

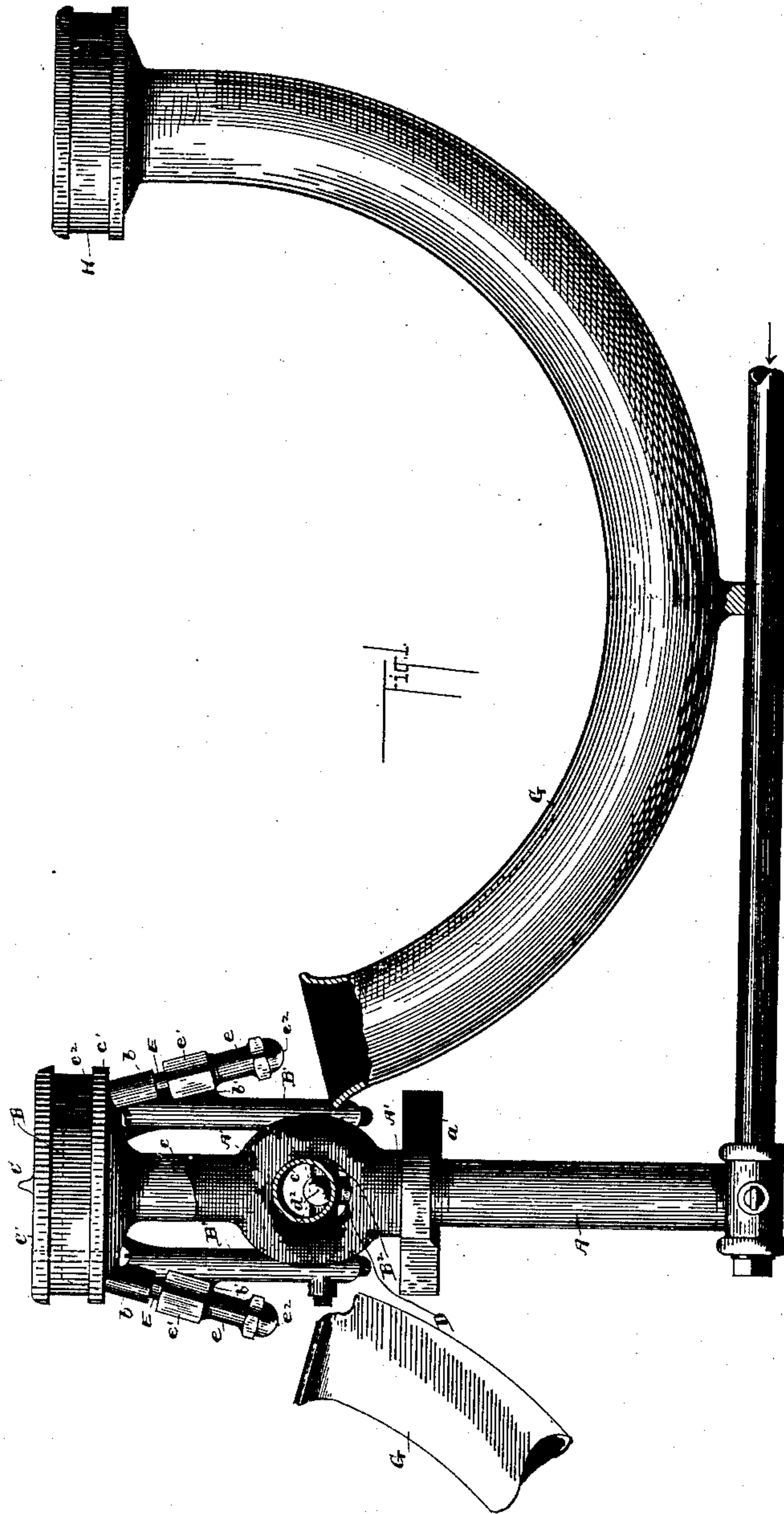
(No Model.)

2 Sheets—Sheet 1.

H. RUPPEL.  
VAPOR BURNER.

No. 375,957.

Patented Jan. 3, 1888.



WITNESSES

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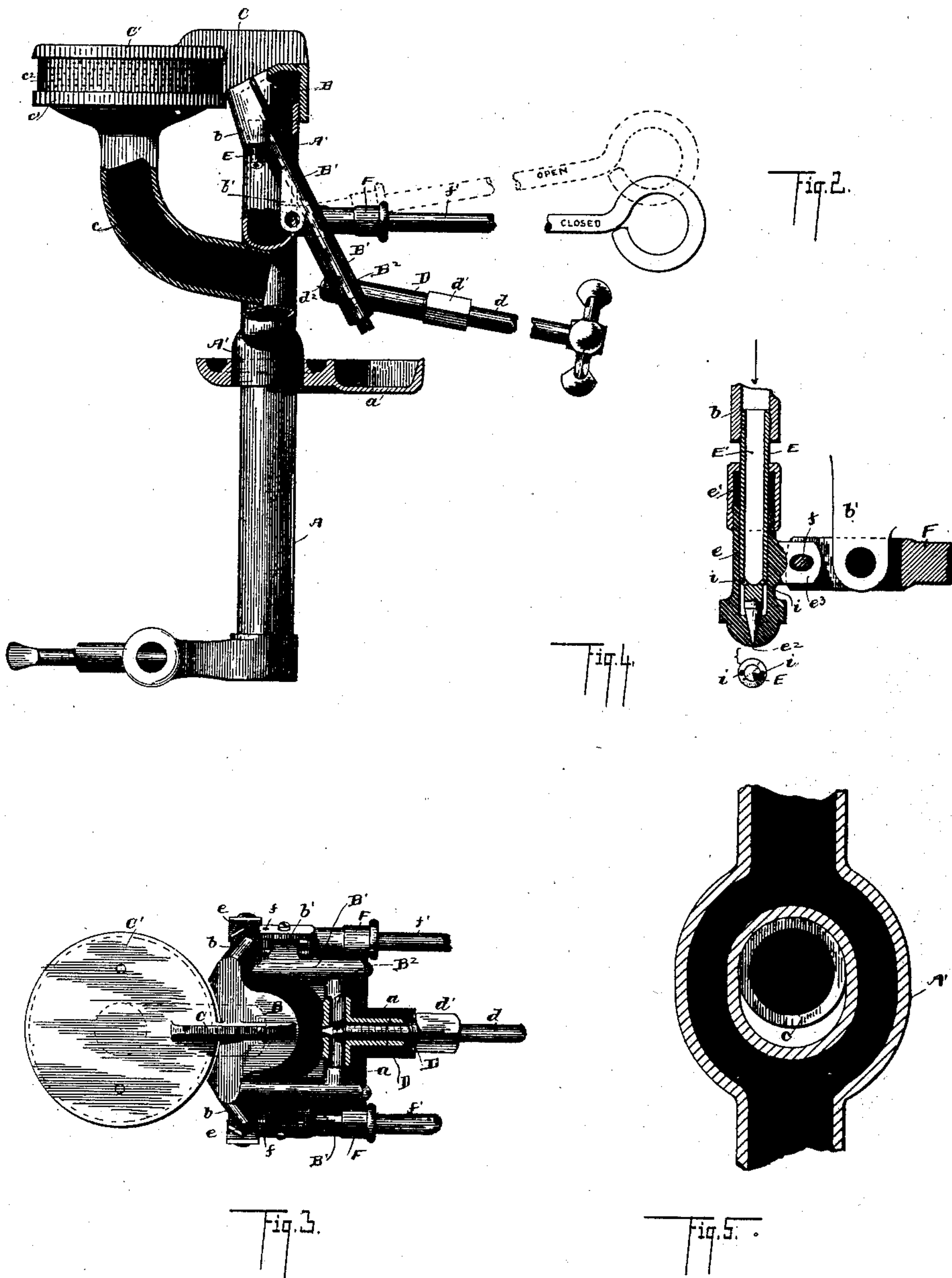
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INVENTOR

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# UNITED STATES PATENT OFFICE.

HENRY RUPPEL, OF CLEVELAND, OHIO, ASSIGNOR TO SCHNEIDER & TRENKAMP, OF SAME PLACE.

## VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 375,957, dated January 3, 1888.

Application filed July 13, 1886. Serial No. 207,907. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY RUPPEL, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vapor-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 pertains to make and use the same.

My invention relates to improvements in vapor-burners; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a rear elevation of a vapor-burner stove embodying my invention. Fig. 2 is a side elevation of the generator and attachments, portions being broken away to show the construction. Fig. 3 is a plan view, partly in section. Fig. 4 is an enlarged elevation in section in detail of a stationary needle-valve and sleeve. Fig. 5 is a detail of the part A'.

A represents a vertical so-called "generating-tube," on which is mounted the lighting-cup *a*, all of the ordinary construction. The upper end of the tube A is screwed into a hollow casting, A', that may be considered a continuation of the generating-tube. The central portion of the part A' is approximately in the form of a hollow ring. (See Fig. 5.) The upper end of the casting A' screws into the bottom of the generator proper, B, the chamber of the latter being in open relation with the tube A through both parts of the ring-like portions of the casting A'. The generator B is hollow and of a peculiar construction, having hollow side arms, B', that slope forward and downward and are connected at their lower ends by a hollow cross-bar, B<sup>2</sup>, these parts being integral and forming an open quadrangle with a continuous cavity extending through the four sides. The main or central chamber in the head of the generator is cored, while the holes in the arms B' and the cross-bar B<sup>2</sup> are drilled and plugged at their outer ends in the usual manner. The cross-bar B<sup>2</sup> has a lug, D, projecting forward, the same being threaded internally for engaging the threaded shank of the needle-valve *d*,

and threaded externally to engage the cap *d'*, the latter forming a stuffing-box around the shank of the needle-valve. This valve is of the ordinary construction and is made to close a jet-orifice at *d*<sup>2</sup>, the same presenting rearward. At the upper and central portion of the generator is an arm, C, integral therewith, that extends rearward and terminates in a disk, C', the latter lying horizontally. A curved tube, *c*, terminates in a concaved disk, *c'*. The latter is secured to the disk C' by screw-bolts, with an intervening perforated metal band, *c*<sup>2</sup>, the two disks and perforated band forming a burner that is supported from the generator.

It will be observed that when the burner is in operation jets of flame from one side thereof will impinge the head or body of the generator, and that, the arm C and disk C' being integral with the generator, much heat will be transmitted from the burner to the generator by these members.

The lower end of the tube *c* presents toward the jet-orifice *d*<sup>2</sup>, and the end of the tube reaches into the opening through the casting A'. The generator B is provided with lugs *b*, through which latter holes are respectively drilled into the chamber of the generator. These holes are screw-threaded internally to receive, respectively, the screw-threaded shanks of the hollow stationary needle-valves E, the latter having holes E' leading lengthwise through their bodies and opening at *i* by the side of the needle-points of the valves.

Sleeves *e* are provided that fit over the respective needles E. These sleeves are provided with stuffing-boxes *e'* and jet-orifices *e*<sup>2</sup> at the ends thereof, the latter, when the sleeves are elevated, being closed by the points of the needle-valve E. The arms B' of the generator are provided with depending ears *b'*, to which are respectively fulcrumed the levers F. The inner ends of these levers are usually bifurcated to embrace the ears *b'* and to embrace the lugs *e*<sup>3</sup>, that project from the sleeves *e*. A pin, *f*, passes through a lug and lever with elongated holes made in the lugs. The free ends of these levers terminate in handles *f'*, by operating which the sleeves are slid on the needles E to open or close the jet-orifices *e*<sup>2</sup>.



This construction, in which the needle-valve is made stationary, has several advantages, to wit: The generator, through some parts of which the jet-orifices are usually made, is preferably of brass on account of the heat-conducting properties of this metal, and because it is not corroded by the action of the gases used; but brass, when heated to any considerable degree, loses much of its adhesiveness and becomes soft. Therefore in closing the needle-valves when the metal around the jet-orifices is highly heated the jet-orifices are likely to be enlarged by means of thrusting the needle-point of the valve in too far, more especially as the operators, unless they are experts, have little conception of the pressure with which they are thrusting the valve to its seat by means of a screw with slight lead. The needle-valves are usually of steel, and this metal expands much less than brass under the same conditions. Now, with the valve casing of brass and integral with the generator, the casing expands so much more than the needle-valve that it is difficult to make a stuffing-box around the valve-stem that will operate freely when cold and will not leak gas when hot.

With my improved construction, the needle-valve being attached to the generator and conducting the gas to near the point thereof, and the sleeve being detached and separated some distance from the heated generator, and the hot gas only coming in contact with the sleeve at or near the jet-orifices, the sleeve is not heated so highly as the valve, and the result is, that under such circumstances the valve and sleeve are expanded approximately alike and there is not found the least difficulty in keeping the stuffing-box tight while hot and in condition to move freely when cold. The handles of the levers for operating these sleeves are short and are made of small rods or wire intended to be stiff enough only to operate the sleeves successfully.

While an average servant-girl would be likely to screw in a valve as far as possible, regardless of consequences, not much harm could be done with a short and limber lever arranged as aforesaid. The jet-orifices  $e^2$  are usually, but not necessarily, in the same vertical plane, but diverge somewhat and discharge toward the adjacent ends of the respective commingling-tubes G. These tubes are curved substantially as shown, and reach to and support the burners H. There is an advantage in this peculiar construction of the tubes G with long regular curves. With a straight commingling-tube the air that is drawn in by the force of the gas is not thoroughly commingled with the latter, to overcome which difficulty these tubes have heretofore usually been made with a sharp bend or elbow. The elbow aids in commingling the air with the gases, but greatly retards the flow of the same through the tube. Now, while the long regular curve shown does not materially retard the flow of gases through the tube, it is effective in thoroughly commin-

gling the same. The excess of friction on the longer side of the tube gives a rolling or retarding movement to the gas and thoroughly commingles the same. This may be demonstrated by blowing smoke rapidly through a curved glass tube, although the smooth surface of the glass is not so effective in producing the said rotative movement as is the rougher surface of an ordinary commingling-tube.

In operating the device the initial heat is obtained by burning fluid in the lighting-cup in the usual manner. The jet of liquid discharged from the orifice  $d^2$  projects into the tube  $c$  as far as the curve in the tube will admit, and the liquid returns by gravity into the lighting-cup. After the generator is sufficiently heated, gas may be discharged from any of the jet-orifices and lighted at the corresponding burners.

When but one burner is required, the central burner is always used to keep the generator heated. With the arrangement thus shown the generator is always kept at a high temperature, and the gas generated is correspondingly heated—an important result in vapor-burners.

What I claim is—

1. The combination, with a generator, a burner in close proximity thereto, a commingling-tube connected to the burner, and arms leading from the generator and connected by a hollow cross-bar, the latter having a jet-orifice located in a line with the open end of the commingling-tube, of a valve mounted in the cross-bar for closing said jet-orifice, substantially as set forth.

2. The combination, with a generator, a stationary hollow needle-valve connected therewith, a commingling-tube, and a burner attached thereto, of a sleeve mounted on the valve and having a jet-orifice adapted to be opened and closed by the valve, the said orifice being so located as to direct the vapor into the open end of the commingling-tube.

3. The combination, with a generator, a pair of hollow stationary needle-valves leading therefrom, commingling-tubes, and burners attached to the outer ends of the commingling-tubes, of sleeves mounted on the stationary valves and provided with jet-orifices located to direct the vapor into the inner ends of the commingling-tubes, and handles for moving the hollow sleeves, substantially as set forth.

4. The combination, with a generator and hollow arms and hollow stationary needle-valves, the said arms being connected by a hollow cross-bar having a jet-orifice, of the commingling-tubes and burners, the needle-valve mounted in the cross-bar, the sleeves mounted on the stationary valves, and levers for moving the sleeves, substantially as set forth.

5. The combination, with a generator, a generating-tube, a burner the upper disk of which is integral with the generator, and a curved commingling-tube leading from the burner through the generating-tube, of a pair of hollow arms



connected by a hollow bar, said bar being provided with a jet-orifice presenting toward the mouth of the curved tube, and a needle-valve for closing said jet-orifice.

5 6. In a vapor-burner, the combination, with a stationary hollow needle-valve, of a sleeve having a jet-orifice, said sleeve being mounted on the valve and adapted to slide thereon in opening or closing the jet-orifice, substantially  
10 as set forth.

7. The combination, with a stationary hollow needle-valve, of a sleeve mounted on the said valve, said sleeve having jet-orifices adapted to be closed by the valve, and means,  
15 substantially as shown, for actuating the sleeve in opening and closing the valve.

8. The combination, with a generator, a stationary hollow needle-valve attached to the generator, and a sleeve mounted on said valve, having a jet-orifice adapted to be closed by the  
20 valve, of a lever connected with the sleeve for actuating the same, said lever being fulcrumed on ears or projections extending from the generator, substantially as set forth.

In testimony whereof I sign this specification, 25  
in the presence of two witnesses, this 29th day of June, 1886.

HENRY RUPPEL.

Witnesses:

CHAS. H. DORER,  
ALBERT E. LYNCH.