(No Model.)

A. M. BRAINARD.

GENERATOR FOR HYDROCARBON VAPOR BURNERS.

No. 320,838. Patented June 23, 1885.

Fig. 1.

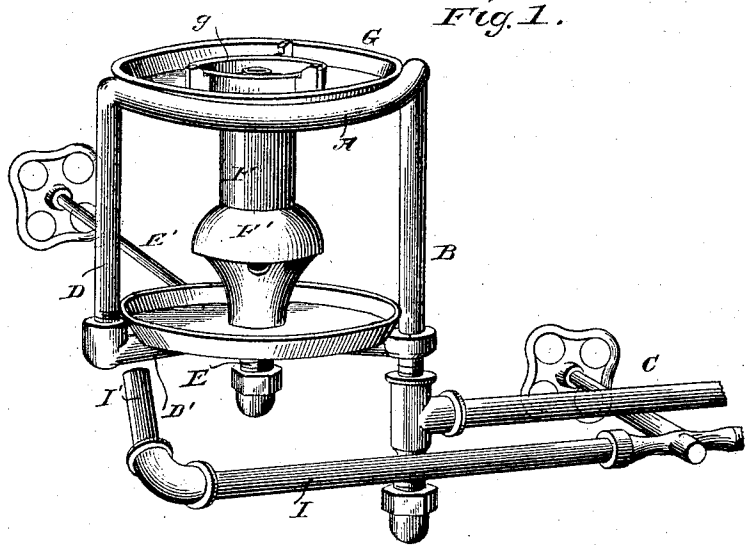


Fig. 2.

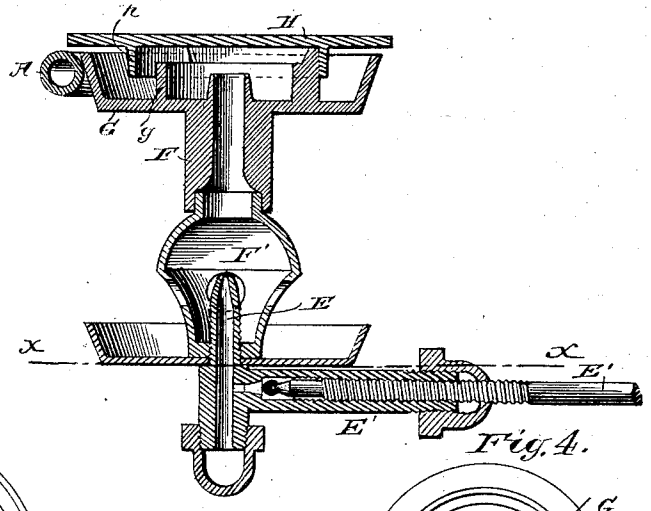


Fig. 3.

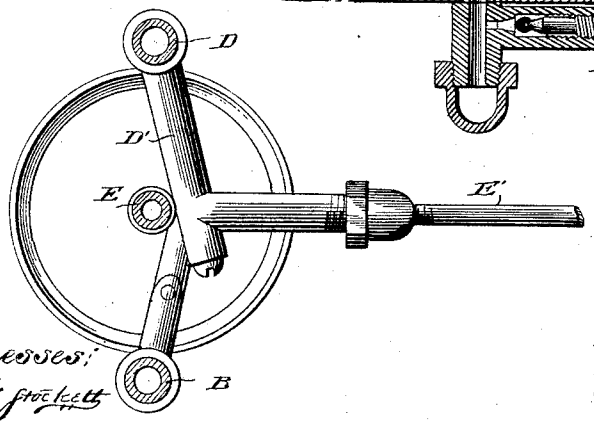
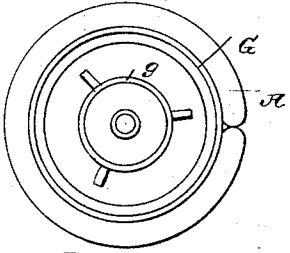


Fig. 4.



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ADELBERT M. BRAINARD, OF CHICAGO, ILLINOIS.

GENERATOR FOR HYDROCARBON-VAPOR BURNERS.

SPECIFICATION forming part of Letters Patent No. 320,838, dated June 23, 1885.

Application filed August 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, ADELBERT M. BRAINARD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Generators for Hydrocarbon-Vapor Burners; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of this invention is to provide an improved construction in generating-chambers for that class of hydrocarbon-vapor burners having a continuous annular exit-orifice for the passage of vapor to the flame; and it consists in the matters hereinafter described, and pointed out in the claim.

In an application for patent upon a hydrocarbon-vapor burner filed by me September 6, 1882, a burner is described having an air and vapor supply tube located above the injector-nozzle and terminating at its upper end in a cup, a deflector plate or disk arranged above said cup, so as to form therewith a mixing-chamber beneath the plate having an annular exit-opening, and a vapor-generating chamber formed by a pipe extending over said deflecting-plate, or by means of a transverse chamber therein. In this construction the generating-chamber is located, principally, in the central part of the deflector-plate, and as a consequence its ends only are exposed to the direct action of the flame at the periphery of the plate, the heat transmitted through the plate being principally depended upon to produce the desired vaporization of the oil in the chamber.

In the present invention a generating-chamber is provided adapted for use in connection with a burner constructed generally as described in the application above mentioned, or with any other form of burner adapted to produce a continuous annular flame, such chamber being of tubular form and extended wholly or partially around the periphery of the burner adjacent to and below the annular exit-opening thereof, whereby the flame is caused to impinge upon the upper surface of said chamber throughout the whole or a principal part of its length, and the said chamber will be thoroughly heated, while the annular flame is at the same time allowed a free and unobstructed outward passage from the exit-opening of the burner. The form of burner herein illustrated also embodies certain improved features of construction whereby the deflecting-plate, the mixing-chamber, and the injecting-nozzle may be removed or detached from the burner without disconnecting the oil or vapor supply pipes, as hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a perspective view of a burner embodying my invention, the top or deflecting plate of the burner being absent. Fig. 2 is a vertical section through the axis of the burner and of the horizontal portion of the vapor-supply pipe. Fig. 3 is a horizontal section on a plane immediately above the horizontal portion of the vapor-supply pipe and upon the line *x x* of Fig. 2. Fig. 4 is a plan of a burner, showing the generating-chamber extended entirely around the periphery thereof.

As herein illustrated, A is a tubular generating-chamber extending around the periphery of the burner adjacent to the annular exit-opening thereof, and connected at one end with a vertical tube, B, connected with an oil-supply pipe, C, which communicates with the oil-tank, and at its opposite end with a vertical pipe, D, having communication with the vertical injector-nozzle E, a suitable regulating-valve, E′, being interposed between the said pipe D and the nozzle for regulating the flow of vapor to the burner.

Above the nozzle E is located a vertical tube or chamber, F, communicating at its upper end with a cup, G, preferably formed integral therewith, and which is provided with a top or deflecting plate or disk, H, which forms with the cup a mixing-chamber for the air and vapor delivered by the action of the injector-nozzle through the tube F. The plate H is supported with relation to the cup G in such manner as to form with the edge of the cup an annular opening calculated to give a continuous annular flame.

The several parts above described, with the exception of the generating-chamber, are constructed and operate generally in the same manner as the corresponding parts shown in the application above referred to. The flanges *g* and *h* upon the cup G, and the disk H, said

flanges being for the purpose of giving a sinuous course to the mixed vapor and air in the outward passage of the latter to the exit-opening of the chamber, are, as herein shown, of peculiar construction, and embody features of construction that are described and claimed in another application for patent made by me simultaneously herewith.

The generator A is, as herein shown, in the form of a curved tube which is arranged around the cup G, and concentric with the axis of the burner, and with its upper surface adjacent to the top edge of the cup, and immediately below and in close proximity to the annular opening between the cup and the disk, so that the flame from said annular opening will impinge upon the upper surface of said tube throughout its entire length. The generator A may extend entirely around the periphery of the burner, as shown in Fig. 5, or it may extend only half-way around, as shown in Figs. 1, 2, and 3; or it may be of any other length desired.

One of the obvious advantages of the construction of the generator A as above described, is that said generator, being independent of the deflector-plate H, the latter may be made of simple form so that it is more effective and durable, may be readily and cheaply replaced by a new one, if warped or otherwise injured by heat, and may also be readily lifted off from its seat to give access to the cup G for cleaning or other purposes.

In the construction herein shown the tube F and the cup G, which is made integral therewith, is supported upon a hollow perforated casting, F′, surrounding and attached at its lower end to the injector-nozzle, and the generator is sustained by the tubes B and D independently of the said tube E and cup G, so that said tube F and the cup may be readily lifted off from its support, and the casing E also removed in order that access may be had to the nozzle E for cleaning the latter.

The generator A is preferably formed, as herein shown, of a single piece of pipe bent to form the curved part of the generator proper, and also the vertical pipes B and D, the pipe B being connected at its lower end with the supply-pipe C, as before stated, and the pipe D with a horizontal pipe, D′, extending inwardly to the nozzle E, as more clearly shown in Fig. 5. By this construction the generator A may be readily and cheaply formed, and is cheap and durable.

As illustrated in the drawings, a pipe, I, is shown for supplying carbureted air for the initial heating of the generator, said pipe being provided with an exit-nozzle, I′, opening beneath the horizontal pipe D′. The said pipe I will usually be connected with the air-space of an oil-tank, in which a constant air-pressure is maintained, as fully set forth in a patent heretofore granted to me.

Prior to my invention it has been proposed to construct a burner of the class herein shown with an annular generator and a mixing-chamber, both attached to and located upon a concave circular plate or disk provided with a central depending tube located over the injector-nozzle of the burner and communicating with the mixing-chamber, said chamber being provided with a vapor-exit opening or openings adjacent to its base and the said plate or disk and below the level of the bottom of the generator-chamber, whereby the flame of the burner is caused to impinge against the lower and inner surface of the generator and then to pass upwardly between the outer wall of the mixing chamber and the inner wall of the surrounding generator. The obvious objection to this construction in the burner is that the flame is broken up or changed in its course by the presence of the generating-chamber around and above the exit-opening of the mixing-chamber, whereby the frame is prevented from spreading laterally in disk or cup shape, as is desirable in this class of burners. The form of burner mentioned is objectionable, also, for the reason that the parts thereof cannot be as readily separated or removed for cleaning and repairs, inasmuch as the inlet-tube of the mixing-chamber and the disk by which the mixing-chamber is supported are attached to and supported by the generating-chamber itself, while in applicant's construction the mixing chamber and generating-chamber are independently supported.

I claim as my invention—

The combination, with the injector-nozzle E′, a cup, G, located over said nozzle, a tubular support for the cup, constituting a direct vapor-passage between the nozzle and the chamber within the cup, and a disk, H, applied over the cup and forming in conjunction therewith a mixing-chamber having an annular exit-opening, of a tubular generator, A, extending wholly or partially around the cup at a point below and adjacent to the annular exit-opening, and the tubes B and D, connected with and supporting the generator independently of the disk and cup, one of said tubes being connected with an oil-supply pipe and the other having connection with a lateral branch, D, which is connected to the injector-nozzle, substantially as and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ADELBERT M. BRAINARD.

Witnesses:

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