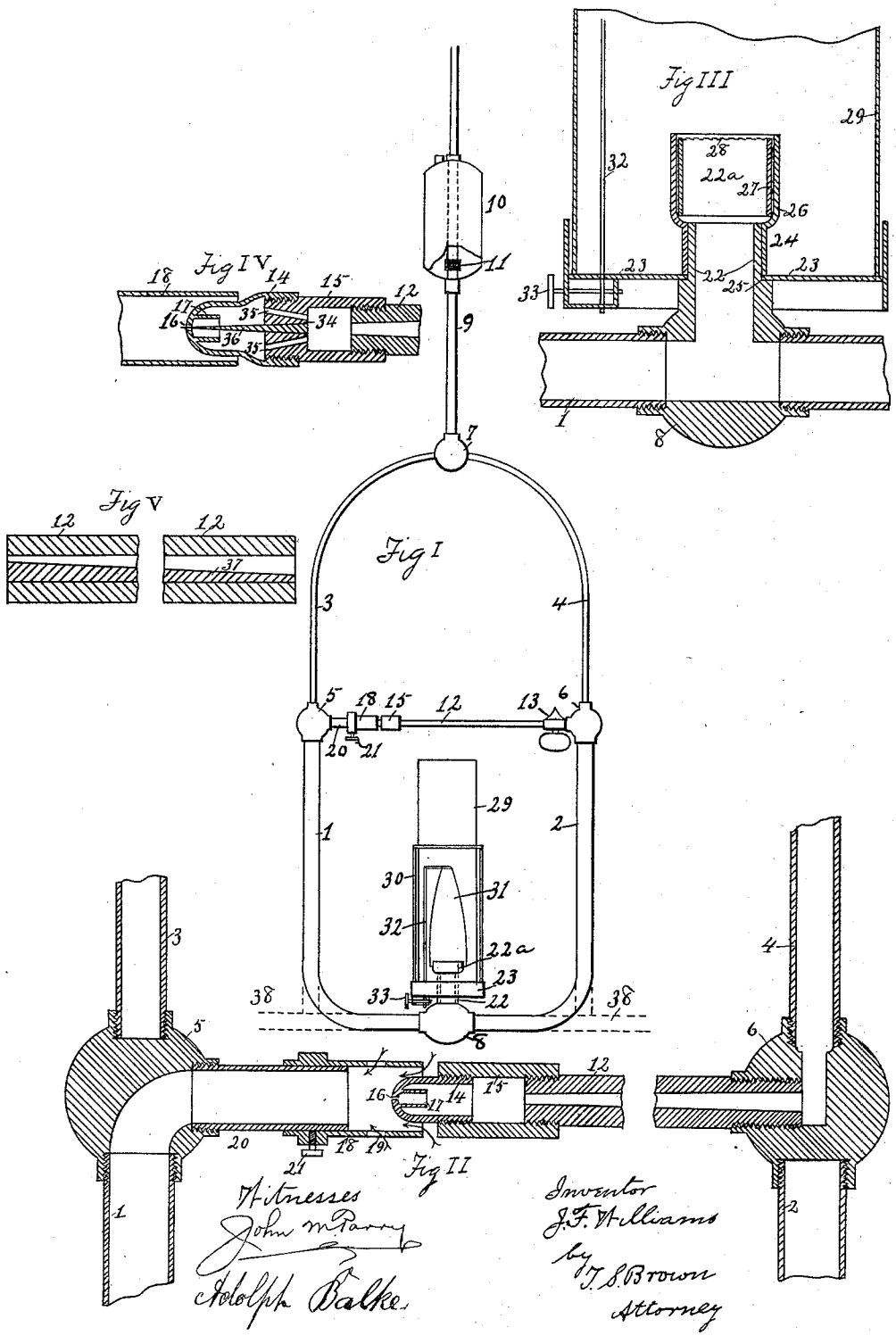
(No Model.) 2 Sheets—Sheet 1.

J. F. WILLIAMS.

GAS GENERATING GAS FIXTURE.

No. 606,435. Patented June 28, 1898.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

J. F. WILLIAMS.

GAS GENERATING GAS FIXTURE.

No. 606,435. Patented June 28, 1898.

Fig. 6.

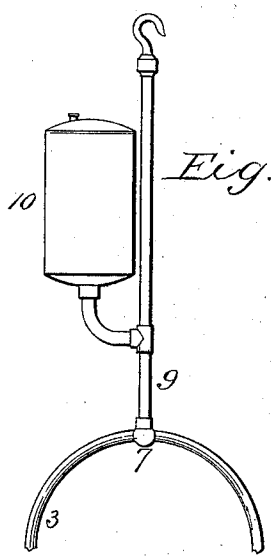


Fig. 7.

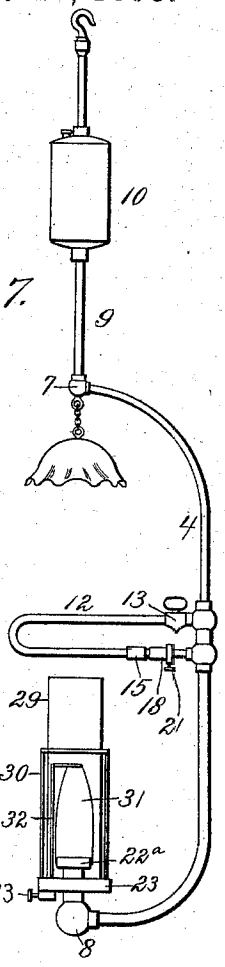
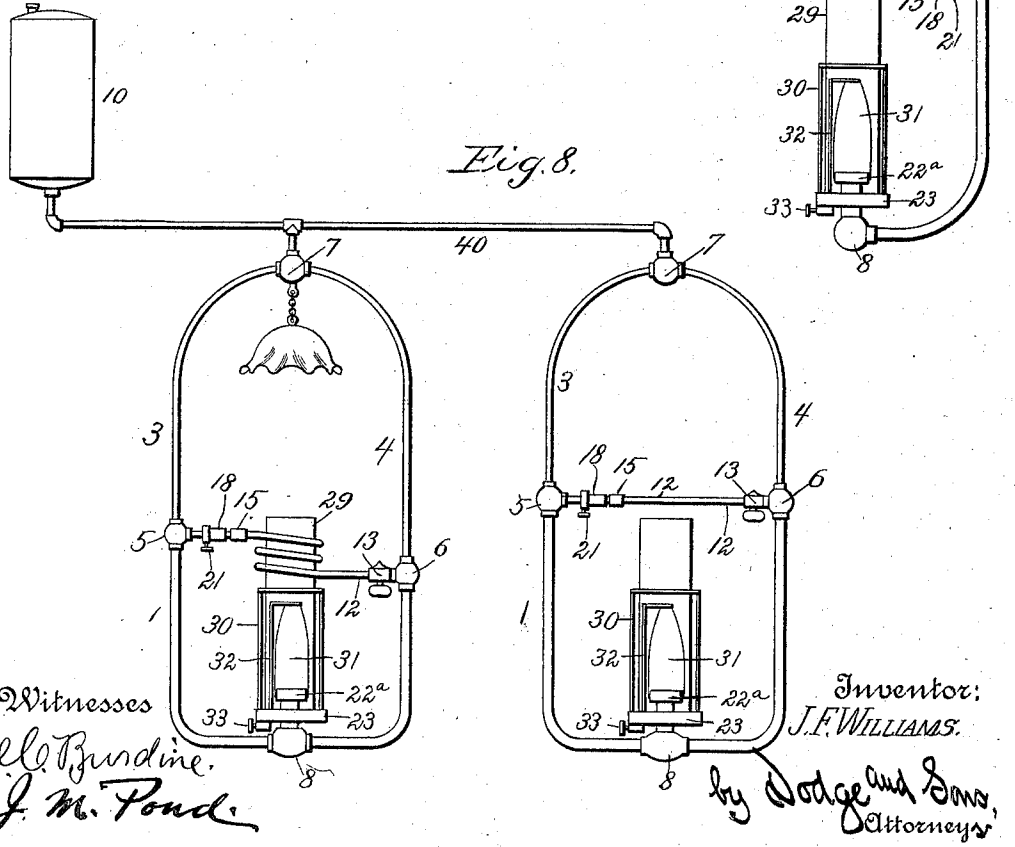


Fig. 8.



Witnesses
W. C. Burdine.
J. M. Pond.

Inventor:
J. F. Williams.
by Dodge and Sons,
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN F. WILLIAMS, OF KANSAS CITY, KANSAS, ASSIGNOR TO ROBERT M. SNYDER, OF KANSAS CITY, MISSOURI.

GAS-GENERATING GAS-FIXTURE.

SPECIFICATION forming part of Letters Patent No. 606,435, dated June 28, 1898.

Application filed June 8, 1897. Serial No. 639,919. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. WILLIAMS, a citizen of the United States, residing at Kansas City, in the county of Wyandotte, in the State of Kansas, have invented certain new and useful Improvements in Gas-Generating Gas-Fixtures, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which are made a part of this specification.

My invention relates to improvements in gas-generating gas-fixtures in which, in passage through the fixture, the gas is generated from liquid hydrocarbons, is mixed with a suitable quantity of air, and delivered to the ignition-tube without the interposition of any of the usual forms of generators or burners; and my invention consists in certain features of novelty hereinafter described, and pointed out in the claims.

Figure I represents a gas-fixture embodying my invention. Fig. II represents a longitudinal cross-section of the generating-tube and its coöperative parts. Fig. III represents a cross-section of the ignition-tube. Fig. IV represents a modified form of tip for the generating-tube. Fig. V represents a view in cross-section of a preferable means of forming the tapering passage in the vaporizing-tube; and Figs. VI, VII, and VIII, views illustrating modifications and variations hereinafter referred to.

Similar numerals refer to similar parts throughout the several views.

1, 2, 3, and 4 represent the tubing or pipes forming the fixture, connected by the T's 5, 6, 7, and 8.

9 represents a tube or pipe passing through the vessel 10, containing a supply of liquid hydrocarbon and connected with the fixture by the T 7. Within said vessel said tube is provided with one or more openings covered by the gauze screen 11 for admitting the liquid to the tube and thence to the fixture, the screen serving to prevent the admission of extraneous matter, the sides of said vessel being partly broken away to show the same. Said tube, extending above said vessel, may be attached to a wall or ceiling-hanger or other convenient support.

The tubes 9 and 4 constitute the supply-tube.

12 represents the vaporizing-tube, connected with the supply-tube 4 through the T 6 and provided with the shut-off valve 13. It will be observed, as shown in Fig. II, that the passage through said tube diminishes from the inlet to the outlet thereof. 14 represents a gas-tip connected with said vaporizing-tube by the coupling 15 and having the minute opening 16 therein. 17 represents a collar or sleeve formed within said tip surrounding said opening, the purpose of which is to intercept the heavier or unvaporized particles and prevent clogging of said opening thereby. The heavy or unvaporized particles naturally tend to adhere to the inner walls of the tip 14 and to travel therealong toward the discharge-opening, but the collar 17 arrests them and prevents their discharge. 18 represents a sleeve surrounding said tip provided with the openings 19, arranged to slide on the tube 20, connected with the T 5 and adjustable thereon by the set-screw 21, the purpose of said sleeve being to regulate the air-supply admitted to mix with the vapor issuing from the tip. In operation the tube or sleeve 18 should not come into direct contact with the tip, for should such contact occur the heat would be drawn from the tip and the tip thereby cooled.

The pipe 1 forms the mixing or diffusing tube, connecting through the T 8 with the tube 22, leading to the burner 22^{A}.

23 represents a chimney-holder formed with the sleeve 24, arranged to slide over the tube 22 and rest upon the shoulder 25 thereon. 26 represents a cup formed on said sleeve. 27 represents a sleeve arranged to be fitted within said cup and provided with the gauze screen 28, forming the burner.

29 represents the chimney, the arrangements of the parts being such that the vaporizing-tube extends across the line of the chimney a short distance above the same.

30 represents a chimney-support.

31 represents an envelop or mantle of refractory incandescing material arranged to surround the flame and form an incandescent mantle around the same. 32 represents a support for said mantle. 33 represents a set-screw for adjusting the same.

In Fig. IV is shown a modification of the coupling and tip shown in Fig. II, which I preferably use when a fixture with more than one light is desired. In such case I provide the coupling 15 with the head 34, having the

openings 35 for the passage of the vapor from the vaporizing-tube to the tip and having the needle-point 36 set therein and extending through the opening 16 in the tip, the arrangement being such that by adjustment of the tip upon the coupling the flow of vapor through said opening will be regulated and controlled according to the amount required by the number of lights with which the fixture is provided.

As shown in Fig. V, the tapering passage in the vaporizing-tube I preferably form from a tube having a straight passage by placing therein a rod 37, filed or dressed to form such tapering passage, as shown. The rod is simply held in place by frictional contact and may be readily withdrawn when it is desired or may become necessary to clean it.

When a fixture with more than one light is desired, arms 38 (shown in dotted lines in Fig. I) may be supplied, provided with burners similar to the one shown, all said burners being supplied from the mixing-tube 1.

In operation my improved apparatus is exceedingly simple. The liquid hydrocarbon passing from the vessel 10 through the tubes 9 and 4 to the vaporizing-tube 12 is there vaporized by the heat from the flame concentrated through the chimney arranged in close proximity under said tube. The tube 9 being larger than the tube 4 and the tube 4 larger than the vaporizing-tube and the passage in the vaporizing-tube decreasing in size from inlet to outlet, it is apparent that by reason of the constant decrease in size of the passage from the inlet of the liquid into the pipe 9 to the exit of the vapor from the vaporizing-tube any back pressure in the tubes generated during the process of vaporization meets the least possible frictional resistance, and the exit of the vapor will be steady and cannot puff and blow and cause uneven pressure. In other words, by the arrangement and construction of the passages as shown, but leaving them otherwise clear of any packing or filling material, the particles or molecules of the liquid as they expand or are converted into gas may exert their pressure in a rearward direction and not tend, as in the usual burners, to force the gas out through the tip under uneven impulses. The vapor passing from the vaporizing-tube passes through the opening in the tip 14 into the air-supply chamber formed by the sleeve 18, the expansion of the vapor in the coupling tending further to promote a continuous and steady flow of the vapor from the tip, the collar 17 within the tip preventing foreign matter from reaching the opening and clogging the same. By adjustment of said sleeve 18 on the tube 20 the amount of air admitted is regulated and controlled, the air entering through the holes 19 and at the space between the sleeve and coupling, as shown by the arrows in Fig. II. Thence the air and vapor passing through the tubes becomes thoroughly mixed in passage and passes to the burner through the tube 22, and by surrounding the flame with the incandescing mantle I obtain by this simple and cheap apparatus a very brilliant and powerful light.

Among the advantages gained by my improved apparatus may be mentioned the simplicity of its construction, a constant and even pressure from the source of supply to and through the vaporizing-tube, a constant and even heat upon the vaporizing-tube resulting in constant and even vaporization, the perfect control of the air-supply, and the constant and perfect mixing and diffusion of the air and vapor before reaching the point of ignition, and there being few parts and all simple and easily accessible it is little liable to get out of order, and any failure of the parts can be easily remedied.

I have preferably arranged the vessel and tube in the relation shown in Fig. I; but it is apparent that the vessel may be put on the side of the pipe, as shown in Fig. VI, or, as shown in Fig. VIII, the vessel may be supported and arranged in any convenient manner and have a pipe 40 run along the ceiling or other place and one or more fixtures connected to the same without departing from the principal construction shown.

The fixture can be varied in construction in many ways—as, for instance, as shown in Fig. VII, I could leave out pipes 1 and 3 and put in an L at 8 in place of the T, letting the tube 12 pass over and back across the chimney and discharge the generated gas and air into pipe 2, making a mixing-chamber of it the same as with pipe 1. So, too, instead of passing the vaporizing-pipe 12 directly over the chimney I may place it lower down and pass it around the chimney, such construction being shown in the burner upon the left of Fig. VIII.

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

1. In a device for generating and burning gas from liquid hydrocarbons, the combination of a suitable supply-pipe; a gas-generating pipe connected thereto and provided with a gradually-decreasing internal bore toward its discharge end; a discharge-outlet for said generating-pipe; a burner; a mixing-chamber intermediate said burner and outlet; and means for admitting air into said mixing-chamber.

2. In a device for generating and burning gas from liquid hydrocarbons; the combination of a suitable supply-pipe; a gas-generating pipe connected thereto and provided with gradually-decreasing internal bore toward its discharge end; a restricted discharge-opening for said generating-pipe; a burner; a mixing-chamber intermediate said burner and discharge-opening; and means for admitting air into said mixing-chamber.

3. In a device for generating and burning gas from liquid hydrocarbons, the combination of a suitable supply-pipe, a gas-generating pipe connected thereto and provided with

a gradually-decreasing internal bore toward its discharge end; a restricted outlet for said pipe; a burner located in proximity to said pipe; a mixing-chamber intermediate said burner and the generating-pipe; an air-inlet into said mixing-chamber; and means for controlling the admission of air.

4. In combination with an elevated reservoir; a discharge-pipe leading therefrom; a gas-generating chamber connected to said pipe and provided with a gradually-narrowing passage toward its discharge end; a restricted discharge-opening for said chamber; a burner located in proximity to said generating-chamber; a mixing-chamber intermediate said burner and the discharge-opening of the gas-generating chamber; and means for controlling the admission of air to said mixing-chamber.

5. The combination with a gas-fixture for generating and burning gas from liquid hydrocarbons, having a supply-pipe and mixing-pipe forming part of the fixture, a suitable burner connected with the mixing-pipe, a chimney-holder mounted below said burner, and a chimney supported thereon, of a vaporizing-tube having a gradually-decreasing bore toward its discharge end and connected with the supply-pipe arranged over said chimney, a tip mounted upon the discharge end of the tube and having a minute opening therein, and an air-supply regulator surrounding said tip connected with said mixing-pipe, substantially as set forth.

6. In a gas-fixture for generating and burning liquid hydrocarbons, the combination with a supply-pipe and a mixing-pipe forming part of the fixture, and a burner connected with the mixing-pipe and provided with a suitable chimney, of a vaporizing-tube provided with a shut-off cock connected with the supply-pipe arranged to be heated from the burner, a tip having a minute opening therein, and a coupling connecting said tip with said vaporizing-tube, arranged to form an expansion-chamber between said tip and said tube and a sleeve surrounding said tip provided with openings in the sides thereof, adjustably connected with said mixing-pipe, and arranged to regulate the air-supply, substantially as set forth.

7. In a gas-fixture for generating and burning liquid hydrocarbons, the combination with a supply-pipe and a mixing-pipe forming part of the fixture, of a vaporizing-tube connected with the supply-pipe, a tip having a minute opening and provided with an internal collar surrounding said opening, a coupling connecting said tip with said tube arranged to form an expansion-chamber between said tip and tube, and a sleeve surrounding said tip provided with openings in the sides thereof, adjustably connected with said mixing-pipe, and arranged to regulate the air-supply, substantially as set forth.

8. In a gas-fixture for generating and burning liquid hydrocarbons, a vaporizing-tube, a tip having a minute opening and provided with an internal collar surrounding said opening and a coupling connecting said tip to said tube and arranged to form an expansion-chamber between said tip and tube, substantially as set forth.

9. In a gas-fixture for generating and burning liquid hydrocarbons, a vaporizing-tube, a tip having a suitable opening and provided with an internal collar surrounding said opening, a coupling connecting said tip with said tube, and a needle-point connected with said coupling arranged to pass through said opening in said tip to control the flow of vapor therethrough, substantially as set forth.

10. In an apparatus for generating and burning gas from liquid hydrocarbons, the combination with a suitable burner and a supply-pipe leading to a source of supply, of a vaporizing-tube having a tapering longitudinal opening arranged between said supply-pipe and the burner, said opening diminishing toward the discharge end of the tube, substantially as and for the purposes set forth.

11. In an apparatus for generating and burning gas from liquid hydrocarbons, the combination of a generator provided with a gradually-diminishing area toward its discharge end; a minute discharge-opening; a burner; a mixing-chamber intermediate the burner and said discharge-opening, said chamber being of a relatively large area; and an air-inlet for said chamber.

12. In an apparatus for generating and burning gas from liquid hydrocarbons, a gas-generating chamber comprising a tube of gradually-diminishing area toward its discharge end; a minute discharge-opening; and an enlarged chamber intermediate the opening and the end of the tube.

13. In an apparatus for generating and burning gas from liquid hydrocarbons, a gas-generating tube having a bar or rod mounted therein, said rod being provided with an inclined flat face upon one side and so arranged within the tube as to gradually diminish the area thereof toward the discharge end; and a discharge-tip mounted on the tube.

14. A fixture for generating and burning gas from liquid hydrocarbons, comprising in combination a tube or pipe 9 having a reservoir connected thereto; supply-pipe 4; a gas-generator 12 connected to pipe 4, and provided with a suitable valve; a mixing and conducting pipe 1 into which the gas is discharged; an air-inlet for said mixing-pipe and means for controlling it; a pipe 3 connecting pipe 9 and pipe 1; a pipe 22 communicating with the mixing-pipe; a chimney mounted on said pipe 22 below the generator 12; and a mantle of incandescing material mounted in said chimney.

JOHN F. WILLIAMS.

Witnesses:
MARY D. LAWRENCE,
SAMUEL LAWRENCE.