

(No Model.)

L. S. CALDER.

HYDROCARBON GENERATOR AND BURNER.

No. 413,169.

Patented Oct. 22, 1889.

FIG. 2.

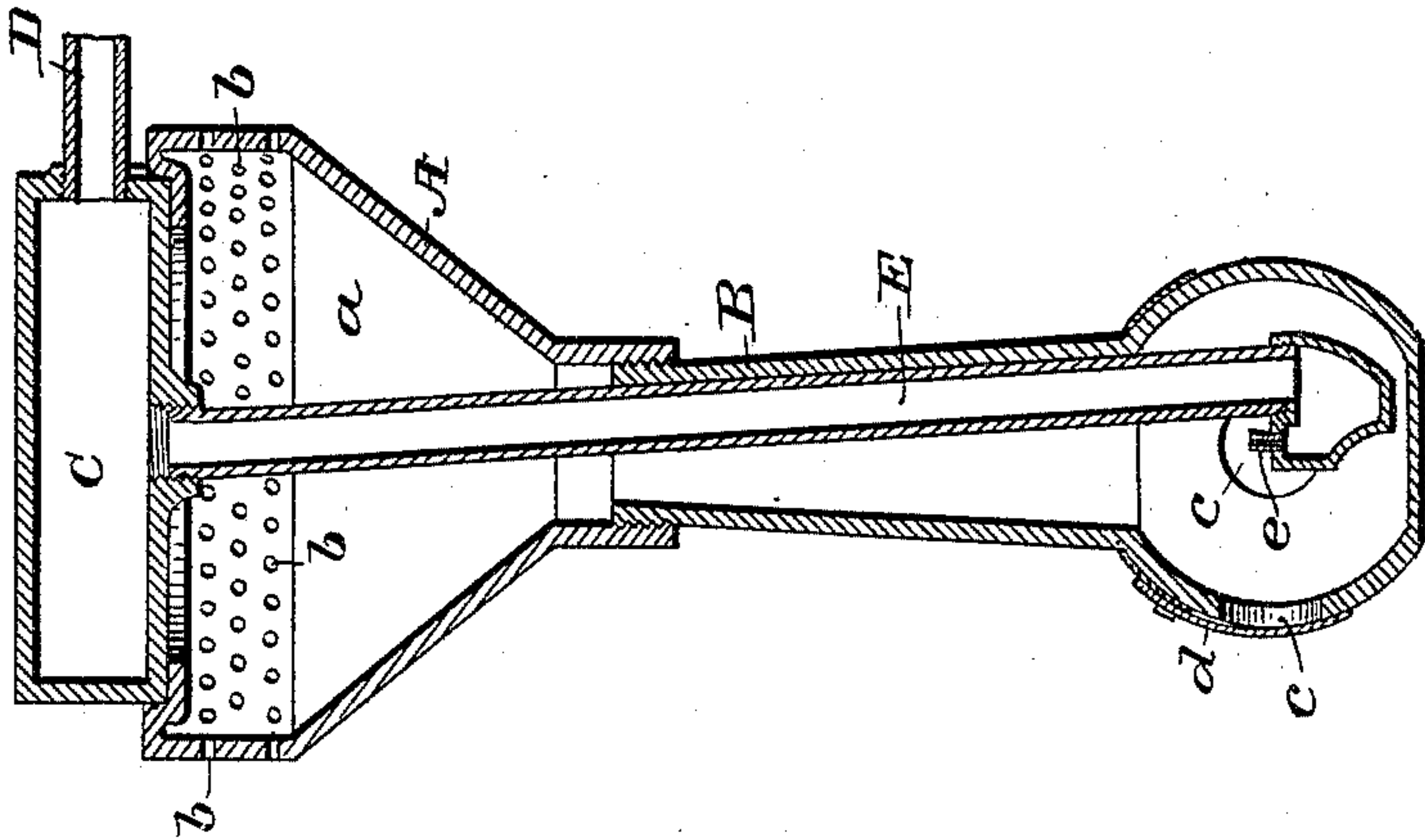
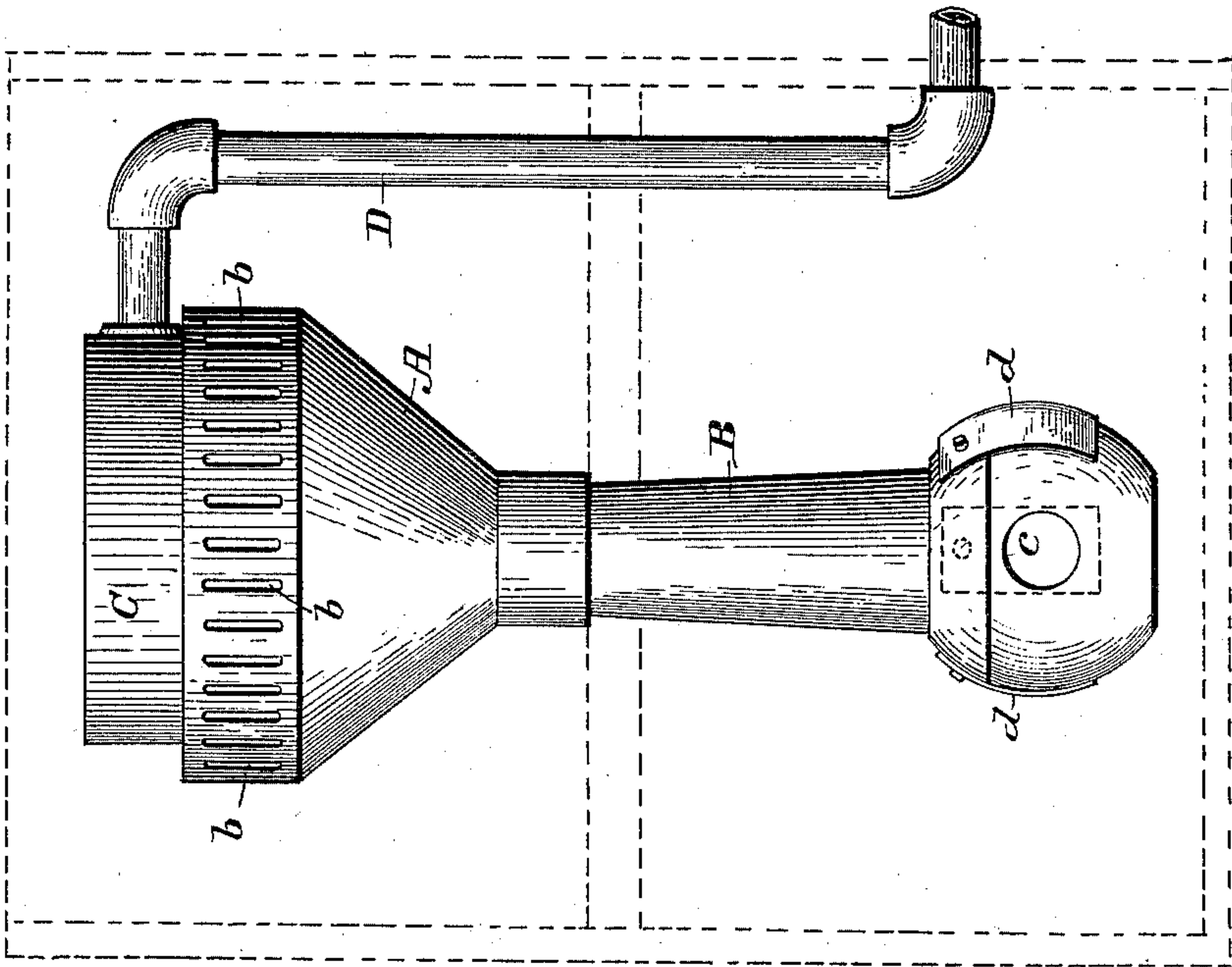


FIG. 1.



ATTEST.

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# UNITED STATES PATENT OFFICE.

LEWIS S. CALDER, OF TERRE HAUTE, INDIANA.

## HYDROCARBON GENERATOR AND BURNER.

SPECIFICATION forming part of Letters Patent No. 413,169, dated October 22, 1889.

Application filed March 6, 1889. Serial No. 302,084. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS S. CALDER, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Hydrocarbon Generators and Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in hydrocarbon-burners; and the same consists, substantially, in such features of arrangement, construction, and combinations of parts as will hereinafter be more particularly described and claimed.

The object of the invention is to provide a burner in which oil-vapor and air are commingled and burned together, and one in which such commingling is so controlled or regulated as that either a very gentle or very powerful blast may be had, so as to obtain varying intensities of heat.

The invention also has for its object to simplify the construction and arrangement of parts constituting the burner, and to very materially cheapen their cost of manufacture, all as will more fully hereinafter appear when taken in connection with the accompanying drawings, wherein—

Figure 1 represents a side view of a burner of my improved construction, the dotted lines being supposed to represent a stove or furnace in which said burner is located; and Fig. 2 represents a vertical sectional elevation of said burner, by which to more clearly indicate the construction and arrangement of the several parts constituting the same.

In carrying my invention into effect I resort to the use of a burner preferably conical in form or enlarging upwardly, and in the sides or wall thereof, at or near its upper edge, I provide series of jet-orifices, either of circular or elongated form, the main body of said burner being closed or without openings, so as to form a chamber within. Fitted to the lower contracted portion of the burner proper is a tube or mixing-chamber of suitable length and proportions, the lower end of which terminates in a bulb having in its sides suitable air ports or inlets for the admission of air,

and surrounding said bulb is a suitable valve, so constructed and arranged as that the ports may be opened to any desired extent to regulate the quantity of air to said mixing-chamber. In the present instance I have shown one valve for all of the ports, and when the same is operated the ports are all opened or closed simultaneously and to the same extent; but, if desired, I may employ a separate valve for each port, so as to render the ports separably capable of regulation either to the same or varying extents or degrees.

Seated within the burner at the top, and in such manner as not to close the jet-orifices thereof, is a superheating-chamber, into which the vaporized oil passes, and from thence such vapor passes down through a pipe or tube extending from the bottom of the superheater and wholly within the mixing-chamber, so as to be wholly inclosed thereby, such pipe or tube terminating at its lower end with a tip or cap that is formed or provided with a jet through which the oil-vapor issues, to become thoroughly commingled with the air entering the mixing-chamber through the ports at the bottom thereof.

The superheater is provided with a pipe or tube entering the same, preferably at the side, such pipe leading away and communicating with a supply-reservoir located at any convenient place.

In the operation of the burner oil is supplied to the superheater through the pipe entering the same, and in order to start the vaporization of the oil a suitable lamp may be placed beneath the burner. After the burner becomes sufficiently heated the oil will be continuously vaporized in the supply-pipe at a point outside of the superheater, from whence it passes into such superheater and attains a very high temperature, and thence it passes down through the tube extending from the bottom of the superheater and issues through the jet at the lower end of such tube. The escape of the oil-vapor through the jet creates a suction of air through the ports in the lower part of the mixing-chamber, and the result is that the air and oil-vapor become very thoroughly intermingled and pass upwardly through the jet-orifices of the burner proper. By suitable adjustment of the valves such regulation can be effected



as that a very slow and gentle flame will issue through the orifices; or when desired a very powerful flame may be had by simply opening the ports to their fullest extent, so as to increase the blast up through the mixing-chamber.

In the use of the burner the tube from the mixing-chamber, as well as the several other parts, are always very hot, and thus the air entering the ports of the mixing-chamber immediately comes in contact with a heated surface before it mixes with the oil-vapor, and the result is that not a particle of condensation of the oil-vapor takes place, thereby overcoming a great fault common to many burners of the present character now in use.

Reference being had to the several parts of the drawings by the letters marked thereon, A represents the burner proper, the same being preferably of conical form, so as to provide the chamber *a* within, while surrounding the upper edge thereof is provided a series of jet-orifices *b* for the escape and burning of the mixed air and oil-vapor. Fitted to the burner at its lower end and communicating therewith is a tube or mixing-chamber B, the same terminating in a bulb at the bottom and provided with air ports or inlets *c*, that are controlled or regulated by the valves *d*, which consist of flaps that are attached to a movable ring surrounding the mixing-chamber, as shown.

C represents a superheater snugly seated within the burner A at the top, the same being closed up all around, and D represents an oil-supply pipe entering such superheater from the side, and which is supposed to lead from a suitable supply tank or reservoir located at any convenient place. Depending from and communicating with the superheater, and passing down through the mixing-chamber, is a pipe or tube E, having attached to its lower end a jet *e*, extending upwardly within said chamber, and through which the oil-vapor issues as it passes down through the tube E from the superheater.

The result of the construction and arrangement described is that the oil will become vaporized in the pipe D just before it enters the superheater by reason of the flame issuing through the orifices impinging upon such pipe, and the vapor entering the superheater becomes superheated to a high degree and passes down the tube E and out through the

jet *e* in a strong current, at which point it becomes mixed with the air that is drawn through the ports of the mixing-chamber, and the mixture passes up and bursts through the jet-orifices of the burner in streams of flame. A very powerful induced current may be had up through the mixing-chamber, and when but small quantities of air are admitted through the ports practical experience has demonstrated that the mixture will only burn at the orifices, apparently producing a vacuum within the chamber *a*; but when greater quantities of air are admitted the whole interior of the chamber will be filled with a flame which possesses a great intensity of heat.

The construction and arrangement of parts herein represented may be altered in immaterial particulars. Consequently I do not wish to be understood as limiting myself thereto in precise detail.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hydrocarbon-burner, the vertically-extended mixing-chamber B, provided at its lower end with air-ports *c*, the combination, with the superheating-chamber C, provided with the vertical extension E, located wholly within the mixing-chamber and having a jet *e* located within the field of the air-ports *c*, of the mixing-chamber, whereby the commingled vapor and air are caused to ascend through a heated space before ignition, substantially as and for the purpose hereinbefore set forth.

2. In a hydrocarbon generator and burner, the combination, with the vertically-extended mixing-chamber provided at its lower end with air-ports, of valves for controlling the admission of air to said chamber, the superheating-chamber provided with the hollow extension located wholly within and being entirely inclosed by the mixing-chamber and having a jet at its lower end, and the supply-pipe entering the side of the superheating-chamber and brought around adjacent to the flame-orifices of the mixing-chamber, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS S. CALDER.

Witnesses:

E. EVERETT ELLIS,  
CURTIS LAMMOND.