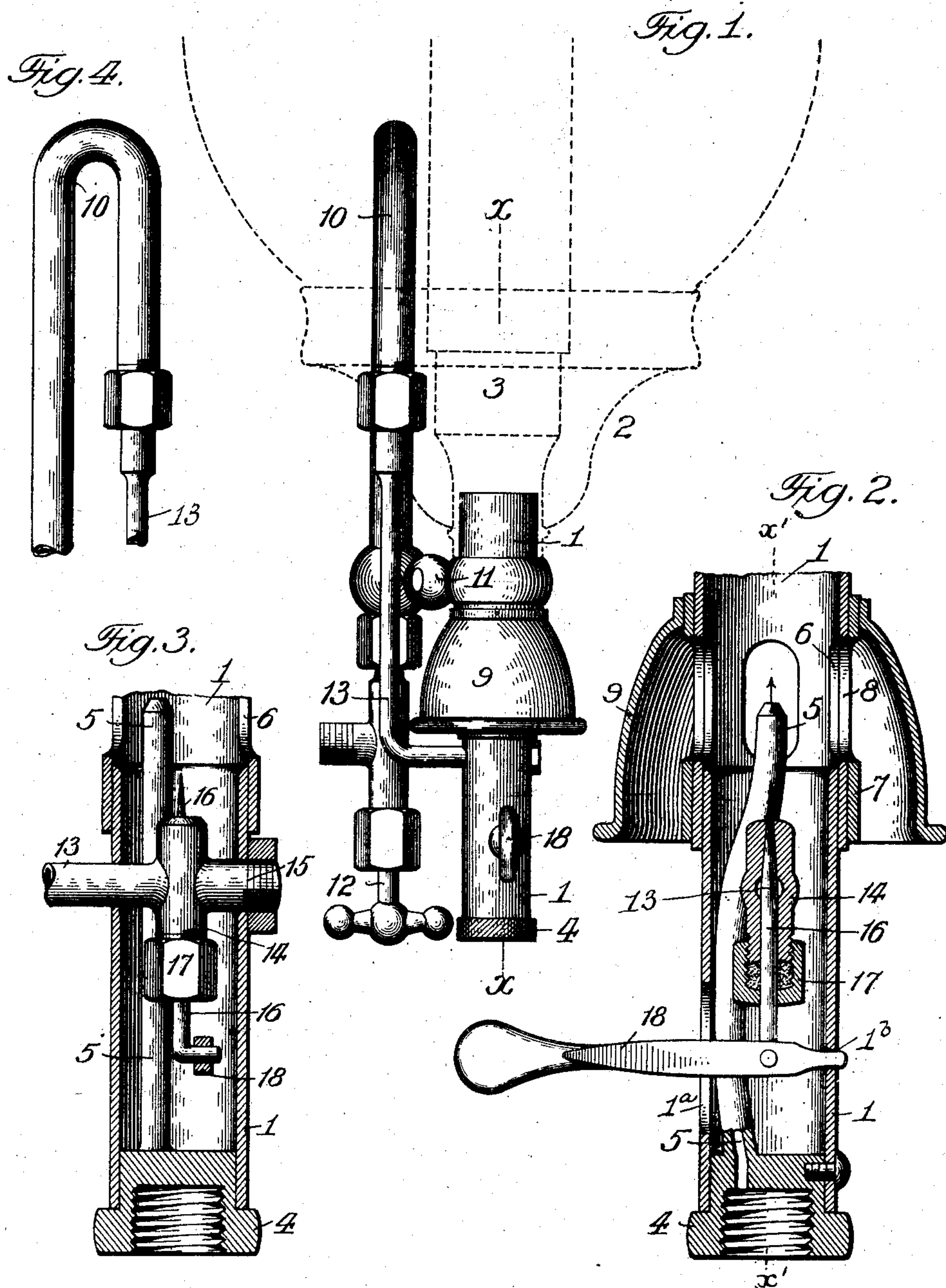


F. & A. H. McMILLAN.  
 COMBINED ILLUMINATING GAS AND VAPOR BURNER.  
 APPLICATION FILED MAY 28, 1906.

905,738.

Patented Dec. 1, 1908.



Attest:  
 John Enders,  
 M. A. Holmes

Inventors:  
 Frank McMillan and  
 Arthur H. McMillan,  
 by Robert Burns  
 Attorney.



# UNITED STATES PATENT OFFICE.

FRANK McMILLAN AND ARTHUR H. McMILLAN, OF CHICAGO, ILLINOIS, ASSIGNORS TO  
CHARLES W. BELL, OF JACKSON, MICHIGAN.

## COMBINED ILLUMINATING GAS AND VAPOR BURNER.

No. 905,738.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed May 26, 1906. Serial No. 318,869.

*To all whom it may concern:*

Be it known that we, FRANK McMILLAN and ARTHUR H. McMILLAN, citizens of the United States of America, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Combined Illuminating Gas and Vapor Burner, of which the following is a specification.

This invention relates to a combined illuminating gas and hydrocarbon vapor burner, and has for its object to provide a simple and efficient structural formation and combination of parts, whereby either ordinary illuminating gas, or hydrocarbon vapor can be used alternately in the burner, and which is self contained so that ordinary illuminating gas can be initially used to properly heat the vapor generating tube after which the supply of such gas can be shut off and the illumination continued by the vapor generated by the burner as needed, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1 is a side elevation of a burner embodying the present invention. Fig. 2 is an enlarged detail section of the same, on line  $x-x$ , Fig. 1. Fig. 3 is a similar view of the same on line  $x'-x'$  Fig. 2. Fig. 4 is a detail side elevation of the vapor generating tube.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 is the central main tube of the burner, the upper open end of which is adapted to receive and support the usual globe or chimney supporting gallery 2 as well as the perforated discharge head 3 of an incandescing mantle through which the combustion takes place.

4 is a socket piece, formed with a gas passage and secured in the lower end of the main tube 1, and provided with a screw threaded recess for attachment in turn to the supply nipple of an ordinary gas fixture.

5 is a gas tube connected at its lower end with the socket piece 4 and extending up a distance inside the main tube 1, and adapted to conduct ordinary illuminating gas passing through the gas passage to the discharge head 3 of the burner.

6 are a series of lateral openings in the main tube 1, midway its height and adjacent to the discharge end of the gas tube, for the admission of air into the interior of the main tube.

7 is a revoluble sleeve fitting the outside of the main tube 1, and formed with a series of lateral openings 8, corresponding to the series of lateral openings 6 in the main tube 1, which in a rotary adjustment of said sleeve are adapted, in connection with the lateral openings of the main tube 1, to increase or diminish the amount of air admitted to the interior of said main tube and as may be required to produce proper combustion.

9 is an open bottom bell shaped shield surrounding the lateral openings and secured at its narrow upper end to the revoluble sleeve 7, immediately above the lateral openings of the same, and adapted to protect the said openings from drafts of wind blowing laterally against the burner, as well as afford a convenient means for the manual adjustment of said sleeve.

10 is a vapor generating tube, preferably of an inverted U form, and arranged vertically at one side of the main tube 1, with its upper end in adjacent relation to the discharge head 3, and incandescing mantle of the burner.

11 is a clip or bracket for connecting the vapor generating tube and the main tube in fixed and proper relation.

12 is a regulating valve, preferably of the needle type, arranged at the inlet end of the vapor generating tube 10, and adapted to regulate the supply of gasoline or other hydrocarbon fluid to said generating tube.

13 is a depending angle tube connected at one end to the depending outlet end of the vapor generating tube 10, and at its other end to the vapor discharge nozzle or head now to be described.

14 is the vapor discharge nozzle or head arranged centrally within the main tube 1, and secured in place therein by a lateral extension 15 fitting a lateral opening in said tube, and provided with an attaching nut on its outer end, as shown in Fig. 3. Such discharge nozzle is formed with a vertical discharge orifice, into which the vapor is introduced laterally by the angle tube 13, which to this end is connected to the said discharge nozzle midway of its height.

16 is a needle valve moving in the vertical orifice of the discharge nozzle 14, and adapted in its vertical adjustment to regulate the flow of vapor from said discharge nozzle.

17 is a stuffing box at the lower end of



the discharge nozzle 14, for the movement of said needle valve in a vapor tight manner.

18 is a lever pivoted at one end in an orifice 1<sup>b</sup> in the wall of the main tube 1 and extending out laterally from said main tube through a lateral opening 1<sup>a</sup> for convenient operation; such lever is connected to the lower end of the needle valve 16, and is adapted in its manual adjustment to effect a corresponding adjustment of said needle valve.

It will be observed that the illuminating gas tube 5 and the hydrocarbon vapor discharge nozzle 14 are arranged side by side within the central main tube with their discharge ends adjacent to the lateral openings of the central main tube.

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

1. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, means for controlling said lateral openings, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with said gas passage and connected to said socket piece and extending vertically within the main tube, to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape, provided with a depending angle tube at its outlet end entering the side of the main tube and a central discharge nozzle supported on the angle tube and communicating therewith, arranged within the main tube and alongside of which the gas discharge tube is positioned.

2. A combined illuminating gas and hydrocarbon vapor burner comprising a central main tube provided with lateral openings for admitting air, a revoluble sleeve on the main tube formed with lateral openings for admitting air and adapted to register with the lateral openings of said main tube and control the admission of air to the lateral openings of the main tube, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with said gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outlet end entering the side of the main tube, and a central discharge nozzle, supported on the angle tube and communicating therewith, ar-

ranged within the main tube and alongside of which the gas discharge tube is positioned.

3. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, a revoluble sleeve on the main tube formed with lateral openings for admitting air and adapted to register with the lateral openings of said main tube and control the admission of air to the lateral openings of the main tube, a bell shaped shield, surrounding the lateral openings, and secured to the revoluble sleeve, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with said gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outlet end, entering the side of the main tube and a central discharge nozzle, supported on the angle tube and communicating therewith, arranged within the main tube and alongside of which the gas discharge tube is positioned.

4. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, means for controlling said lateral openings, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with said gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outlet end entering the side of the main tube, a central discharge nozzle, supported on the angle tube and communicating therewith, arranged within the main tube and alongside of which the gas discharge tube is positioned, a needle valve arranged axially in the discharge nozzle, and means for operating said needle valve to regulate the discharge from said discharge nozzle.

5. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, a revoluble sleeve on the main tube formed with lateral openings for admitting air and adapted to register with the lateral openings of said main tube and control the admission of air, a socket



piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with said gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outlet end entering the side of the main tube, a central discharge nozzle supported on the angle tube and communicating therewith, arranged within the main tube and alongside of which the gas discharge tube is positioned, a needle valve arranged axially in the discharge nozzle, and means for operating said needle valve to regulate the discharge from said discharge nozzle.

6. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, a revoluble sleeve on the main tube formed with lateral openings for admitting air and adapted to register with the lateral openings of the main tube and control the admission of air, a bell shaped shield, surrounding the lateral openings, and secured to the revoluble sleeve, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with the gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outlet end entering the side of the main tube, a central discharge nozzle supported on the angle tube and communicating therewith, arranged within the main tube, and alongside of which the gas discharge tube is positioned, a needle valve arranged axially in the discharge nozzle, and means for operating said needle valve to regulate the discharge from said discharge nozzle.

7. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, means for controlling said lateral openings, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with the gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of

inverted U-shape provided with a depending angle tube at its outlet end entering the side of the main tube, a central discharge nozzle, supported on the angle tube and communicating therewith, arranged within the main tube and alongside of which the gas discharge tube is positioned, a needle valve arranged axially in the discharge nozzle, and a lever pivoted to the main tube and operatively connected to the lower end of said needle valve.

8. A combined gas and illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, a revoluble sleeve on the main tube formed with lateral openings for admitting air and adapted to register with the lateral openings of said main tube and control the admission of air, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outer end entering the side of the main tube, a central discharge nozzle, supported on the angle tube and communicating therewith, arranged within the main tube and alongside of which the gas discharge tube is positioned, a needle valve arranged axially in the discharge nozzle, and a lever pivoted to the main tube and operatively connected to the lower end of said needle valve.

9. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, a revoluble sleeve on the main tube formed with lateral openings for admitting air and adapted to register with the lateral openings of said main tube and control the admission of air, a bell shaped shield surrounding the lateral openings and secured to the revoluble sleeve, a socket piece formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with the gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to the lateral openings, a vapor generating tube of inverted U-shape provided with a depending angle tube at its outer end entering the side of the main tube, a central discharge nozzle, supported on the angle tube and communicating therewith, arranged within the main tube and



alongside of which the gas discharge tube is positioned, a needle valve arranged axially in the discharge nozzle, and a lever pivoted to the main tube and operatively connected  
5 to the lower end of said needle valve.

10 10. A combined illuminating gas and hydrocarbon vapor burner comprising, a central main tube provided with lateral openings for admitting air, means for controlling said lateral openings, a socket piece  
15 formed with an illuminating gas passage and closing the lower end of said main tube and adapted for attachment to the outlet nipple of an illuminating gas fixture, an illuminating gas discharge tube communicating with the gas passage and connected to said socket piece and extending vertically within the main tube to a point adjacent to

the lateral openings, a vapor generating tube of inverted U-shape provided with a  
20 depending angle tube at its outer end entering the side of the main tube, and a central discharge nozzle with which the angle tube communicates, at one side and provided with a lateral extension at the other  
25 side by which it is secured to the main tube and alongside of which the gas discharge tube is positioned.

Signed at Chicago, Illinois, this 22nd day of May 1906.

FRANK McMILLAN.  
ARTHUR H. McMILLAN.

Witnesses:

ROBERT BURNS,  
M. H. HOLMES.