

No. 739,667.

PATENTED SEPT. 22, 1903.

E. H. J. C. GILLETT.  
BURNER AND AUTOMATIC VALVE.  
APPLICATION FILED JULY 19, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

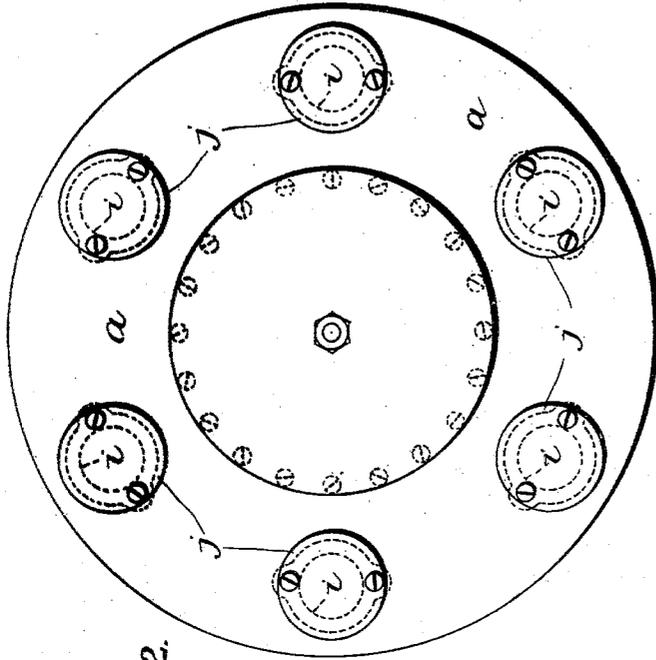


Fig. 2.

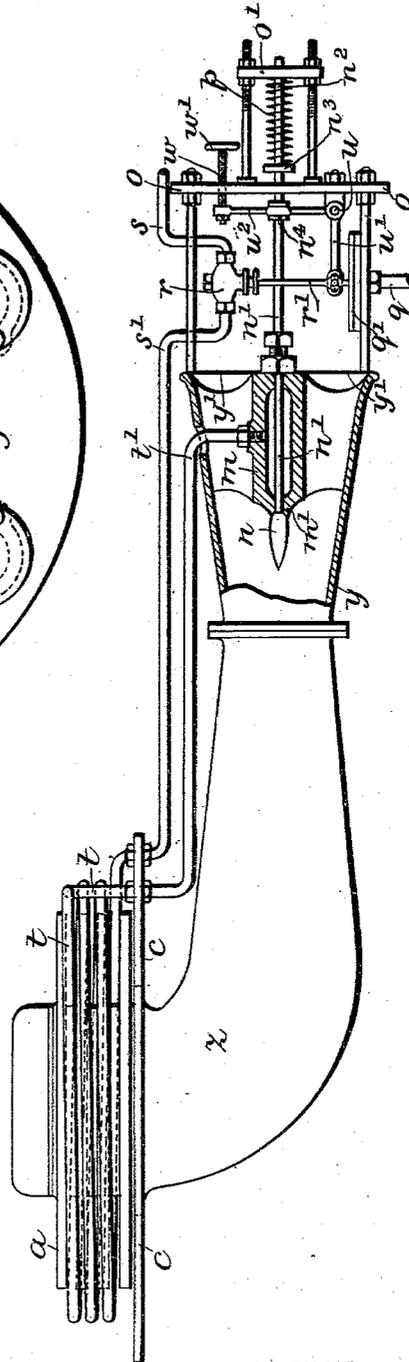


Fig. 1.

WITNESSES:

*Walker W. Gellerman*  
*Henry Substiver*

INVENTOR:

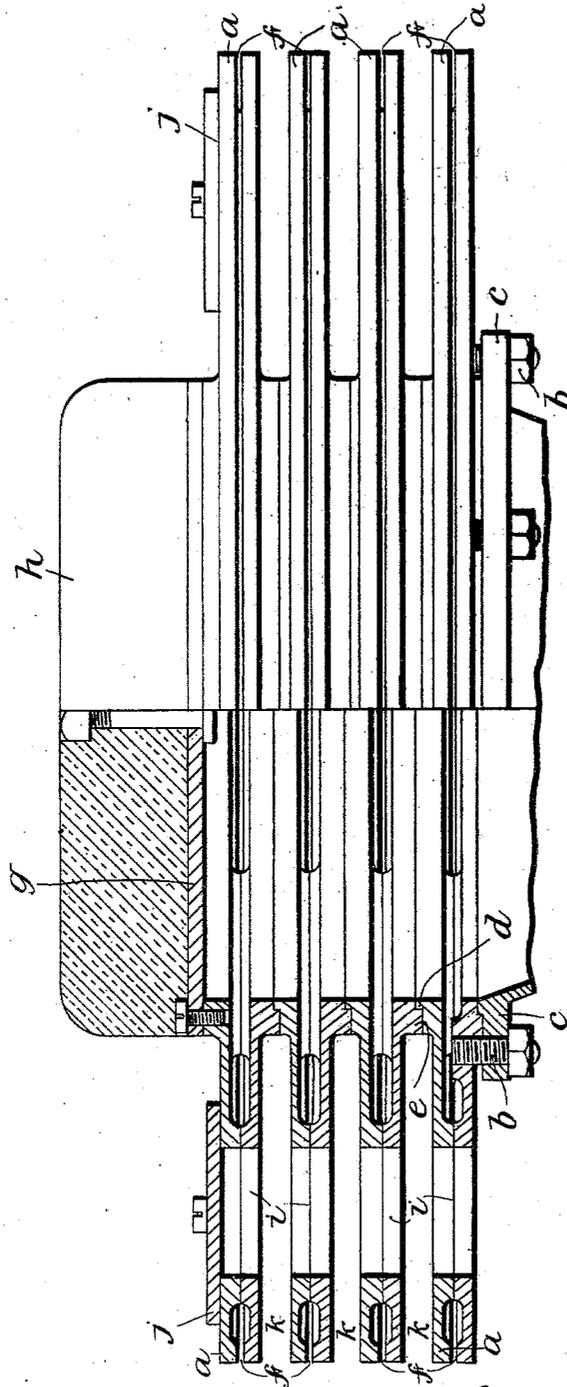
*Edward H. J. C. Gillett*  
by *John W. Blake*  
ATTORNEYS.

E. H. J. C. GILLETT.  
BURNER AND AUTOMATIC VALVE.  
APPLICATION FILED JULY 19, 1901.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 3.



WITNESSES:

*Walter Wallberg*  
*Henry Schubert*

INVENTOR

*Edward H. J. C. Gillett*  
*by Gooker & Waller*  
ATTORNEYS.

# UNITED STATES PATENT OFFICE.

EDWARD H. J. C. GILLETT, OF HOUNSLOW, ENGLAND.

## BURNER AND AUTOMATIC VALVE.

SPECIFICATION forming part of Letters Patent No. 739,667, dated September 22, 1903.

Application filed July 19, 1901. Serial No. 68,895. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HENRY JAMES CECIL GILLETT, engineer and launch-builder, a subject of the King of Great Britain, residing at Hounslow, in the county of Middlesex, England, have invented certain new and useful Improvements in Burners and Automatic Valves, of which the following is a specification.

This invention relates to atmospheric burners which are intended for heating purposes. It also relates to means for automatically regulating the supply of liquid hydrocarbon to the same.

In order that my invention may be easily understood and readily carried into practice, I will proceed to fully describe same, with reference to the drawings hereunto annexed.

Figure 1 is a view in side elevation, partly in section, of the burner and valve complete in one apparatus. Fig. 2 is a plan view of the burner upon an enlarged scale, omitting the vaporizing coil of pipe around said burner. Fig. 3 is a local view on a still further enlarged scale, in side elevation, partly in vertical section, of the burner alone.

Referring to the drawings, I will first of all describe the burner.

$a a$  are the shallow chambers or pans, horizontally mounted or superimposed one above the other, the lowermost pan being secured, if desired, by screws  $b$  to the frame-plate  $c$  or otherwise suitably secured in position, as desired, the top  $d$  of each said pan being formed, if desired, with an annular bead or shoulder, on which the under side of the pan above (being formed as a counterpart  $e$  thereto) fits down snugly, and, if desired, the whole series of pans may be locked or secured together in any suitable manner—for instance, by vertical bolts and nuts (not shown) passed right through same from top to bottom and through the frame-plate  $c$ .

$f$  is a continuous slit extending completely around each said shallow chamber or pan  $a$  and communicating with the interior space in said chamber, the central part of said chambers  $a$  all being in open communication with one another and with the passage  $z$ , through which the mixture of hydrocarbon vapor and air is supplied to the burner.

The top of the uppermost pan is closed.

For instance, the central opening there-through is closed by means of a plate  $g$ , over which I may place any suitable heat-non-conducting material, such as a block of fire-clay  $h$  or equivalent, to prevent the top of the burner becoming too hot.

$i i$  are a series of vertical air-passages through each pan  $a$  and arranged concentrically around same and correspondingly in each said pan, so that when several such pans are superimposed one over the other these air-passages  $i$  will register with one another vertically and form a series of vertical air passages or flues right through the whole of the pans (see Fig. 3) except through the top pan, in which latter case such vertical air-passages  $i$  are either not provided or if provided same are each closed up by a plate or cover, such as  $j$ , to prevent the atmospheric air coming through the passages  $i$  passing through the top pan  $a$ . A free supply of atmospheric air can thus pass through the vertical openings or passages  $i$  to the horizontal air-spaces  $k$  formed between said spaced-apart edges of the pans  $a$ , from which spaces  $k$  the air will thus issue in horizontal layers in between the layers of flame, (where the vapor issues from the slots  $f$ ,) and thereby afford an ample supply of atmospheric air in between the said layers of flame, by which means a very perfect degree of combustion of the hydrocarbon-vapor mixture is obtained. As many of the pans  $a$  as desired may be superimposed one above the other, according to the size or power of the burner required. It will be obvious that the hydrocarbons may be vaporized and such hydrocarbon vapor or mixture of vapor and air may be supplied to a burner thus formed according to my present invention in any suitable manner or by any suitable means, and also the quantity of such vapor or such mixture of vapor and air may be regulated in any suitable manner by any suitable means, as it will be obvious that the essential feature of this part of my invention is the peculiar construction of the burner and not the means of feeding same, provided the latter is effected in any suitable manner adapted for the purpose.

In the application of the above burner for steam-raising purposes I find I get the best results in practice by arranging and combin-

ing said burner in or under the steam-generator in such wise that all atmospheric air is excluded from passing into the heating space or furnace except that air which is either  
 5 drawn in with the vapor through the passages  $y$  and  $z$  or that air which passes in alone through the vertical passages  $i$  and supplied in horizontal layers between the rings of flame, and thereby I exclude all possibility of  
 10 cold air reaching the tubes or heating-surface of the steam-generator in said furnace.

I will now proceed to describe that part of my invention for regulating the supply of hydrocarbon vapors mixed with air to the  
 15 above said burner or any other suitable burner.

$m$  is a valve-chamber located centrally in the open end  $y'$  of the passage  $y$ , (which may advantageously be bell-mouthed or tapered, as  
 20 shown,) leading to the aforesaid conduit  $z$ , from which latter the mixture of hydrocarbon vapor and air is led to the burner—for instance, to the interior of the burner pans or chambers  $a$ , as aforesaid.

$n$  is a valve which has its seating on the foremost end  $m'$  of said valve-chamber  $m$  and controls the outlet of the vapor from said valve-chamber, said valve  $n$  being provided with a rearwardly-extending valve-spindle  $n'$ ,  
 30 which passes through a gland or stuffing-box at the rear of said valve-chamber  $m$  and through an aperture in the frame  $o$ , the rear-most end  $n^2$  of said valve-spindle  $n'$  having a spring  $p$  thereon located between the frame  $o'$  and the shoulder  $n^3$  on said valve-spindle, by which spring  $p$  said valve is normally kept open.

$q$  is a steam-pipe leading to a steam-chamber  $q'$ , provided with an expansible corrugated metal disk or diaphragm, (such as of the well-known character used in reducing-valves, &c.,) to which corrugated disk is attached the oil-valve-operating rod  $r'$ , which at its other end opens or closes any suitable oil-valve  $r$ , such as the ordinary needle-valve,  
 45 which valve  $r$  controls the amount of oil which can pass through the pipe  $s$  (flowing under suitable pressure from any suitable oil-supply) to the pipe  $s'$ , leading to the vaporizer-coils  $t$ , surrounding the burner-pans  $a$ , which coils  $t$  are spaced apart from said pans  $a$  and from one another at any suitable distance and held in position around said burner by any suitable means—such, for instance, as simply  
 55 passing the pipe  $s'$ , leading to the coil  $t$ , and the return-pipe  $t'$ , leading from the coil  $t$  to the valve-chamber  $m$ , through the frame-plate or bottom plate  $c$ , secured to the latter by means of a nut screwed up thereon on  
 60 each side of said plate.

$u$  is one arm of a bell-crank pivoted at  $u$  to the fixed frame  $o$ , the end of this arm  $u'$  engaging in and controlled by a slot in the connecting-rod  $r'$ , so that as the latter is moved  
 65 endwise by increase or decrease of the steam-pressure in the steam-chamber  $q'$  thereby the bell-crank will be rocked upon its piv-

point  $u$ , and thereby the other arm,  $u^2$ , of said bell-crank will be operated. This other arm,  $u^2$ , of said bell-crank may either pass through  
 70 the valve-spindle  $n'$  or may pass around same loosely between collars  $n^4$   $n^4$  on said valve-spindle  $n'$ . The operation of this valve is therefore as follows: Upon pressure of the steam in the steam-chamber  $q'$  increasing,  
 75 and thereby forcing the connecting-rod  $r'$  to reduce the supply of oil passing through said valve, consequently a reduced supply of vapor will be furnished to the valve-chamber  $m$ , while the same movement that reduces  
 80 the oil-supply will through the medium of the bell-crank  $u'$   $u^2$  simultaneously reduce the outlet from said valve-chamber by moving the valve-spindle rearwardly, thereby  
 85 drawing the valve  $n$  toward its seating, and consequently reducing the size of the outlet from said valve-chamber  $m$  according to the reduced supply of vapor, and thus the velocity of the vapor issuing from the valve-chamber  $m$  will be maintained at the desired  
 90 rate whether the amount of vapor issuing be greater or less, and it will be obvious that the parts will act conversely—that is to say, if the steam-pressure falls in the steam-generator then upon reduction of the steam-  
 95 pressure in the steam-chamber  $q'$  the connection  $r'$  will open the oil-valve  $r$  and allow an increased supply of oil to flow to the vaporizer, and thereby produce an increased supply of hydrocarbon vapor to the valve-  
 100 chamber  $m$ , and simultaneously with said opening of the oil-valve the bell-crank will move the valve  $n$  away from its seating, and consequently increase the size of the outlet from the valve-chamber  $m$  through which  
 105 the increased supply of vapor can pass at the required velocity and so that in all cases the desired amount of atmospheric air will be drawn in through the bell-mouth  $y'$  and caused to mingle with the vapor in the de-  
 110 sired proportion and be carried forward thereby and therewith through the passage  $z$  into the burner. Means may be provided to close or open the oil-valve  $r$  and the vapor-valve  $n$  by hand, such means being advantageously adjustable, so that the extent to  
 115 which said valves can respectively be closed or opened may be varied as desired. For instance, this object may be attained by means of a screw  $w$  with milled head  $w'$ , said screw  
 120  $w$  being simply screwed through the frame  $o$  and its end passed through the arm  $u^2$  of the aforesaid bell-crank, so as to thereby limit the amount to which said bell-crank can be moved in the opening direction, and conse-  
 125 quently limit the extent to which both the oil-valve and vapor-valve can be opened.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An atmospheric burner for liquid hydrocarbons consisting of a plurality of shallow chambers or pans superimposed one above the other and spaced apart at their edges so

as to form horizontal air-spaces between the edges of said chambers, outlets around the outer edge of each said chamber from which the mixture of hydrocarbon vapor and air can issue in a ring all around each said chamber, means to afford access of the mixture of hydrocarbon vapor and air to the interior of said plurality of chambers and means to afford separate air-supply to the air-spaces between the spaced-apart edges of the aforesaid superimposed chambers to thereby supply a series of horizontal layers of air alternating with each layer of hydrocarbon vapor where same issues around the edges of said chambers substantially as and for the purposes set forth.

2. An atmospheric burner for liquid hydrocarbons consisting of a plurality of shallow chambers or pans superimposed one above the other and spaced apart at their edges so as to form horizontal air-spaces between the edges of said chambers, outlets around the outer edge of said chamber from which the mixture of hydrocarbon vapor and air can issue in a ring all around each said pan, means to afford access of the mixture of hydrocarbon vapor and air to the interior of said plurality of chambers and a series of vertical air-passages through the said chambers and located concentrically and equidistant around same so as to exactly register when said chambers are superimposed on one another to afford full supply of air to the aforesaid horizontal air-spaces to thereby supply a series of horizontal layers of air alternating with each layer of hydrocarbon vapor where same issues around the edges of said chambers substantially as and for the purposes set forth.

3. An atmospheric burner for liquid hydrocarbons consisting of a plurality of shallow chambers or pans superimposed one above the other and spaced apart at their edges so as to form horizontal air-spaces between the edges of said chambers and outlets around the outer edge of each said chamber from which the mixture of hydrocarbon vapor and air can issue in a ring all around each said pan, means to afford access of the mixture of hydrocarbon vapor and air to the interior of said plurality of chambers and means to afford separate air-supply to the air-spaces between the spaced-apart edges of the aforesaid superimposed chambers to thereby supply a series of horizontal layers of air alternating with each layer of hydrocarbon vapor where same issues around the edges of said chambers, and means to prevent all atmospheric air from reaching the furnace or heating-surface therein except the air passing with the hydrocarbon vapor through the burner itself and the air passing through the aforesaid horizontal air-spaces in the burner substantially as and for the purposes set forth.

4. An atmospheric burner for liquid hydrocarbons consisting of a plurality of shallow chambers or pans superimposed one above

the other and spaced apart at their edges so as to form horizontal air-spaces between the edges of said chambers, outlets around the outer edge of said chamber from which the mixture of hydrocarbon vapor and air can issue in a ring all around each said pan, means to afford access of the mixture of hydrocarbon vapor and air to the interior of said plurality of chambers and a series of vertical air-passages through the said chambers and located concentrically and equidistant around same so as to exactly register when said chambers are superimposed on one another to afford full supply of air to the aforesaid horizontal air-spaces to thereby supply a series of horizontal layers of air alternating with each layer of hydrocarbon vapor where same issues around the edges of said chambers and means to prevent all atmospheric air from reaching the furnace or heating-surface therein except the air passing with the hydrocarbon vapor through the burner itself and the air passing through the aforesaid horizontal air-spaces in the burner substantially as and for the purposes set forth.

5. The combination, with a vapor-chamber, of a vaporizer connected therewith, a supply-pipe leading to said vaporizer, a valve in said pipe controlling the supply of fuel, a valve in said chamber having movement independent of said supply-controlling valve, a steam-pressure-actuating device for closing said valves, a spring for opening the same, and adjustable means connected with said device, and spring for limiting the movement of each valve simultaneously, substantially as set forth.

6. In valves for automatically regulating the supply of liquid hydrocarbon vapors to atmospheric burners—the combination with an open-ended air-supply pipe leading to the burner of a valve-chamber located centrally in the open end of said passage to which chamber the hydrocarbon vapor is supplied from the vaporizer, a valve controlling the outlet from said vapor-chamber, a rearwardly-extending spindle on said valve, an oil-valve controlling the supply of oil to said vaporizer, a rod controlling said oil-valve, means to operate said oil-valve rod on variation of steam-pressure in the generator, means operated by said oil-valve-controlling rod to simultaneously operate said vapor-valve spindle so as to simultaneously open the vapor-outlet when the oil-valve is opened and to correspondingly close said vapor-outlet as and when the oil-supply is reduced substantially in the manner and for the purposes hereinbefore described.

7. In valves for automatically regulating the supply of liquid hydrocarbon vapors to atmospheric burners—the combination with an open-ended air-supply pipe leading to the burner of a valve-chamber located centrally in the open end of said passage to which chamber the hydrocarbon vapor is supplied from the vaporizer, a valve controlling the outlet from said chamber, a rearwardly-extending

spindle on said valve, an oil-valve controlling the supply of oil to said vaporizer, a rod controlling said oil-valve, means to operate said oil-valve rod on variation of steam-pressure in the steam-generator, a bell-crank pivoted to the frame and having one arm thereof operated by said oil-valve-operating rod and the other arm of said bell-crank arranged to operate the aforesaid valve-spindle so that when variation of steam-pressure in the steam-generator increases or diminishes the oil-supply thereby the outlet from the vapor-chamber will be correspondingly increased or diminished, substantially as and for the purposes hereinbefore set forth.

8. The combination, with a burner, of a vaporizer, an air-inlet chamber, a vapor-chamber in said air-inlet chamber, a vapor-valve

in said vapor-chamber, a hydrocarbon-supply pipe connected with said vaporizer, a valve in said pipe regulating the supply of hydrocarbon, said valves being independent in operation and having movement in different direction, a steam-pressure-actuating device, a tilting elbow-lever actuated by the same and connected with said valves for operating the same simultaneously, adjustable means for limiting the movement of said tilting lever, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

E. H. J. C. GILLETT.

Witnesses:

H. BIRKBECK,  
K. HASELDEN.