No. 713,314. Patented Nov. 11, 1902.

# P. LAMURE & P. E. YÈGE.

## GAS BURNER OF BUNSEN TYPE FOR ILLUMINATING PURPOSES AND FOR HEATING.

(Application filed July 1, 1902.)

(No Model.)

Fig. 1.

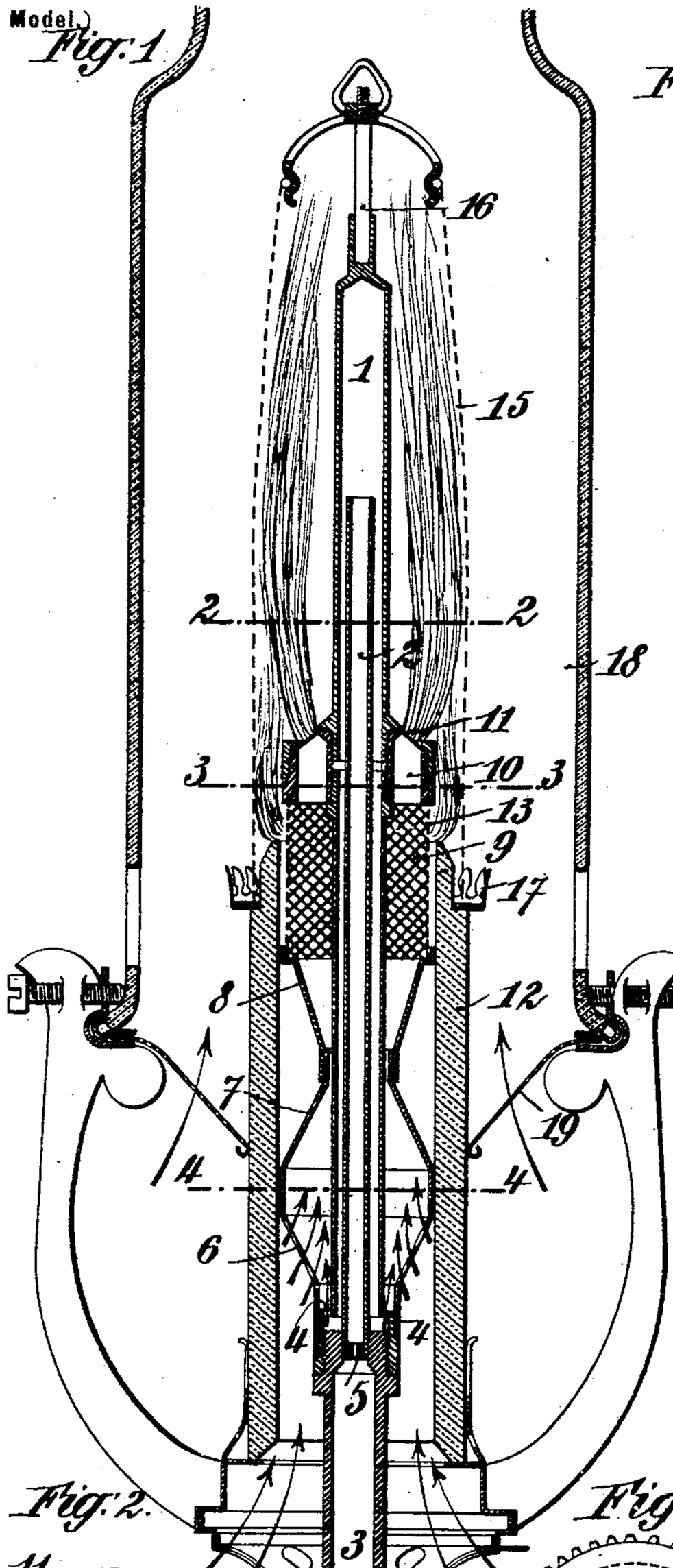



Fig. 5.

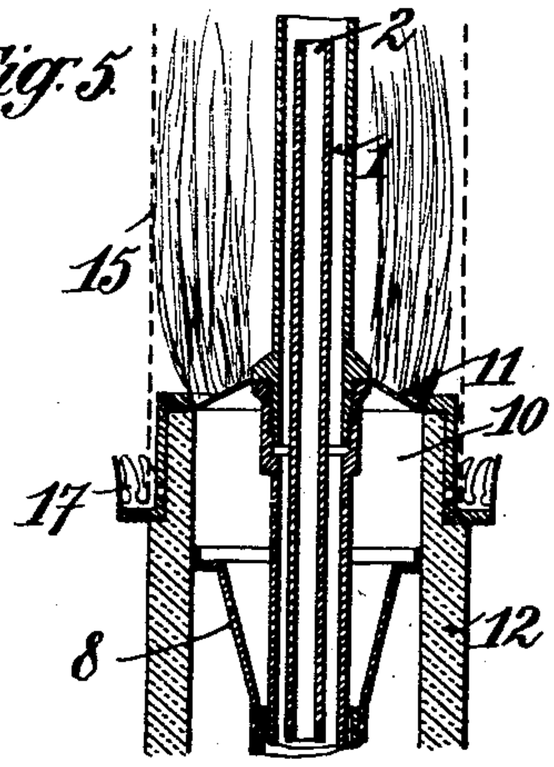



Fig. 6.

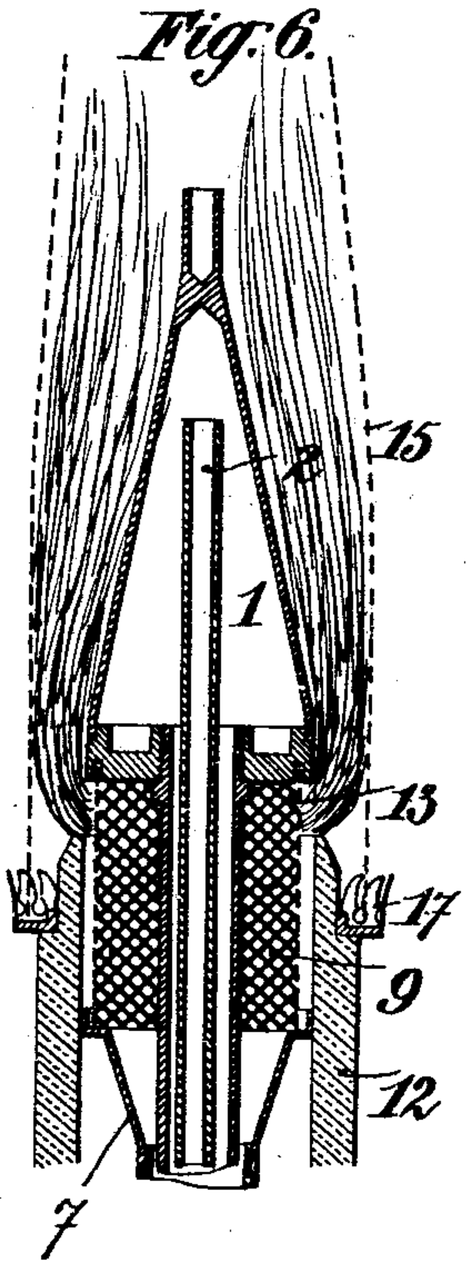



Fig. 2.

Fig. 3.

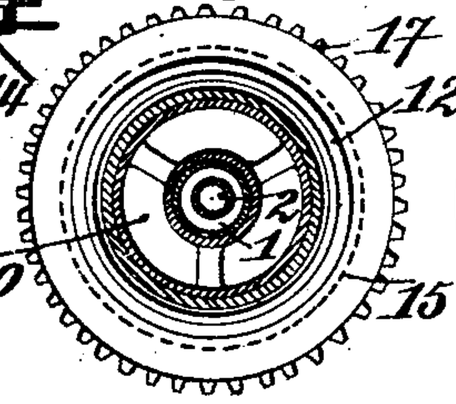
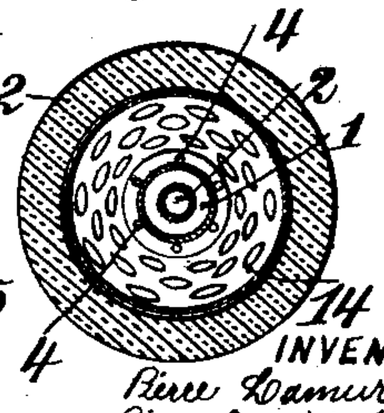



Fig. 4.

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# UNITED STATES PATENT OFFICE.

PIERRE LAMURE AND PIERRE EVARISTE YÈGE, OF BOIS COLOMBES, FRANCE.

## GAS-BURNER OF BUNSEN TYPE FOR ILLUMINATING PURPOSES AND FOR HEATING.

SPECIFICATION forming part of Letters Patent No. 713,314, dated November 11, 1902.

Application filed July 1, 1902. Serial No. 113,944. (No model.)

*To all whom it may concern:*

Be it known that we, PIERRE LAMURE and PIERRE EVARISTE YÈGE, citizens of the Republic of France, residing in Bois Colombes, Seine, France, have invented certain new and useful Improvements in Gas-Burners of Bunsen Type for Illuminating Purposes and for Heating, of which the following is a specification.

This invention relates to a gas-burner of the Bunsen type, which is adapted for illuminating purposes with incandescent mantles and for heating.

This burner is characterized by the fact that the gas before it is mixed with the air, so as to constitute the combustible mixture, passes into a chamber at the center of the flame, where it is raised to a high temperature, and also by the fact that it produces two concentric flames. It is further characterized by various dispositions which are hereinafter described.

In the accompanying drawings, Figure 1 is a vertical section of a gas-burner for incandescent lighting constructed in accordance with our invention. Figs. 2, 3, and 4 are cross-sections on the lines 2 2, 3 3, and 4 4 of Fig. 1. Figs. 5 and 6 are partial vertical sections relating to modifications.

The burner represented in Fig. 1 consists, essentially, of the three following parts: first, a heating-chamber arranged at the center of the flame and into which the gas is conducted before it is mixed with the air so as to produce the combustible mixture; second, a mixing-chamber which the heated gas enters on leaving the heating-chamber; third, a chamber for the expansion and superheating of the gaseous mixture, upon issuing from which it is ignited.

The gas is conducted through the supply-pipe into the heating-chamber 1 by way of the inner tube 2, fixed to the pipe 3, connected to the supply-pipe. This heating-chamber 1 consists of a tube closed at its upper portion and arranged in the center of the flame. The gas-supply tube 2 rises to the upper portion of this tube 1, which descends concentrically with this latter down to the base of the appliance. The gas heated in the chamber 1 descends into the annular space between the tubes 1 and 2 and escapes at the base of the tube 1 through small orifices 4. The admission of gas into the heating tube-chamber 1 is limited by the diaphragm 5, arranged at the lower part of the tube 2. This diaphragm permits of regulating the burner and to a certain extent fulfils the office of a regulator. The maximum effect is obtained when the quantity of gas introduced into the heating-chamber 1 through this twyer 5, regard being had to the expansion, is equal to the capacity of the orifices—that is to say, is sufficient to produce complete incandescence of the mantle.

The heating-chamber is preferably constructed of iron in order that as it is raised to a red heat by the flame which surrounds it the hydrogen of the gas is separated from the other carbonated products.

The heated gas escaping through the orifices 4 enters the mixing and expansion chamber 6 7 8. This chamber consists of a wall 6, in the form of a truncated cone flaring upwardly and joined to a truncated conical wall 7, flaring downwardly, and this latter is joined to a third truncated conical wall 8, flaring upwardly. The wall 6 is provided with orifices through which the air intended to mix with the gas issuing from the orifices 4 of the heating tube-chamber 1 is admitted. Upon contact with the air entering at 6, the temperature of which is lower, the gas experiences a contraction which assists the mixture of the two fluids. The air is carried along by the gas which escapes from the orifices 4 with great velocity. The gaseous mixture enters in the expansion-chamber 8, where it becomes perfectly homogeneous, and the various parts of the fluid stream assume an equal velocity.

The volume of the chambers 7 and 8, the section of the reduced connecting portion, and that of the outlet-orifices for the combustible mixture are determined in such a manner that its velocity is equal to that of the propagation of the flame.

On leaving the expansion-chamber 8 the mixture enters into a cage of metallic gauze 9, through which it passes into an annular chamber 10, from which the gas escapes through a crown of metallic gauze 11, which constitutes the ignition-point. The whole, constituted by the chamber 6 7 8 and the cage 9, is arranged in a large tube 12, which

is preferably formed of a substance which is a bad conductor of heat—such as refractory earth, porcelain, steatite, or the like. The upper portion of this chamber terminates a little below the annular chamber 10 in such a manner as to uncover a small part of the height of the cage 9. The combustible mixture also escapes at this point, thus forming at 13 a second flame concentric with that formed at 11. The portion of the gaseous mixture forming the flame at 11 is superheated in the chamber 10, thus insuring perfect combustion. The air entering the chamber 6 7 8 9 is directed by the tube 11, at the base of which it enters, through a register 14, by means of which the quantity of air admitted may be regulated. The mantle 15 is suspended from the top of the rod 16, arranged in continuation of the tube 1.

The tube 12 obviates all loss of heat from the chambers 6 7 8 and also serves to heat the air entering through the register 14.

This novel burner not only permits of utilizing the flame for heating the air and the gas before their admixture, but also of utilizing by means of a more intimate mixture a quantity of air proportionately greater than in ordinary burners, so that with this burner the unit termed "carcelhour" may be obtained with an expenditure which is at the most ten liters of gas at the normal pressure of six centimeters of water.

For a given luminous effect, probably proportionate to the surface of the mantle, the volume occupied by the tube 1 within the mantle 15 may always be determined proportionately to that of the mantle in order to reduce the space in which the combustion of the gas is effected and produce the maximum effect for a minimum consumption of gas.

We will now describe a device which we apply to our burner, but which may also be applied to all kinds of burners for incandescent mantles. It consists of a gutter-shaped part 17, in which the base of the mantle is lodged. The said gutter protects this portion of the mantle from external currents of air capable of cooling the flame. The lower edge of the gutter is of open-work design, so that when the mantle is burned off this operation may take place throughout its whole extent. In the drawings the burner is represented as being placed in a glass chimney 18, and the circulation of the air within this chimney is regulated by a sieve 19. This latter is arranged in such a manner as to project toward the chimney the intense portion of the air-current. In the first case (represented in Fig. 5) the tube 12 is prolonged up to the part 11. Superheating-chamber 10 is dispensed with, as is also the outer flame, which is formed at 13. The whole of the gaseous mixture passes through the grating 11 for the production of the flame. In the second modification (represented in Fig. 6) the superheating-chamber 10 is also dispensed with or united to the heating-chamber, which may then assume the conical form represented in the figure. The whole of the gaseous mixture then escapes at 13 at the top of the metallic cage 9.

Having thus described our improved gas-burner and its modifications, it should be understood that we may introduce therein any further modifications compatible with the essential features described. We may also use this burner with all kinds of combustibles—such as coal-gas, alcohol, hydrocarbons—and for heating as well as for lighting.

In the application of the burner for heating purposes the incandescent mantle is replaced by a mantle of refractory material—such as refractory earth, magnesia, and the like—widely open at its upper part and provided with lateral apertures in order to permit of rapid discharge of the products of combustion. This radiating-mantle is preferably of an elongated semi-ovoid form.

We claim—

1. In combination in a gas-burner, a chamber 10 for superheating the air and gas, an outlet from said chamber at the upper part thereof, and a lateral annular outlet for the gas in a lower plane than the upper outlet whereby two concentric flames are produced, the said lateral or outer flame inclosing the said superheating-chamber, said chamber 10 being located at the lower end of the mantle and with its openings to direct the flames at the lower end only of the mantle, substantially as described.

2. In combination, a gas-heating chamber 1 located within the flame, a mixing-chamber 6, 7, 8, for air and gas communicating with the gas-heating chamber 1, a metallic cage 9 above the mixing-chamber to receive the mixed gas and air therefrom, a superheating-chamber above the cage, laterally-disposed outlets below the superheating-chamber, and a tube 12 surrounding the mixing-chamber, substantially as described.

3. In combination, a gas-heating chamber 1 located within the flame, a mixing-chamber 6, 7, 8, for air and gas communicating with the gas-heating chamber 1, a metallic cage 9 above the mixing-chamber to receive the mixed gas and air therefrom, a superheating-chamber above the cage, laterally-disposed outlets below the superheating-chamber, and a tube 12 surrounding the mixing-chamber, the said superheating-chamber having upwardly-directed outlets leading therefrom, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

PIERRE LAMURE.
PIERRE EVARISTE YÈGE.

Witnesses:
GUSTAVE DUMONT,
EDWARD P. MACLEAN.