranged and operating substantially in the manner herein described.

2. The combination of a jet, a mixing-tube, and an adjusting screw, when arranged and

operating as described, for the purpose of regulating the relative proportions of air and vapor admitted to the burner-tip, as set forth.

In testimony whereof I have hereunto subscribed my name,

JAMES S. GRAY.

Witnesses:

CHARLES WHITTLESEY,  
J. E. PALMER.