

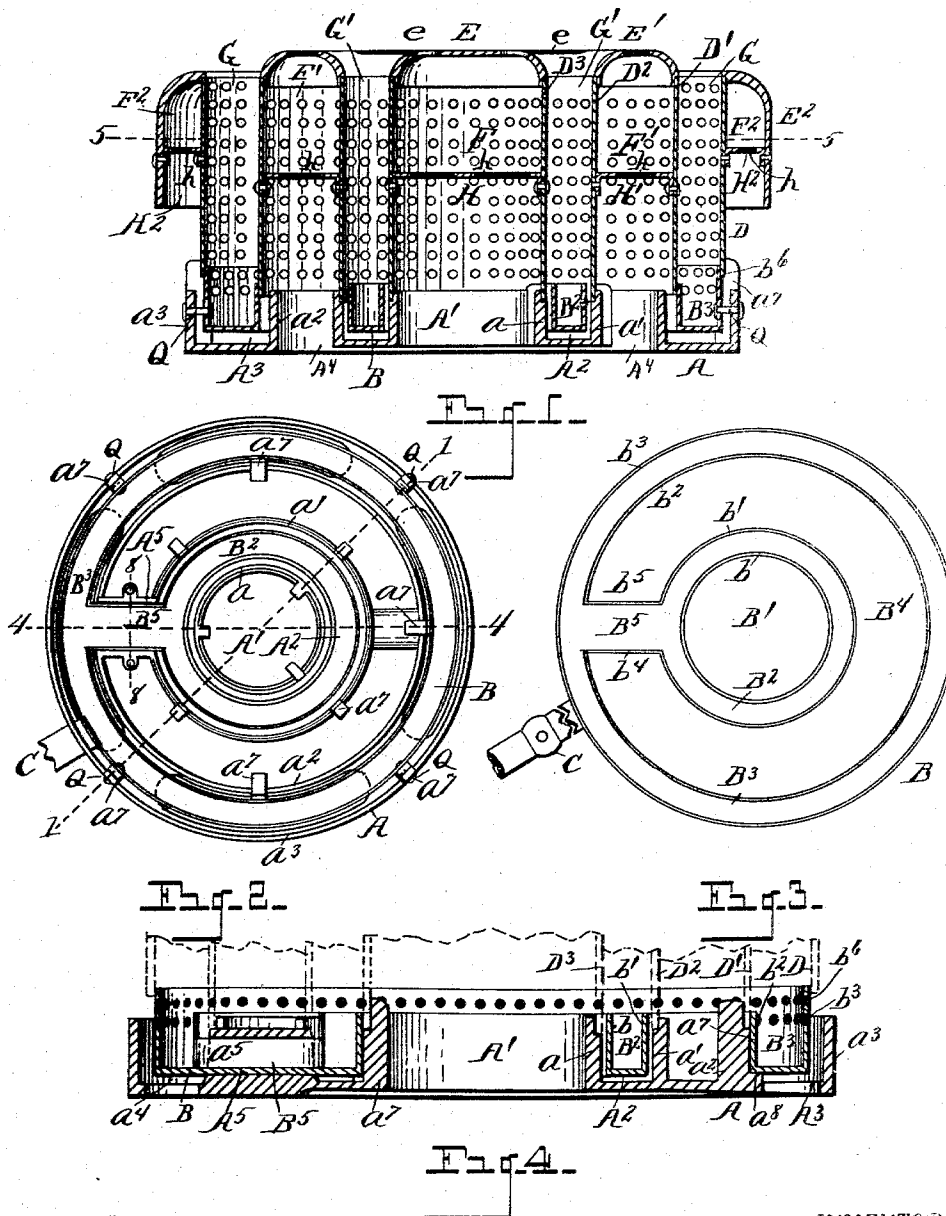
(No Model.)

2 Sheets—Sheet 1.

E. G. MUMMERY.  
HYDROCARBON BURNER.

No. 563,788.

Patented July 14, 1896.



WITNESSES

*O. B. Baenziger.*  
*M. A. Martin.*

INVENTOR

*Edwin G. Mummery*  
By his Attorney  
*Newell S. Wright.*

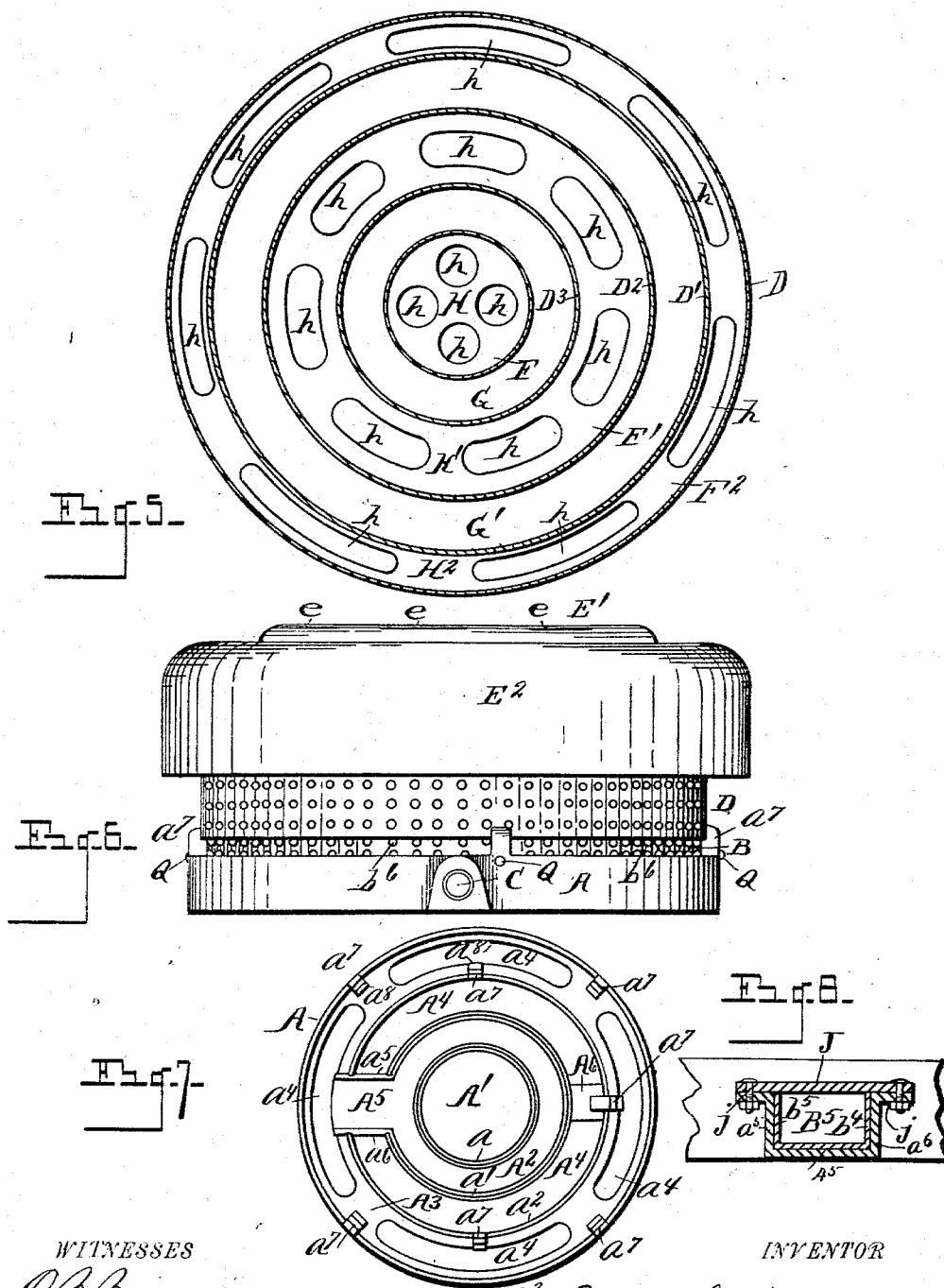
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# UNITED STATES PATENT OFFICE.

EDWIN G. MUMMERY, OF DETROIT, MICHIGAN.

## HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 563,788, dated July 14, 1896.

Application filed August 26, 1895. Serial No. 560,559. (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 is designed to provide an improved hydrocarbon-burner of superior efficiency and utility; 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 vertical section on the line 1 1, Fig. 2. Fig. 2 is a plan view of the vaporizer-holder with the vaporizer in place. Fig. 3 is a separate plan view of the vaporizer. Fig. 4 is a vertical section on the line 4 4, Fig. 2. Fig. 5 is a horizontal section on the line 5 5, Fig. 1. Fig. 6 is a side elevation of the burner complete. Fig. 7 is a separate plan view of the vaporizer-holder. Fig. 8 is a sectional view on the line 8 8, Fig. 2.

The aim of my invention is to provide a hydrocarbon-burner whereby the hydrocarbon may be more quickly and more satisfactorily vaporized and complete combustion secured, without a wick and without offensive odors, in a very simple and economical manner, the burner being easily operated.

I carry out my invention as follows:

A represents a vaporizer-holder, which is preferably made of cast metal of suitable heft to form a firm and suitable support for the burner as a whole. This holder is constructed with an interior orifice, as at A', surrounded by a channel A<sup>2</sup>, the holder being provided with upwardly-extended flanges a and a' to form the channel A<sup>2</sup>. The holder is also constructed with an exterior channel A<sup>3</sup>, said channel being formed by upwardly-extended flanges a<sup>2</sup> and a<sup>3</sup>. The channel A<sup>3</sup> is preferably constructed with a series of elongated slots a<sup>4</sup>, through which air may freely circulate. The holder is also provided with openings A<sup>1</sup>, through which the air may freely

pass upward. The channels A<sup>2</sup> and A<sup>3</sup> communicate one with another through a connecting-channel A<sup>5</sup>, constructed with upwardly-extended flanges a<sup>5</sup> and a<sup>6</sup>, a brace A<sup>6</sup> preferably connecting the channels A<sup>2</sup> A<sup>3</sup> on the side of the holder opposite the channel A<sup>5</sup>. The various flanges of the vaporizer-holder are provided with vertically-extended ribs, (indicated at a<sup>7</sup>.) These ribs on the flanges a<sup>2</sup> a<sup>3</sup> are preferably formed with shoulders or steps, as at a<sup>8</sup>, toward their lower ends.

B denotes a vaporizer made of suitable sheet metal, as of copper, the sheet metal being comparatively thin in order that it may be the more quickly heated. This vaporizer B is formed with an interior orifice (indicated at B', Fig. 3) corresponding to the orifice A' of the vaporizer-holder, with an interior channel B<sup>2</sup>, corresponding to the channel A<sup>2</sup> of the holder, with an outer channel B<sup>3</sup>, corresponding to the channel A<sup>3</sup> of the holder, with an air-space B<sup>4</sup>, corresponding to the air-spaces A<sup>4</sup> of the holder, and with a connecting-channel B<sup>5</sup>, corresponding to the channel A<sup>5</sup> of the holder. These channels are formed with lateral flanges b b' about the inner channel B<sup>2</sup>, and with lateral flanges b<sup>2</sup> b<sup>3</sup> about the channel B<sup>3</sup>. The channel B<sup>5</sup> is formed with lateral flanges b<sup>4</sup> b<sup>5</sup>. The vaporizer B is located within the channels A<sup>2</sup> and A<sup>3</sup> of the holder, the connecting-channel B<sup>5</sup> being located in the channel A<sup>5</sup> of the holder.

The vaporizer B is supported, preferably, a little above the base of the holder, as upon the shoulder or step a<sup>8</sup> of the ribs of the flanges a<sup>2</sup> a<sup>3</sup> of the holder. The outer flange b<sup>3</sup> of the channel B<sup>3</sup> is preferably extended above the upper edge of the inner flange b<sup>2</sup> of the channel B<sup>3</sup>, and is provided with a series of perforations, as shown at b<sup>6</sup>, through which air may readily circulate, while air may also circulate upwardly about the vaporizer and into said perforations through the orifices a<sup>4</sup> in the base of the channel A<sup>3</sup>.

C denotes a feed-pipe led through the flange a<sup>3</sup> of the holder and communicating into the channel B<sup>3</sup> of the vaporizer, the hydrocarbon fuel passing thence from the channel B<sup>3</sup> into the interior channel B<sup>2</sup> of the vaporizer through the connecting-channel B<sup>5</sup>.

It has been found that where, as in some burners heretofore constructed, the fuel is

admitted into a channel, as  $A^3$ , in the holder having a closed base some difficulty has been experienced in lighting the fuel and securing proper vaporization thereof at the outset, owing to the length of time necessarily required to properly heat a cast-metal vaporizer, embodying, as such a structure necessarily does, a considerable amount of metal comparatively, in consequence of which imperfect vaporization is at the outset secured, and the hydrocarbon fuel, as gasoline, is liable to accumulate in such a vaporizer because it is not readily vaporized and consumed, while such a vaporizer is becoming sufficiently heated.

The result is that where the valve in the feed-pipe  $C$  is opened, as required in the subsequent operation of the burner, the fuel accumulates to some extent, as above observed, in the outer channel of the vaporizer, and when the cast-metal vaporizer, as heretofore constructed, has become properly heated, so as to consume the fuel, the fuel blazes up in an undesirable and unsatisfactory manner until the extra supply of fuel has been exhausted, on account of which the odors of imperfect combustion escape into the room.

My present invention is particularly adapted and designed to overcome effectually any such liability and objection to burners heretofore used, and therefore in carrying out my invention I employ as a vaporizer a vaporizer formed of comparatively thin sheet metal, copper being preferred, as heretofore observed, the vaporizer of thin metal being formed with the channels, as heretofore described, this vaporizer being supported upon the cast-metal holder above set forth, the outer flange of the outer channel of the vaporizer  $B$  being perforated toward its upper edge, as specified, to admit a desired amount of air into the outer channel of the vaporizer to mingle with the hydrocarbon fuel to provide for perfect combustion.

It will be readily seen and understood that a vaporizer made of comparatively thin sheet metal will be very quickly heated when the fuel is lighted, on account of which the burner will quickly produce a proper vaporization of the fuel at the very outset, which vaporization will of course be continuously kept up while the burner is in use. In this way all liability of an undue accumulation of the fuel within the sheet-metal vaporizer in starting the burner into operation is effectually prevented and the flaming up of the burner, heretofore mentioned, is also prevented, together with the escape of any odors, as imperfect combustion is overcome and perfect combustion secured almost instantly when the burner is lighted. This permits the valve to be opened in the supply-pipe to the full extent desired in the operation of the burner at the very first, as is desirable in order to insure simplicity and satisfaction in operation. The provision of such a vaporizer causes the burner to operate evenly from the instant the light is applied to the fuel.

About the outer and inner periphery of the channel  $B^2$  of the vaporizer I locate foraminous walls  $D$   $D'$ . About the outer and inner peripheries of the channel  $B^2$  of the vaporizer I locate corresponding foraminous walls  $D^2$   $D^3$ . These walls may be supported upon the vertical ribs  $a^7$  of the inner and outer flanges of the channels  $A^2$  and  $A^3$  of the holder. The vaporizer also may be riveted, if desired, to the ribs  $a^7$ . The walls  $D$   $D'$   $D^2$   $D^3$ , I prefer to make of wrought or sheet metal suitably perforated to make them foraminous. It is evident that these walls become very much heated in the operation of the burner, and where formed of cast metal made foraminous the accidental spilling of water thereupon may cause the cast-metal walls to break. With the walls made as above set forth this liability is obviously entirely overcome. I therefore design to use wrought or sheet metal in their construction.

$E$  denotes a cap covering the interior chamber formed by the wall  $D^3$ .  $E'$  is a cap covering the chamber formed between the walls  $D'$   $D^2$ .

$E^2$  is a cap projecting downward from the top of the wall  $D$  thereabout. These caps may be engaged in position in any suitable manner.

It will be obvious that the foraminous wall  $D^3$  forms an interior air-chamber  $F$ , into which the air may freely pass through the openings  $A'$   $B'$  in the holder  $A$  and vaporizer  $B$ . The walls  $D'$   $D^2$  form an intermediate air-chamber  $F'$ , into which air may freely pass through the openings  $A^4$   $B^4$  in the holder and vaporizer. An additional air-chamber  $F^2$  is formed between the outer cap  $E'$  and the foraminous wall  $D$ , which chamber is open to the atmosphere at the base of the cap  $E^2$ . Above the vaporizing-channels  $B^2$   $B^3$  of the vaporizer are thus formed combustion-chambers  $G$  and  $G'$ , open at the top, as shown. These caps  $E$   $E'$   $E^2$  may be made of cast metal constructed to engage the upper ends of the corresponding foraminous walls. Intermediate the upper and lower edges of the foraminous wall  $D^3$ , I locate a horizontal partition  $H$ . Between the upper and lower edges of the walls  $D'$   $D^2$ , I locate a similar horizontal partition  $H'$ , while between the foraminous wall  $D$  and the cap  $E^2$ , I locate a similar horizontal partition  $H^2$ . These partitions  $H$   $H'$   $H^2$ , as indicated more especially in Fig. 5, are constructed with orifices  $h$ , preferably elongated, through which the air may freely pass into the regions of the chambers thereabove. The caps  $E$   $E'$  are also provided with suitable perforations or orifices, as at  $e$ , preferably elongated. The partitions  $H$   $H'$   $H^2$  are employed for the purpose of holding the respective parts adjacent thereto in place.

It will be understood that when the burner is in use the foraminous walls on the inner and outer peripheries of the respective combustion-chambers become very highly heated, and these partitions prevent all liability of

the warping of said walls in consequence of the heat holding the parts securely in position.

It will be obvious that air is admitted into the respective combustion-chambers through the surrounding foraminous walls on both the inner and the outer peripheries of each chamber, the bulk of air being admitted into the combustion-chambers through the lower perforations of the walls.

Attention is particularly called to the fact that the lower edge of the foraminous wall D is spaced from the upper edge of the outer flange  $a^3$  of the holder, as more clearly shown in Fig. 6, in order to permit air to circulate freely through the perforations in the outer flange  $b^3$  of the vaporizer B into the adjacent vaporizing-channel.

Over the channel  $B^5$ , I locate a removable cap J, which may be bolted upon the flanges  $j$  of the flanges  $a^5 a^6$ . By making this cap removable, access can readily be had into the channel  $B^5$  in case of any obstruction or obstacle getting located therein, whereas if said cap were not removable it would be difficult to get access to said channel. The upper orifices  $e$  in the caps E E' are preferably elongated, as before stated, so as to let the air that may accumulate in the upper portions of the corresponding chambers F F' more freely escape. These caps E E' E<sup>2</sup> are employed chiefly to deflect or hold down the air to cause its passage more efficiently through the foraminous walls of the combustion-chambers. At the same time, in order to prevent an accumulation of dead air in the top of the air-chambers and to prevent an undue deflection of the heat downward thereby, it is desirable to provide the slots therein, as above described, so that there may be a desired circulation of air therethrough to prevent the accumulation of dead air and to allow the heat to escape upward. The partitions may be secured to the adjacent parts in any desired manner, as by forming them with ears and riveting them to said parts.

I prefer to extend the outer flange  $b^3$  of the vaporizer upward above the upper edge of the flange  $a^3$  of the holder and perforate it, rather than to extend the foraminous wall D downward to the said edge of the flange  $a^3$ , in order that the vaporizer may become more quickly heated, as by this construction the initial heat, when the burner is lighted, is more confined to the vaporizer itself. The air coming in through the perforations in the flange  $b^3$ , and over the edge of the adjacent flange  $b^2$ , supports the initial combustion within the channel  $B^3$ , and as the flame will cling to the solid parts of perforated flange  $b^3$  between the orifices the vaporizer will be much more quickly heated than if the heat were in some measure transmitted to an independent wall above the channel  $B^3$ .

The outer wall D is disconnected from the holder, it will be seen, except where it rests upon the ribs  $a^7$ . This construction limits

materially the transmission of heat to the holder, confining it more effectually to the upper parts of the vaporizer, on account of which vaporization is more quickly and more effectually obtained.

The vaporizer B is preferably riveted or otherwise firmly secured to the holder, as indicated at O, to hold the parts together and prevent warping. The foraminous walls and the caps E E' are preferably removable.

What I claim as my invention is—

1. In a hydrocarbon-burner, the combination of a cast-metal holder provided with annular communicating channels  $A^2$ ,  $A^3$ , a thin sheet-metal vaporizer formed with similar communicating channels located within the corresponding channels of the holder and supported thereby, and a feed-pipe leading into the channels of the vaporizer, for the purpose set forth.

2. In a hydrocarbon-burner, the combination of a cast-metal holder formed with interior and outer communicating channels  $A^2$ ,  $A^3$ , a thin sheet-metal vaporizer formed with analogous channels located within the corresponding channels of the holder and supported thereby, a feed-pipe communicating with the channels of said vaporizer, an air-inlet within the inner channels of the holder and vaporizer, and an air-inlet between the inner and outer channels of the holder and vaporizer, for the purpose set forth.

3. In a hydrocarbon-burner, the combination of a cast-metal holder provided with communicating outer and inner concentric channels  $A^2$ ,  $A^3$ , a thin sheet-metal vaporizer formed with similar outer and inner concentric communicating channels located respectively within the said channels of the holder and supported thereby, foraminous walls supported at the sides of the channels of the vaporizer, caps located upon said walls, a feed-pipe leading into the outer channel of the vaporizer, an air-inlet within the inner channels of the holder and vaporizer, and an air-inlet between the inner and outer channels of the holder and vaporizer, said foraminous walls forming combustion-chambers above the channels of the vaporizer, and air-chambers above said air-inlets, for the purpose set forth.

4. In a hydrocarbon-burner, the combination of inner and outer vaporizing-channels, formed with an air-inlet within the inner channel, and an air-inlet between said channels, foraminous walls located on each side of the channels of the vaporizer, forming air-chambers above said air-inlets and combustion-chambers above said channels, horizontal perforated partitions engaged with said walls, intermediate their extremities extending across said air-chambers, and a feed-pipe leading into the vaporizer, for the purpose set forth.

5. In a hydrocarbon-burner, the combination of the holder provided with interior and outer channels, and a connecting-channel  $A^5$ ,

a thin metal vaporizer formed with corresponding interior and outer channels supported in the channels of the holder and provided with a communicating channel B<sup>5</sup>, and  
5 a removable cover over the channel B<sup>5</sup>, substantially as set forth.

6. In a hydrocarbon-burner, the combination of the holder provided with interior and outer channels, and a connecting-channel A<sup>5</sup>,  
10 a thin metal vaporizer formed with corresponding interior and outer channels sup-

ported in the channels of the holder and provided with a communicating channel B<sup>5</sup>, and a cover over the channel B<sup>5</sup>, substantially as set forth.

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

15

EDWIN G. MUMMERY

Witnesses:

N. S. WRIGHT,  
O. B. BAENZIGER.