

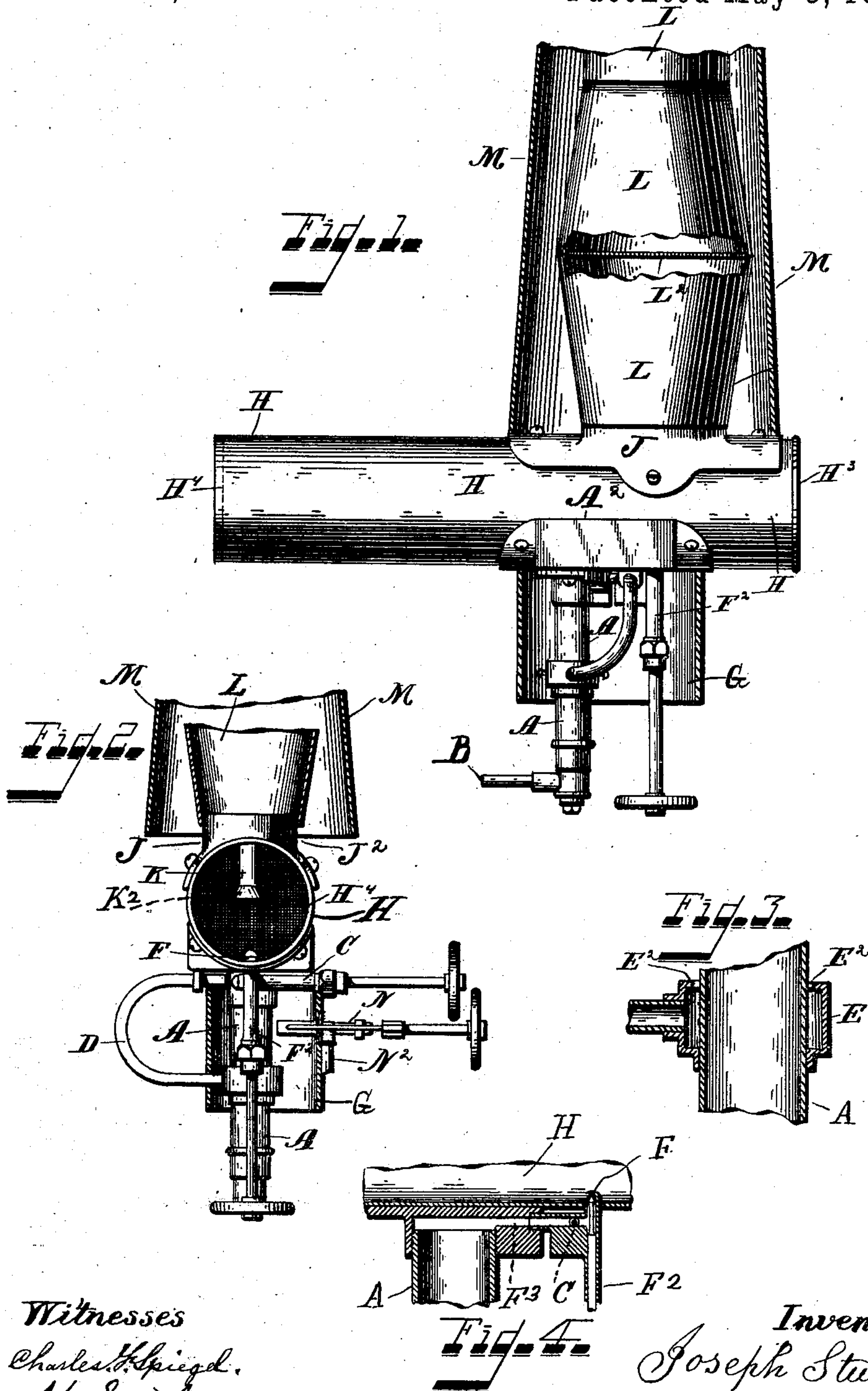
(No Model.)

J. STUBBERS.

APPARATUS FOR CONVEYING AIR AND VAPOR TO BURNERS.

No. 603,436.

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APPARATUS FOR CONVEYING AIR AND VAPOR TO BURNERS.

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To all whom it may concern:

Be it known that I, JOSEPH STUBBERS, a citizen of the United States, and a resident of the city of Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Apparatus for Conveying Air and Vapor to Burners, of which the following is a specification.

One of the primary objects of my invention is to convey vapor generated from a gasolene-stove generator through pipes to burners with a Welsbach or similar incandescent mantle and to provide in novel combinations means for forcing the vapor and air commingled therewith upward and along the service-pipes and for preventing the vapor from condensing, and also convey in the vicinity of the needle-opening more air into commingling-tube to the already-generated vapor, which enables me to get a perfect combustion for a larger number of burners than could be done without it, all as hereinafter more particularly set forth.

In the accompanying drawings, making a part of this specification, and in which similar letters of reference indicate corresponding parts, Figure 1 is a side view, partly in elevation and partly in section, of mechanism embodying my invention. Fig. 2 is a view, partly in elevation and partly in section, of the parts as they appear to a spectator when standing at the right of the mechanism of Fig. 1 and looking at this mechanism, the cap of the air-receiver and conductor being removed and that half of the subflame-protector which is next to the spectator being also removed. Fig. 3 is a vertical central section of the subflame-burner cup and of the adjacent portions of the generator and of the adjacent part of the tube for supplying the subflame-burner with vapor. Fig. 4 is a vertical section through the upper part of the generator and the needle-valve for supplying vapor to the burners and of the conduit connecting the generator with this valve and the subflame needle-valve.

I will now proceed to particularly describe my invention.

The primary object of my invention is to improve the service of gasolene-vapor in feeding the service-pipes of a system for lighting one or more rooms or apartments, &c., of a

building or other structure. Heretofore such systems of lighting by gasolene-vapor have been to a large extent failures, and these systems, though the material (gasolene) used in vaporization is much cheaper than coal-gas, have failed to successfully compete with those systems employing coal-gas. I overcome these disadvantages heretofore incident to the imperfect systems and mechanism employed and present a successful means for utilizing gasolene-vapor by a cheap apparatus and in advantageous and thoroughly effective operations in the lighting of houses and other structures.

I will now proceed to describe in detail the several features of my invention and the respective modes of operation and the various advantages resulting from their use jointly or otherwise.

A indicates a gasolene-generator, and B a delivery-pipe for supplying gasolene to the generator.

C indicates a needle-valve for supplying gasolene-vapor to the subflame to keep the generator hot. This vapor is under pressure. A simple mode of exerting pressure upon the vapor is by elevating above the generator the tank whereby the latter is supplied with gasolene. This needle-valve C is supplied with vapor from the generator by conduit F³. (See Fig. 4.)

D indicates the mixing or commingling tube for supplying the subflame with commingled air and vapor, the vapor being that which issues from valve C in the ordinary plan of a Bunsen burner.

E indicates the cup, fitting tight at the bottom around the generator-pipe A and allowing a small aperture E² at its top all around the generator-pipe A for exit of the vapor to heat the generator. Such vapor is burned at this place E² as it escapes. Thus burning, it is termed the "subflame." F² is a needle-valve to supply vapor to burners used for illumination and provided with incandescent mantles (not herein shown) at various locations in the building. This valve F² is connected to the generator A by the conduit F³, and receiving the vapor from the generator delivers it at orifice F.

A subflame-protector G surrounds the generator and subflame, and is suitably upheld

by commingling-tube D at bottom and by initial heating-burner N, hereinafter mentioned.

II indicates a horizontal cylinder or receiver to receive air to be commingled with the gasoline-vapor coming from valve F^2 and to convey it thereto under certain important conditions, as hereinafter specified. Cylinder II is preferably secured by suitable lugs or equivalent connections to the generator, preferably by being secured to the flange A^2 on the upper part of the generator-pipe. The upper end of the barrel or tube of needle-valve F^2 projects through the bottom of this cylinder through an opening in the latter. The edge of this opening fits close against the needle-valve tube to prevent the products of the air and gas consumed at the subflame from passing up around the needle-valve tube into the cylinder II.

A tube K for the purpose of mixing or commingling the air and gasoline-vapor is located in the upper part of the cylinder II and establishes communication between the interior of the cylinder II and a point above and outside of the same. This tube K is located directly above the point of the needle-valve F^2 , and the axis of the tube K and of the orifice of the needle-valve F^2 are preferably in the same vertical line. The object of this location of the tube K with reference to valve F^2 is to enable the tube K to receive the vapor projected upward from the needle-valve and to transmit it upward and at the same time enable this moving vapor to entrain with it air into mixing-tube and enable it to begin its process of commingling, the vapor at this point being mostly in the center and the air encircling it. The commingling-tube is flared out at K^2 at the lower end the better to collect the vapor from the exit-orifice of the valve F^2 in case it (the vapor) should go a little to one side of the perpendicular. When the needle-valve is almost closed, the vapor issuing from it is apt to leave the perpendicular, but when the needle-valve is well open the vapor ascends forcibly in a vertical line without substantial variation or deflection.

One end of the cylinder II is provided with a removable cap H^3 , so as to allow of ready access to the exit-orifice F of the needle-valve F^2 in case it should become clogged. The other end of the cylinder II is provided with a grating or network or diaphragm H^4 , in every case having fine perforations to prevent any dust from entering cylinder II and passing up through the commingling-tube K and clogging the wire-gauze L^2 , located in the tube K. This same wire H^4 may also be of service in preventing any flame from entering the cylinder II and igniting the vapor as it leaves the exit-opening of the needle-valve F^2 .

On top of the cylinder II is a collar J, connected thereto and forming a convenient support for the commingling-tube K. The pipe L is preferably supported by this same collar,

being slipped over a vertical annular flange J^2 of the same. The pipe L gradually enlarges and then receives the wire-gauze or finely-perforated diaphragm L^2 . The object of such enlargement is to enable the actual combined area of the perforations of the wire-gauze to substantially equal the area of the tube K in a transverse space thereof, and thus prevent the gauze from impeding the passage of commingled air and gasoline-vapor through the service-pipe L. The function of this wire-gauze prevents any flame from entering the service-pipe, and thereby prevents an explosion in said pipe.

Outside of and encircling the service-pipe L, I locate a gas or vapor pipe or flue M directly over the subflame of subflame-chamber E to receive the heat from the said flame. This flue M extends upward to an extent proportionate to the distance which it is desired to force the commingled air and vapor in the service-pipe, and also according to the quantity of such air and vapor to be forced up and the rate of velocity at which this commingled air and vapor are to move through the service pipe or pipes. All of these functions it performs or supplements and also performs the additional function of preventing the vapor from condensing in the service-pipes. The length of the flue M will therefore vary from about two feet to twenty feet. A flue M of less than two feet will operate within certain limits.

The hotter the air and vapor are heated the more air is taken in at the mixing-tube, and vice versa.

The tube II may be dispensed with and the generator may be constructed similar to the ordinary gasoline-stove generator with a subflame, so as to prevent the products of combustion from entering the mixing-tube, and different modes may be employed for heating the air and vapor in the service-pipe leading upward with good results.

It remains to speak of the burner N. This is located, substantially as shown in Fig. 2, so as to heat the generator A at the commencement of the operation of generating gasoline-vapor for the service-pipes. This burner is fed by means of a conduct N^2 , connected to that main supply-pipe from the gasoline-tank which supplies the generator; but this burner may be otherwise supplied with fuel and may be by any gas instead of gasoline-vapor.

The means for heating the generator to start the generator in making vapor may be varied. For example, a drip-cup or torch, &c., may be used instead of burner N and with suitable fuel. This preliminary heating is an old process and does not enter into my invention. It is alluded to here merely to show a mechanism in all respects complete and operative.

The mode in which my invention operates is as follows: First the generator A, filled with gasoline, is heated, and a vapor is generated, preferably, by a flame from the burner of nee-

dle-valve N. Then the generator-valve C for the subflame is opened, and the vapor therefrom, passing out at orifice E² of the subflame-burner, is there lighted and continually heats the generator A, causing the latter to generate vapor. The needle-valve F² is now opened. The flame of the subflame-burner E serves to cause the generator to make as much vapor as is needed to escape from the two openings—viz., E² and F. The vapor from exit-orifice of needle-valve F² passes up across the space in cylinder H and into the commingling-tube K. Right here, at this stage of the operation, attention is called to the fact that I heat the cylinder H by the heated air and gases from the subflame, and the heated cylinder H heats the air within it. This air, being expanded, rises, and thereby assists the needle-valve F² in conveying air into the tube K along with the vapor. Generated vapor from valve-orifice F issues therefrom with great force and entrains the air in the cylinder H and carries it up with it into the commingling-tube K; but as the commingled air and vapor becomes heavy when it gets cold it will form a resistance, and thereby prevent the air from entering tube K as freely as it would if there were no resistance. The fresh air from cylinder or chamber H, being heated and expanded, has a tendency to rise and enables the jet of carbureted air from generator-pipe F to more easily raise it. Inasmuch as it continues heated and expanded, it will continue to rise after the impetus received with the generated vapor from pipe F has been exhausted, and the commingling air and vapor will continue to rise and pass along service-pipes. For the latter purpose—viz., to supplement the action of the cylinder H—I have devised and arranged the air and gas forcing tube M. The heat—viz., the heated air and gases of combustion from the subflame—will pass around the cylinder H into the space between the tube M and pipe L, and thereby from without heat the pipe L and the air and vapor within. This tube M may be dispensed with where there is a certain number of burners used—say from five to nine—and the vapor is not to be raised very far; but when there are only a few burners used, although the vapor does not have to be raised far, the movement of the vapor will be slow, and the air and vapor will get cold and heavy, even when the temperature is normal. There will not be sufficient power in the current generated by the needle-valve to raise this heavy vapor. In such cases the tube M must be employed. Another function of this supplemental pipe M is to keep gasoline-vapor from condensing in the service-pipes in cold weather, and this function is necessary in all cases, whether there be few or many burners and whether the mixture of vapor and air is required to be raised a long or a short distance, where the service-pipes run through cold places and a heavy grade of gasoline is used. This heating of the air and vapor in the serv-

ice-pipe L by the hot air of pipe M prevents such condensation altogether in pipes of ordinary length. The heated air and vapor pass through the service-pipes and keep them warm and in proper condition to be conduits for the oxygenated vapor until the latter is consumed at the burners. By means of this extra apparatus of my invention I can draw more air into the service-pipes, and thus more fully oxygenize the vapor and therefore feed a larger number of burners than I could otherwise do and raise the vapor much higher and move it farther and feed burners at a higher altitude than could otherwise be done.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. In an apparatus for supplying burners with fuel, the combination with a generator, of means for heating the same, a tube adapted to receive commingled air and vapor, an upwardly-extending service-pipe adapted to receive the discharge of air and vapor from said tube, and means for heating said pipe, substantially as described.

2. The combination with a gasoline-burner and a generator adapted to be heated thereby, of a commingling-tube, an upwardly-extending service-pipe for conveying the commingled air and vapor, a tube surrounding said service-pipe and adapted to receive heated products of combustion from said burner and to conduct said heated products in contact with the said service-pipe whereby the contents of said service-pipe become heated and rise and are prevented from condensing, substantially as described.

3. In an apparatus for supplying burners with fuel-vapor and air, the combination with a generator and means for heating the same, a service-pipe leading upward from above said generator and adapted to convey the commingled air and vapor, a tube surrounding the service-pipe, located over the generator-heater and adapted to receive the surplus heat from said heater, and to convey it in contact with the exterior of said service-pipe, for heating the contents of said service-pipe, substantially as described.

4. The combination of a generator, means for heating the same, a receiver, and a tube having an orifice located therein for forcibly delivering commingled air and vapor to the receiver, means for heating the receiver, a service-pipe mounted vertically over said receiver and communicating therewith, and a tube inclosing the said service-pipe and adapted to convey heat from said heating means along the outside of said service-pipe, substantially as described.

5. In an apparatus for supplying burners with fuel-vapor and air, the combination with a generator and means for heating the same, of a service-pipe substantially upright and adapted to convey the hydrocarbon vapor from said generator commingled with air, a tube surrounding the said service-pipe, means whereby heat from said generator is caused

to pass through the said tube and heat the contents of the service-pipe to cause them to rise and prevent condensation, substantially as described.

5 6. The combination of a gasolene-generator having a needle-valve whose chamber is connected with said generator and means for heating said generator, a commingling-tube, means for separating the products of combustion of said generator-heater from the contents of said commingling-tube, a delivery-pipe leading upward from said commingling-tube and means for conducting heat from the generator-heater along the exterior of said
10 delivery-pipe, heating the same and causing the mixture in said delivery-pipe to rise and preventing condensation, substantially as described.

7. The combination with a gasolene-generator having a subburner for heating the same, of a needle-valve whose chamber is connected with said generator, a commingling-tube adapted to commingle air with the vapor from said valve, a delivery-pipe leading upward and
25 adapted to convey the air and vapor from said commingling-tube and means whereby the heat from the subburner is caused to heat the contents of the delivery-pipe for causing them to rise and preventing condensation, substantially as described.
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8. In an apparatus for supplying burners at a higher level than the needle-opening with vapor and air, a vapor-generator, and means for supplying a subflame thereto, the receiver
35 H, located above the generator, and receiving at its lower part vapor under pressure from the delivery-orifice F, and also having a direct communication with the fresh external air whereby this fresh air may enter for mixture
40 with the vapor from the generator the receiver H being exposed to the subflame, and an exit for commingled air and vapor, from the receiver to the service-pipe system, substantially as and for the purposes specified.

9. In an apparatus for supplying burners with illuminating vapor and air, a vapor-generator, means for supplying a subflame thereto, the receiver H, located so as to be heated from the subflame, and adapted to receive at
50 its lower portion a stream of vapor directed vertically upward, the receiver H having an opening for receiving air to be commingled with the vapor, and a tube K, located over the inlet F, and establishing communication
55 between the receiver H and the service-tube

L, substantially as and for the purposes specified.

10. The combination of the generator, means for supplying a subflame thereto, receiver H, exposed to the subflame, vapor-delivery pipe to the receiver, at the lower portion thereof, the service-pipe L, with which the receiver is in communication and the auxiliary tube M, surrounding the service-tube L, and extending approximately to the receiver, said tube
65 M being open at the bottom and receiving the heated air and products of combustion of the subflame, substantially as and for the purposes specified.

11. The combination of the generator, means for supplying a subflame thereto, receiver H, exposed to the subflame, vapor-delivery pipe to the receiver, at the lower portion thereof, and the tube K in the receiver above vapor discharge or supply orifice F, and the tube L,
75 above the receiver, and receiving the commingled vapor and air from the latter, for the service-pipes, and the tube M, and the service-tube L, the tube M receiving the heated air and products of combustion from the subflame, and conveying them into contact with the service-pipe, substantially as and for the purposes specified.
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12. The combination of a generator, means for heating the same, a receiver H above, and
85 having a direct communication with fresh external air whereby this air may enter for mixture with the vapor from the generator and a tube having orifice F located therein for forcibly delivering under pressure vapor to
90 the receiver, means for heating the receiver H, and a connection between the receiver and the service-pipe, substantially as and for the purposes specified.

13. In an apparatus for supplying burners
95 with fuel-vapor and air, a generator, means for heating the latter, a delivery vapor-pipe having a small orifice F, a receiver, through which the forcibly-ejected vapor passes, and adapted to supply air thereto, means for heating the receiver, a receiving-pipe in line with the stream of vapor and adapted to receive this vapor and heated air from the receiver, and a service-pipe connected with said receiving-pipe, substantially as and for the purposes specified.
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Attest:

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