(No Model.) 2 Sheets—Sheet 1.

E. G. MUMMERY.

HYDROCARBON GENERATOR.

No. 568,956. Patented Oct. 6, 1896.

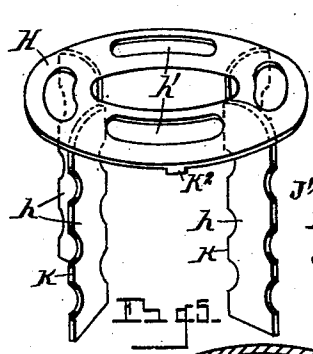

Fig. 5.

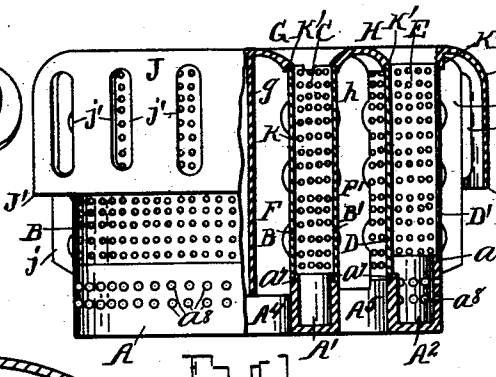

Fig. 1.

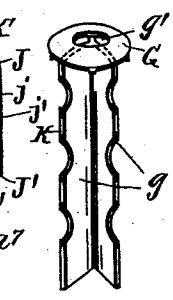

Fig. 4.

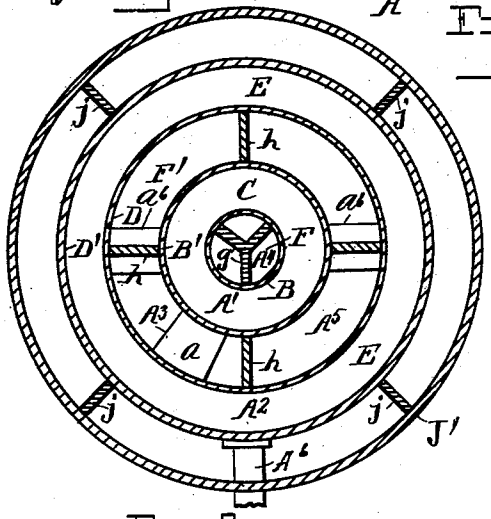

Fig. 2.

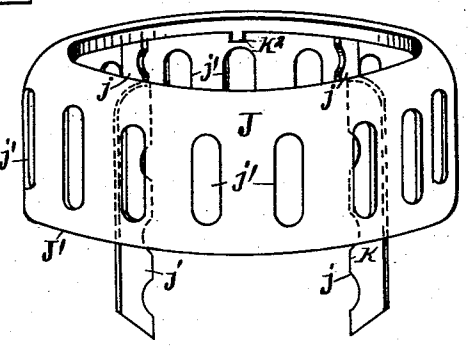

Fig. 6.

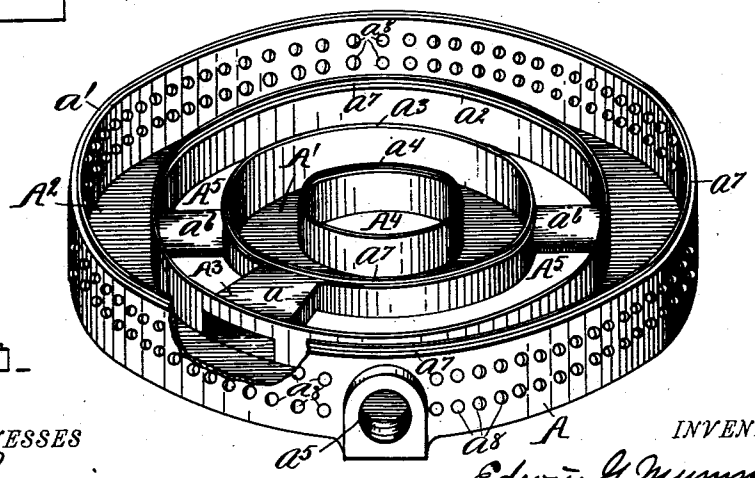

Fig. 3.

WITNESSES

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Merrill S. Wright

(No Model.) 2 Sheets—Sheet 2.

E. G. MUMMERY.

HYDROCARBON GENERATOR.

No. 568,956. Patented Oct. 6, 1896.

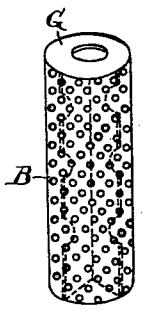

Fig. 7.

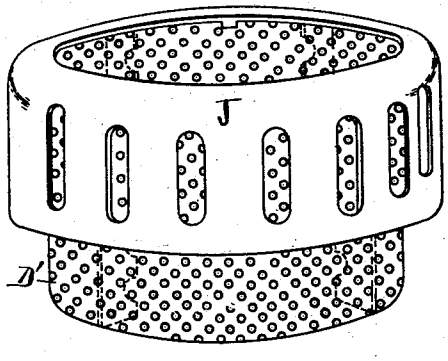

Fig. 9.

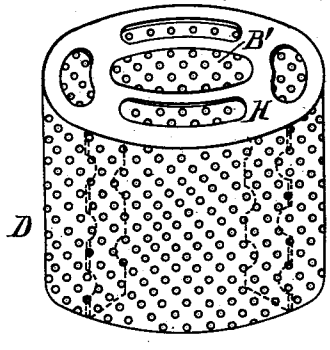

Fig. 8.

WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

EDWIN G. MUMMERY, OF DETROIT, MICHIGAN, ASSIGNOR OF THREE-TWENTIETHS TO W. G. HASTIE AND N. S. WRIGHT, OF SAME PLACE.

HYDROCARBON-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 568,956, dated October 6, 1896.

Application filed February 8, 1896. Serial No. 578,475. (No model.)

To all whom it may concern:

Be it known that I, EDWIN G. MUMMERY, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Hydrocarbon-Generators; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in hydrocarbon-generators or vapor-burners; and it consists of the construction, combination, and arrangement of devices hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view partly in vertical section and partly in side elevation. Fig. 2 is a horizontal section. Fig. 3 is a separate view in perspective of the base of the generator. Fig. 4 is a view in perspective of the inner cap with the partitions connected therewith. Fig. 5 is a similar view of the middle cap with the partitions connected therewith. Fig. 6 is a similar view of the outer cap with the partitions connected therewith. Fig. 7 is a separate view showing the inner cap with its partitions and the adjacent perforated wall B removed from the base. Fig. 8 is a similar view of the middle cap with its partitions and the perforated walls B′ and D adjacent thereto removed from the base. Fig. 9 is a similar view of the outer cap with the outer perforated wall D′ adjacent thereto detached from the base.

My present invention has for its objects more particularly certain new and useful improvements in the construction of the base of the generator, in the construction of the cap or covers of the burner with their integrally-connected arms or partitions, and in the arrangement of these caps or covers with their partitions in connection with the foraminous or perforated sheet-metal walls forming the combustion-chambers of the burner.

One of the chief purposes which I have in view in my present invention is to secure a more rapid generation of the hydrocarbon vapors when starting up the burner, thereby also avoiding disagreeable odors which would arise from imperfect combustion and the accumulation of unvaporized hydrocarbon fuel.

The main features of my invention will be better understood if I proceed first to describe the general construction and arrangement of the generator or burner illustrated in the accompanying drawings, and then point out the special features and the advantages and superior results secured thereby.

My invention will be more clearly and more fully demonstrated after the general construction and arrangement of the device has been explained.

Accordingly A represents the base of the generator or burner, shown herewith constructed with an inner trough A′, and an outer trough A^2, communicating with the inner trough by a connecting-channel A^3, said channel provided with a cover *a*. The base is made with an inner air-inlet opening A^4 within the trough A′ and with an outer air-inlet opening A^5 between the troughs A′ A^2. The outer trough is formed with upwardly-projecting flanges *a*′ a^2 and the inner trough with upwardly-projecting flanges a^3 and a^4. The outer flange *a*′ is provided with a feed-supply opening a^5, into which may be connected a feed-supply pipe A^6, said opening communicating into the outer trough. Braces a^6 serve to give the inner trough a firmer connection with the outer trough of the base.

B and B′ denote foraminous walls, preferably made of sheet metal, located about the inner trough A′, forming therebetween a combustion-chamber C above said inner trough.

D and D′ denote foraminous walls, preferably made of sheet metal, located about the outer trough A^2 and forming therebetween a combustion-chamber E above said outer trough. These various foraminous walls are preferably located upon and supported by the corresponding flanges of the troughs of the base of the generator, said flanges being constructed with upwardly-projecting shoulders a^7, extending upward from the lower edge of the corresponding foraminous walls. Within the inner foraminous walls is formed an inner chamber F above the air-inlet opening A^4, and between the foraminous walls B′

and D is formed an additional inner chamber F′ above the air-inlet opening A^5 in the base of the generator. These air-chambers F F′ admit air through the adjacent foraminous walls into the respective combustion-chambers, while air is supplied to the outer combustion-chamber also through the outer foraminous wall D′.

G denotes an inner cap located over the inner air-chamber F, said cap constructed with integral arms or partitions *g*, projecting downward within the foraminous wall B, or within the air-chamber F, said partitions firmly bracing said walls. Said cap is also preferably constructed with an inner opening *g*′.

H denotes an additional cap located over the outer air-chamber F′ and provided with integral arms or partitions *h*, extending downward within said air-chamber between the foraminous walls B′ and D. Said cap is preferably constructed with a series of openings *h*′ therein.

J denotes an outer cap provided with a flange J′, projecting downward outside the outer foraminous wall D′ and spaced therefrom, said cap provided with integral arms or partitions *j*, extending downward outside the wall D′. Said cap is also preferably constructed with a series of elongated openings *j*′. These arms or partitions, it will be observed, extend downward to the lower edge of the respective foraminous walls to assist in holding said walls against the adjacent shoulders a^7 of the flanges of the base A.

I prefer that the edges of the partitions on the several caps adjacent to the foraminous walls should be corrugated or provided with shoulders K, as shown, to fit against said walls, the edges of the partitions being cut away adjacent to the walls between said shoulders to prevent contact of the partitions with the walls, except at the points of said shoulders, to permit air to pass therebetween and to limit the conduction of heat from the combustion-chamber to said partitions and caps. The caps are constructed with additional shoulders K′ at the upper edges of the foraminous walls to set over said walls, whereby the caps and walls are held together. The caps are also preferably constructed with shoulders K^2 to set down into corresponding recesses in the upper edges of the foraminous walls to assist in holding the parts firmly together. It will be perceived that the several caps, with the partitions integrally connected therewith and the several perforated walls adjacent thereto, are removable when it is desired to take the burner to pieces, as to clean the same. It will also be evident that since said partitions are made separate from the foraminous walls the liability of their warping is diminished or entirely prevented, which liability is found where partitions are provided integral with the foraminous walls, and whereby said walls are thrown out of place.

The liability of any warping of the foraminous walls is prevented also by constructing the same of perforated sheet metal instead of kerfed cast metal, inasmuch as the perforated sheet-metal walls are solid about and between said perforations, so that the body of said walls is adequately supported, so as to prevent any warping of the same.

My invention contemplates casting the base A, with its troughs and flanges thereabout, of an integral casting sufficiently heavy to form an upper and firm foundation and support for the superstructure of the burner. One of the upwardly-projecting flanges of the outer trough, as the outer flange *a*′, is provided with a series of perforations a^8, a portion of said perforations extending well downward toward the base of the trough.

Attention is here called to the important fact that where the base of a hydrocarbon burner or generator is formed without such perforations as are indicated at a^8, as has heretofore been the common construction of corresponding parts, the air is shut out from the corresponding trough below its upper edges, and it has been found that upon the admission and primary ignition of the hydrocarbon fuel in said trough the oxygen adjacent to the fuel in said trough is quickly consumed near the surface of the fuel, air being only admitted through foraminous walls above the upper edges of the trough, in consequence of which very imperfect combustion takes place at or near the surface of the hydrocarbon fuel, while the base of the generator is being heated sufficiently to thoroughly vaporize the fuel, the sufficient heating of the base being delayed and prolonged, owing to the imperfect combustion, for several minutes, during which interval of delay the fuel is accumulating in the trough, owing to which fact, and the fact of imperfect combustion, very disagreeable odors are disseminated into the room. The walls of the base being of comparatively heavy construction to support the superstructure requires quite a considerable time to become efficiently heated under the slow and imperfect combustion initially taking place, owing, as above described, to the inefficient supply of oxygen in close proximity to the hydrocarbon fuel. I have found that I can overcome this difficulty of imperfect and slow combustion in starting up the burner, and the consequent slow and prolonged heating up of the base, by perforating the cast-metal flange so as to supply a plentiful admission of air in close proximity to the hydrocarbon fuel in the trough. By this provision, secured by perforating the flange of the metal base casting, the hydrocarbon fuel, when ignited, burns immediately with perfect combustion, causing an almost immediate heating of the metal casting in consequence of the perfect combustion secured, so that by actual experiment I have found that where, as heretofore, it has required five minutes to get the base sufficiently heated to effi-

ciently vaporize the fuel I am enabled by my present construction to secure such a heating of the base and a consequent vaporization of the fuel inside of thirty seconds, thereby dispensing with the imperfect combustion and the odors arising therefrom, the perfect combustion preventing an undue accumulation of the fuel and any odors arising therefrom. It has been found, thus, in practical operation, of exceeding importance and utility to so perforate the flange of the outer trough, since it secures an almost immediate vaporizing of the fuel. In no other way can a sufficient quantity of air be admitted close to the bottom of the trough to cause the fuel to burn freely and with a full volume of flame at the outset. It will be perceived that I carry the flanges of the outer trough well upward in order to provide a base of sufficient heft to secure the proper heating of the liquid fuel to vaporize it.

It will be evident that were the flanges of the outer trough made lower and the foraminous walls brought down closer to the base of the trough a less rapid heating of the base would be secured, in consequence of the foraminous walls not being formed integral with the trough but separate therefrom and superimposed thereupon, while there would not be a sufficient heft of metal in the casting or base to hold the desired amount of heat to promote the proper vaporization of the fuel.

It has been found that where burners have been constructed with an outer downwardly-projecting flange analogous to the flange J′ heat has accumulated between said flange and the adjacent combustion-chamber, which has radiated downward to a considerable extent instead of being allowed to pass upward, as desired. Where the foraminous walls are made of light perforated metal, the flame from the adjacent combustion-chamber has been found to pass therethrough, necessitating in constructions heretofore made the formation of said outer downwardly-projecting flange solid; but by making the foraminous walls of substantial thickness I have found that the depending flange, as the flange J, can be perforated or provided with openings therethrough, the thickness of the foraminous walls preventing the passage of flame through the perforations thereof, so that by my construction the heat can pass through the openings in said flange J′ upward, and at the same time the flame in the combustion-chamber will not be disturbed.

The perforated sheet-metal walls adjacent to the partitions or arms secured to the various caps, respectively, while separate from said arms or partitions, may be fitted so snugly thereabout as to be made removable therewith.

As indicated in Fig. 7, the inner cap with the perforated wall B about the partitions connected with said cap may be removed from the base, said parts simply resting upon the base. So, also, the cap H with the perforated walls B′ and D, adjacent to the partitions connected with said cap, may be readily removed from the base upon which they simply rest, and also the outer cap with the perforated wall D′ about the partitions connected with said cap may readily be removed from the base, said parts simply resting upon the base, the walls of the troughs of the base being rabbeted, as above described, to receive and support said perforated walls.

What I claim as my invention is—

1. In a hydrocarbon-generator, a cast-metal base constructed with a vaporizing-trough, having an inner flange and a heat-conducting outer flange integral with the base, an air-inlet within said trough opening through the base, and foraminous walls located about said trough and extending upward above said flanges forming a combustion-chamber above said trough, and an air-chamber above said air-inlet communicating through said foraminous walls with the combustion-chamber, said integral outer flange provided round about said vaporizing-trough with openings therethrough below the foraminous walls to admit air into the trough at the base of the combustion-chamber, close to the bottom of the trough, substantially as and for the purpose described.

2. In a hydrocarbon-generator, a cast-metal base constructed with a vaporizing-trough, having a heat-conducting outer flange integral with the base, said outer flange provided round about said vaporizing-trough with perforations or openings therethrough to admit air into said trough in proximity to the fuel in the bottom of the trough, substantially as and for the purpose described.

3. In a hydrocarbon-generator, the combination of a cast-metal base, formed with a vaporizing-trough, an air-inlet, opening through the base within said trough, foraminous walls located about said trough forming a combustion-chamber thereabove, and an air-chamber above said air-inlet, and a cap located over said air-chamber, said cap provided with arms or partitions secured thereto projecting downward within said air-chamber, for the purpose set forth.

4. In a hydrocarbon-generator, the combination of a cast-metal base constructed with an inner trough, an outer trough communicating with the inner trough, an air-inlet within the inner trough opening through the base, an air-inlet between said troughs opening through the base, perforated sheet-metal walls located about said troughs forming combustion-chambers thereabove, and air-chambers above said air-inlets, and caps located over said air-chambers provided with arms or partitions secured thereto projecting downward within said air-chambers between the corresponding perforated walls, said caps and

the partitions secured thereto, together with the perforated walls being removable from the base, for the purpose set forth.

5. In a hydrocarbon-generator, the combination of a base, foraminous walls located thereabove forming combustion-chambers therebetween, and air-chambers communicating through said foraminous walls with said combustion-chambers, and caps located over said air-chambers provided with integral partitions extending downward adjacent to the corresponding foraminous walls, substantially as set forth.

6. In a hydrocarbon-generator, the combination of a base, foraminous walls located thereabove forming a combustion-chamber therebetween, and an air-chamber communicating through said foraminous walls with said combustion-chamber, and a cap located over said air-chamber provided with partitions secured thereto extending downward adjacent to the corresponding foraminous walls, said partitions being corrugated or cut away at intervals on their edges adjacent to said foraminous walls, substantially as set forth.

7. In a hydrocarbon-generator, the combination of a base, foraminous walls located thereabove forming combustion-chambers therebetween, air-chambers opening through said base communicating through said foraminous walls with said combustion-chambers, and caps located over said air-chambers provided with partitions secured thereto extending downward adjacent to the corresponding foraminous walls, the outer cap provided with a downwardly-projecting flange having openings therein for the purpose set forth.

In testimony whereof I sign this specification in the presence of two witnesses.

EDWIN G. MUMMERY.

Witnesses:

N. S. WRIGHT,

O. B. BAENZIGER.