(No Model.)

E. G. MUMMERY.

HYDROCARBON BURNER.

No. 575,659. Patented Jan. 19, 1897.

Fig. 1.

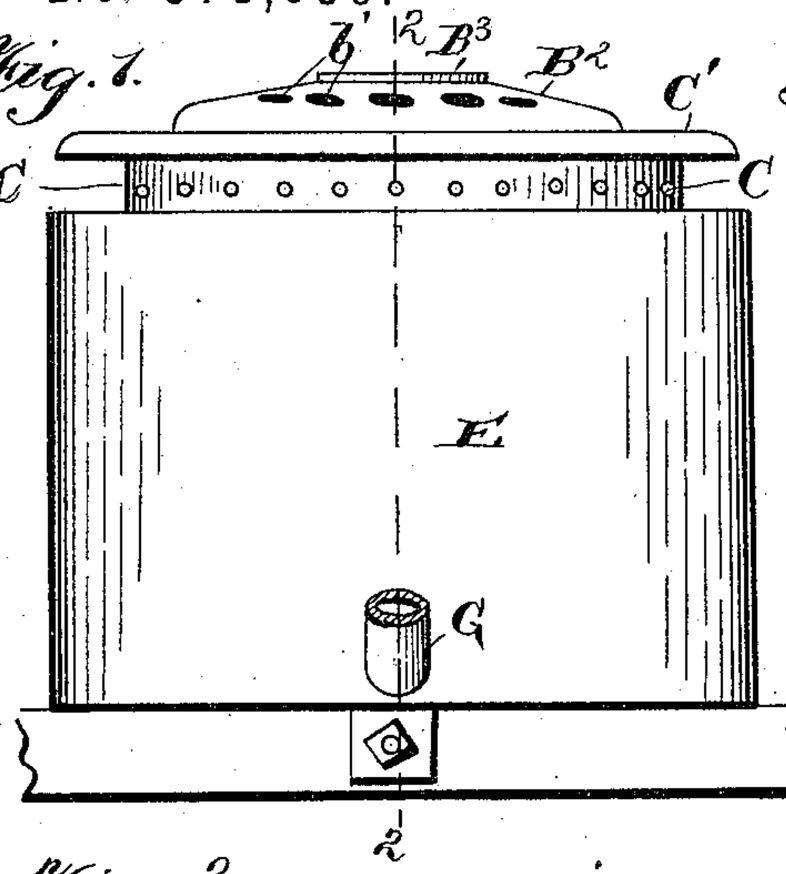


Fig. 2.

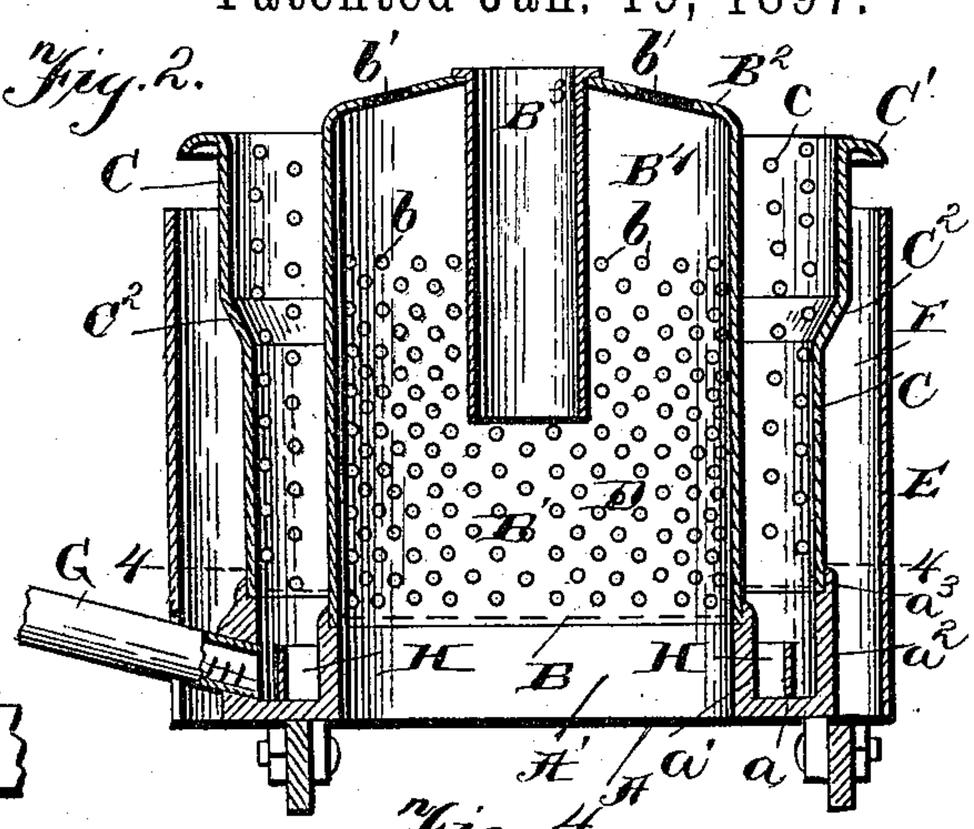


Fig. 4.

Fig. 3.

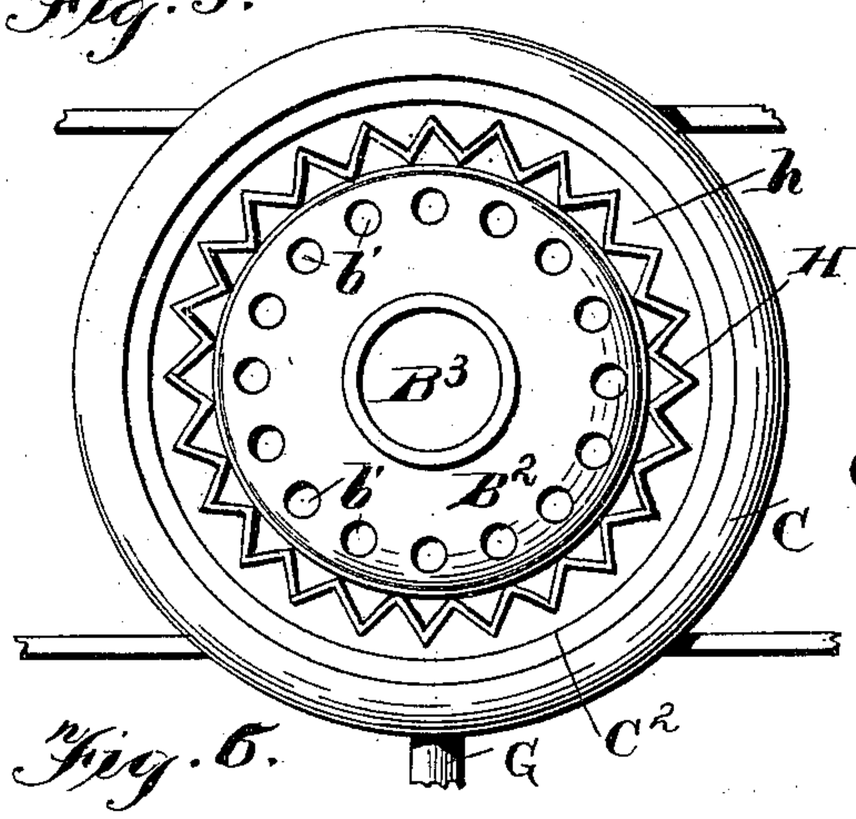


Fig. 6.

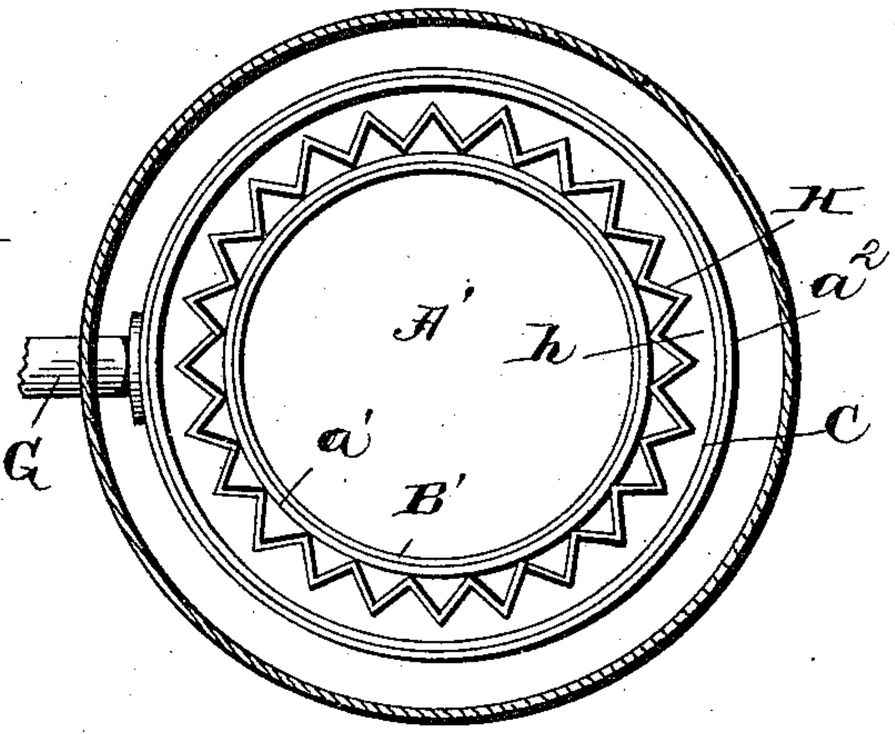
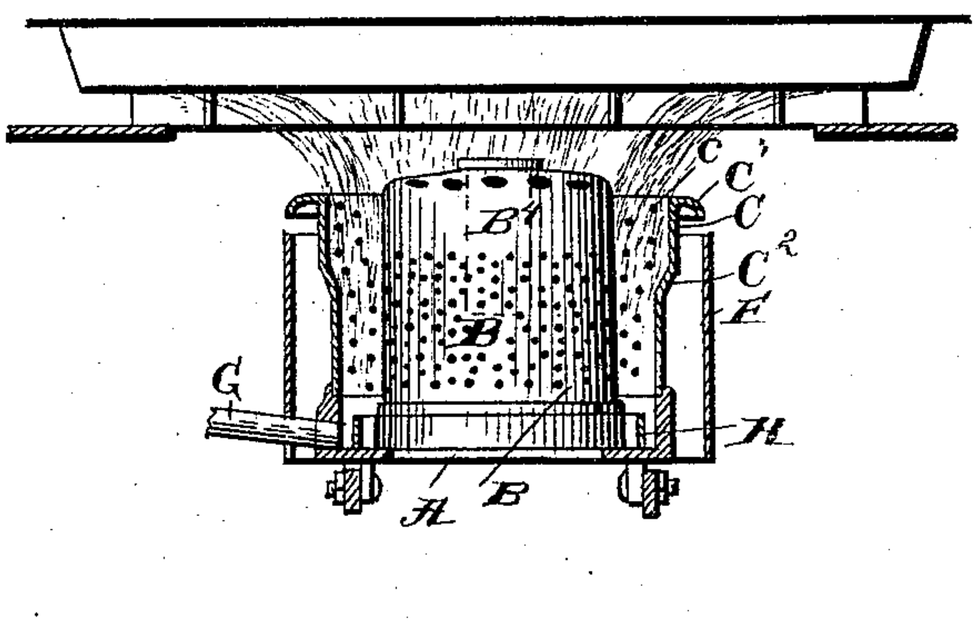
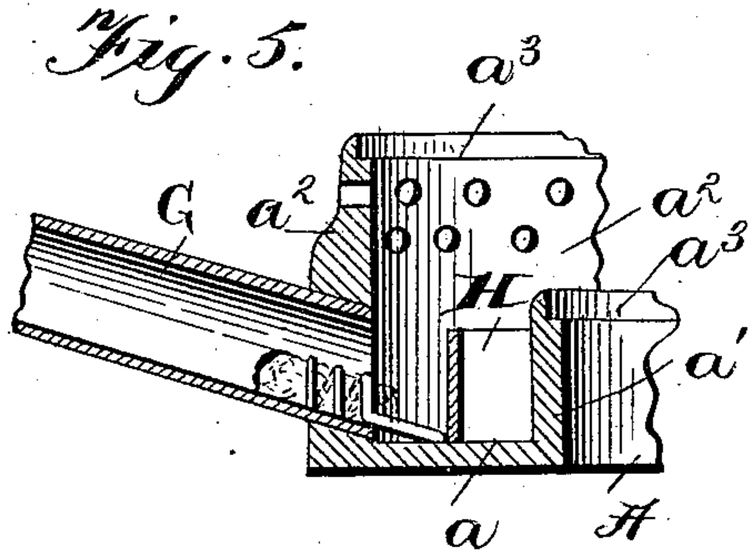


Fig. 5.





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UNITED STATES PATENT OFFICE.

EDWIN G. MUMMERY, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-FOURTH TO JOHN HUTTON, WILLIAM G. HASTIE, AND N. S. WRIGHT, OF SAME PLACE.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 575,659, dated January 19, 1897.

Application filed November 27, 1896. Serial No. 613,692. (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-Burners; 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 has for its object certain new and useful improvements in hydrocarbon-burners; and it consists of the construction, combination, and arrangement of devices hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a vertical cross-section on the line 2 2, Fig. 1. Fig. 3 is a plan view. Fig. 4 is a cross-section on the line 4 4, Fig. 2. Fig. 5 is a detail view showing a portion of the base in vertical section. Fig. 6 is a view partly in elevation and partly in vertical section.

My invention is designed to provide a more satisfactory supply of air to the combustion-chamber of the burner; also to give a freer exit of the flame at the upper portion of the burner; to prevent compression of the flame when a cooking utensil or analogous device is placed over the burner; furthermore, to provide a more uniform feed of the vapor throughout the channel of the vaporizer, and to provide for the feeding of the gasolene or vapor into the vaporizing-channel of the base with a more even flow, so that the burner when in operation shall be less liable to fluctuation of the flame.

My invention also contemplates the general construction of the burner to effect superior simplicity and economy of construction, as well as superior utility and efficiency of operation, and the readiness with which the burner may be taken apart and put together, should occasion require it.

I carry out my invention as follows:

A represents a base or vaporizer constructed with a vaporizing-channel *a*, preferably of annular form. The inner and outer walls a' a^2 of said channel are preferably rabbeted, as indicated at a^3, to receive and to support thereupon suitable foraminous walls, B representing an inner foraminous wall resting upon the inner wall of the vaporizing-channel, and C indicating an outer foraminous wall resting upon the outer wall of said channel. The two foraminous walls, the one within the other, form a combustion-chamber D therebetween above the channel *a* of the base. The base is made open at the center, as indicated at A′. The inner foraminous wall B, being also open at its lower extremity, forms an air-chamber B′ therewithin, opening to the atmosphere through the orifice A′ of the base.

E represents an outer shell or shield open at both extremities and forming an air-passage F between it and the outer foraminous wall C. The wall C is formed at its upper end with an outwardly projecting or flaring rim C′, giving rigidity to said foraminous wall. The inner foraminous wall is formed with an inwardly-projecting rim or cap extending toward the center, (indicated at B^2.)

B^3 is an air-draft pipe depending from the cap B and opening therethrough, as indicated in Fig. 2. The cap B^2 is also preferably provided with a series of perforations, (indicated at *b*′.)

The outer wall of the channel is preferably made higher than the inner wall, as indicated more particularly in Figs. 2 and 5.

The outer wall a^2 of the base may either be left imperforate, as indicated in Fig. 2, or it may be provided with a series of perforations, (indicated at a^4 in Fig. 5.) I would have it understood that I do not limit myself either to an imperforated or perforated wall of the vaporizer-channel.

By reference to Fig. 2 it will be seen that the openings or air-inlets (indicated at *b*) in the foraminous wall B are more numerous than the openings or air-inlets (indicated at *c*) in the foraminous wall C, whereby more air may be admitted into the combustion-chamber D through the inner foraminous wall than is admitted to said combustion-chamber through the outer foraminous wall. I have observed that where the inner and outer foraminous walls are formed of metal with like openings the flame within the com-

bustion-chamber forms in small jets in proximity to the orifices in said inner and outer foraminous walls. Moreover, where the openings or air-inlets in the inner and outer walls are of uniform size and uniformly spaced one from another the jets of flame form unevenly or are unevenly distributed within the different portions of the combustion-chamber. Where a larger number of jets are formed, of course there is produced a larger volume of flame at that portion of the combustion-chamber. Consequently any agitation of the flame, as by a draft or gust of air, will cause the jets of flame to form irregularly in the combustion-chamber. These effects are prevented effectually by affording a larger air-supply into the combustion-chamber through the inner foraminous wall and by providing the inner wall with more numerous and more closely-spaced orifices. The results in this latter case are that the flame, by the increased air-supply through the inner wall through orifices more closely related, is forced against the inner surface of the outer foraminous walls and forms in a sheet. By means of the air admitted through the inner foraminous wall through openings located more closely together than the openings of the outer wall a greater draft is caused to enter the combustion-chamber through the inner wall, and the flame is spread against the inner surface of the outer foraminous wall, the sheet of flame forming between the openings of the outer wall as well as in proximity to or in front of the openings of the outer wall. If the sheet of flame so formed in the combustion-chamber is fluctuated by any draft or gust of air, the flame will re-form in a sheet, evenly distributed, as before. I prefer to construct the inner foraminous wall toward its upper end imperforate, as indicated at B^4, the imperforated portion of said wall constituting practically one-third or thereabout of the entire height of said inner wall.

By constructing the inner wall imperforated toward its upper end I am enabled to obtain an increased capacity of the burner. Were the upper end of the inner wall formed with air-inlet openings, too great a supply of air would be admitted to the combustion-chamber, causing a yellow flame and decreased capacity. By excluding the air-supply through the upper portion of the inner foraminous wall a better combustion takes place and the flame is permitted to rise higher above the combustion-chamber, while the perfect combustion of the flame is maintained. The openings of the inner foraminous wall beneath the imperforate end afford an ample air-supply to support perfect combustion. The bulk of the air-supply needed to effect perfect combustion will be admitted more closely to the base or lower portion of the combustion-chamber. By extending the inner wall B above the air-inlet openings increased height is given to the combustion-chamber and in consequence a larger capacity. I also prefer to construct the outer foraminous wall C of larger diameter at its upper end than toward the lower end of said wall. This may be done by forming the wall C with an outwardly-flaring shoulder, (indicated at C^2,) whereby the upper portion of the combustion-chamber is of greater width than the portion below the shoulder C^2. By this construction an undue compression of the flame is avoided when a cooking or other utensil is located over the burner. By avoiding such compression of the flame I am enabled to bring the burner and said utensil into closer proximity than would otherwise be the case.

It will readily be understood that the placing of a utensil over the burner will cause the flame to flare outwardly. By constructing the upper end of the wall C with an outward flare it permits the flame to flare outwardly more readily and without breaking. Of course where the flame breaks or parts in consequence of a utensil being located thereabove odors are liable to be thrown off.

The flaring shoulder or offset permits the flame more readily to flex outward, owing to the increased width of the combustion-chamber thereabove. Were this flaring shoulder not provided, the flame could flex outward only at the upper edge of the wall C, and no expansion of the flame having been provided the flame would be more dense or more compact at the said edge, rendering it more liable to break and odors to be disseminated in consequence. The greater width of the combustion-chamber above the flaring shoulder permits the flame to have a freer and less compressed exit from the combustion-chamber.

It will readily be seen that naturally the heat would tend to radiate laterally from the surface of the outer wall C. By providing the shield E thereabout the heat radiated from the outer wall C is confined and directed upward, so as to be utilized under the utensil thereabove. The provision of the shield E open at its extremities causes a draft of the heated air upward therethrough, materially increasing the efficiency of the burner. By providing the air-draft tube B^3, depending within the inner wall D, and by perforating the cap B^2 close to the outer edge thereof a plentiful supply of air is permitted to pass upward through the inner wall D to give a proper air-supply within the flame underneath the utensil. Were it not for this inner air-supply, when a utensil is placed over the burner odors would be given off from the burner, which are effectually prevented by the construction described.

G represents the feed-inlet pipe, passing through the shield E and communicating with the vaporizing-channel *a*. When the burner is in operation, it will be seen that the lower end of this pipe is liable to be heated, in consequence of which the fuel will be vaporized before it is admitted into and disseminated throughout the channel *a*. When the fuel

enters the channel *a* in the form of vapor, difficulty is experienced in feeding the fuel into said channel evenly and steadily, for the reason that where the fuel is vaporized in the lower end of the pipe G a slight pressure is formed, which pressure forces a larger portion of the vapor to the side of the channel opposite said pipe, the vapor dividing to the right and left as it enters the channel *a*, causing the flame to burn more freely at portions of the burner distant from the inlet end of the feed-pipe than directly thereabove. This tendency I overcome by locating within the channel *a* a corrugated ring, (indicated at H,) said ring fitting closely against the inner wall *a'* of said channel. By the employment of said corrugated ring the vapor as it enters through the inlet end of the feed-pipe G seeks the inwardly-projecting depressions (indicated at *h*) of said ring, and the ring, being of sufficient height, causes the vapor as it enters said depressions to rise. The upward tendency of the vapor is controlled by the height of said ring. It is obvious that as the depressions *h* are successively filled with vapor the entering vapors continuously admitted into the vaporizing-channel under a slight pressure will force the vapor upward from said depressions, as a result of which the flame thereabove is even and uniform throughout the entire combustion-chamber. To regulate the supply of fuel admitted through the inlet end of the pipe G into the vaporizing-channel *a*, I locate a small roll or quantity of asbestos, (indicated at J,) which may be held in place in any suitable manner, as by means of a coil *j*, the asbestos serving to absorb a certain amount of the fuel and to regulate its flow into the vaporizing-channel. Where the fuel is vaporized in the lower end of the pipe G, the asbestos slightly checks its admission into the vaporizing-channel and causes the vapor to flow thereover into said channel more evenly and steadily than where the asbestos is not employed. At the same time the asbestos does not prevent liquid fuel from passing therethrough into the vaporizing-channel. As a result of the use of the asbestos in the lower end of the feed-pipe the burner operates much more evenly than without it. In this manner a burner with a single vaporizing-channel may be constructed to operate with great efficiency and with large capacity.

The outer foraminous wall C, with its rim C' and flaring upper extremity, may all be formed in a single integral piece. So also the inner wall B, with its cap B^2, may be formed in a single integral piece, the air-draft tube B^3 being united thereto. When so united, the inner wall B, with its cap and said air-draft flue, is rigidly united and may be removed from its seat upon the upper edge of the inner wall *a'* of the vaporizing-channel. So also the outer foraminous wall is made removable from its seat upon the outer wall a^2 of said channel, while the shield is also removable. In this manner the completed burner is formed in four parts, all readily removable the one from the other without having to remove any bolts or screws or other fastening devices.

The foraminous walls B and C may be made of any desired weight or material, but are preferably made of sheet metal stamped or drawn into desired shape and then perforated. As so constructed said walls are seamless. No fastening devices are then required and the parts may be very accurately formed.

The burner may be lighted in any desired manner, but it will be convenient to provide an asbestos or other similar torch, which may be extended downward into the vaporizing-channel adjacent to the feed-pipe when the valve is open to absorb a desired amount of liquid fuel. The torch when retracted is then lighted and reinserted into the vaporizing-channel to ignite the fuel therein.

It will be understood that the feed-pipe G is provided with any suitable feed-controlling valve.

I do not limit myself to any specific construction of the ring H, as any ring formed with a series of pockets or depressions may be used within the scope of my invention.

By constructing the inner foraminous wall to admit more air, in consequence of its being formed with more numerous air-inlet openings, said wall does not become heated to the extent that it otherwise would, but the extra amount of air tends to keep it cooler, whereby the wall is made more durable. The outer foraminous wall being surrounded with cool air has not the same liability to heat as the inner wall, for the reason that the air within the inner wall is heated. The openings of the inner foraminous wall are made more numerous over the general area thereof beneath the imperforate portion.

What I claim as my invention is—

1. In a hydrocarbon-burner, the combination of a base provided with an annular vaporizing-channel, and foraminous walls of equal height located thereabove forming a combustion-chamber between them, one of the foraminous walls constructed so as to admit more air into the combustion-chamber than is admissible through the other foraminous wall, and being imperforate at its upper end, for the purpose set forth.

2. In a hydrocarbon-burner, the combination of a base provided with an annular vaporizing-channel, and foraminous walls located thereabove forming a combustion-chamber between them, the inner foraminous wall constructed to admit more air into the combustion-chamber than is admissible through the outer foraminous wall, for the purpose set forth.

3. In a hydrocarbon-burner, the combination of a base provided with an annular vaporizing-channel, an inner and an outer foraminous wall located thereabove forming a combustion-chamber between them, the inner

wall provided with a greater number of openings throughout its perforated surface which openings are located nearer together than the openings in the outer wall, for the purpose set forth.

4. In a hydrocarbon-vapor-generating burner, the combination of a base formed with an annular vapor-generating channel which is closed at the bottom and open at the top, and inner and outer separable foraminous walls located thereabove forming a combustion-chamber between them, the inner wall made imperforate toward its upper end, the outer wall extending upward about the imperforate end of the inner wall and provided with openings which extend to the top thereof, said walls being of substantially the same height.

5. In a hydrocarbon-vapor-generating burner, the combination of a base provided with an annular vapor-generating channel, and foraminous walls located thereabove forming a combustion-chamber between them, the inner foraminous wall made imperforate toward its upper end and formed with an inwardly-projecting cap above the imperforate portion of said wall, the outer wall extending upward about the imperforate end of the inner wall to substantially the same height and provided with openings which extend to the top thereof for the purpose set forth.

6. In a hydrocarbon-burner, the combination of a base provided with a vaporizing-channel, and foraminous walls located thereabove forming a combustion-chamber between them, the outer foraminous wall offset toward its upper end to widen the upper portion of the combustion-chamber, for the purpose set forth.

7. In a hydrocarbon-vapor-generating burner, the combination of a base provided with a single annular vaporizing-channel, foraminous walls located thereabove forming a single combustion-chamber between them, the inner wall made imperforate toward its upper end and provided with an inwardly-projecting cap and with an air-draft pipe depending from said cap and opening therethrough, the outer wall extending upward about the imperforate end of the inner wall to substantially the same height, and provided with openings which extend to the top thereof, for the purpose set forth.

8. In a hydrocarbon-burner, the combination of a base provided with a vaporizing-channel, a feed-pipe communicating therewith, foraminous walls located above said channel forming a combustion-chamber between them, and a vertically-corrugated ring located within the vaporizing-channel, substantially as and for the purpose described.

9. In a hydrocarbon-burner, the combination of a base provided with an annular vaporizing-channel, and foraminous walls located thereabove forming a combustion-chamber between them, the inner wall formed with openings toward its lower end more closely spaced one from another than the openings of the outer wall, the upper portion of said inner wall being imperforate, for the purpose described.

10. In a hydrocarbon-burner, a base provided with a vaporizing-channel, and a ring located in said channel provided with vertical corrugations or projections around its margin forming a series of pockets or depressions, for the purpose set forth.

11. In a hydrocarbon-burner, the combination of a base provided with a vaporizing-channel, and foraminous walls located thereabove forming a combustion-chamber between them, said foraminous walls spaced a greater distance the one from the other at the top than at the bottom thereof, for the purpose set forth.

12. In a hydrocarbon-burner, the combination with a base provided with a vaporizing-channel, of a ring situated in said channel, and having a series of side pockets or depressions, substantially as set forth.

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

EDWIN G. MUMMERY.

Witnesses:
N. S. WRIGHT,
JOHN F. MILLER.