

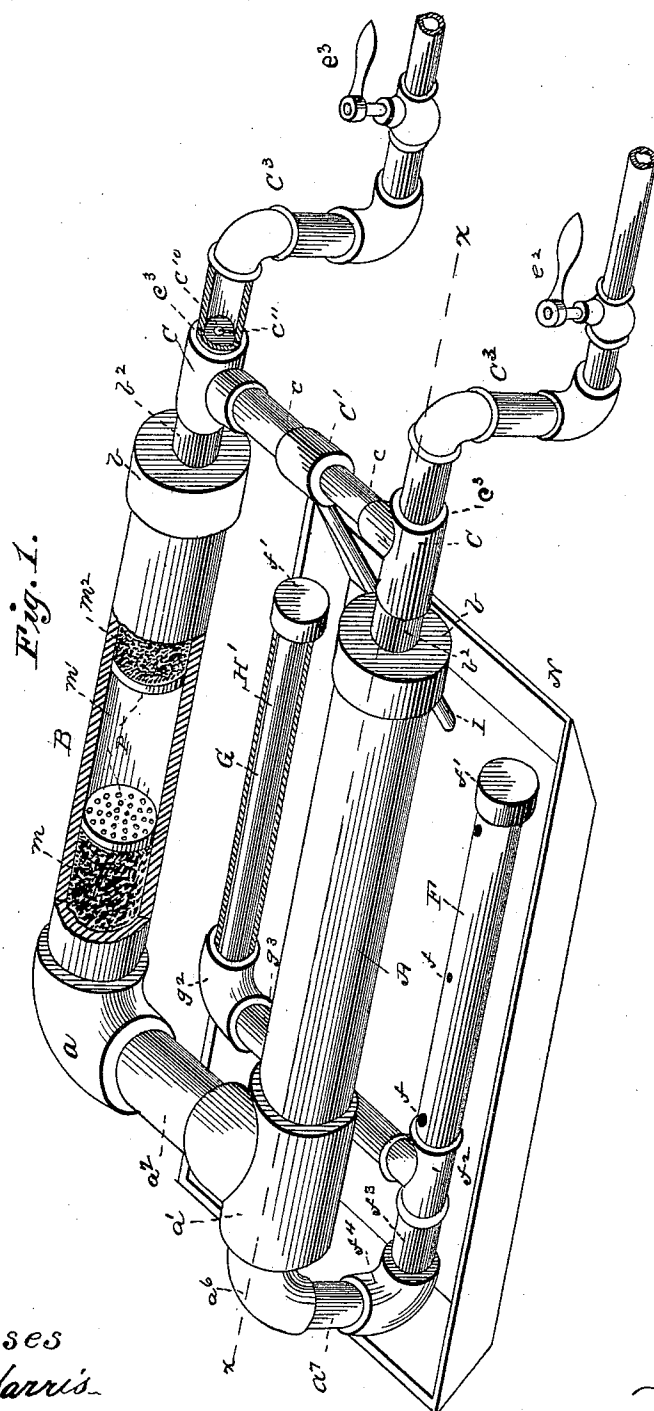
(No Model.)

2 Sheets—Sheet 1.

W. F. OTIS.
HYDROCARBON BURNER.

No. 460,653.

Patented Oct. 6, 1891.



Witnesses
M. B. Harris

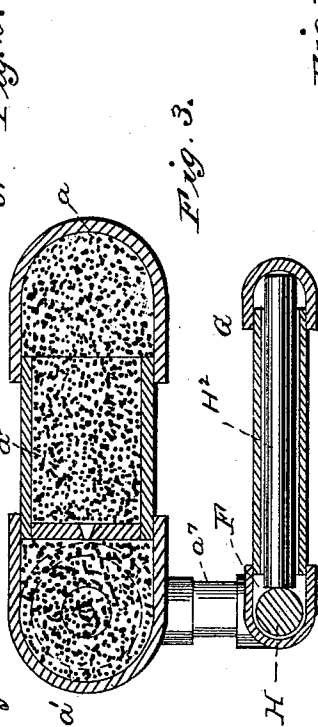
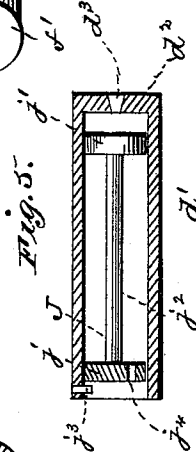
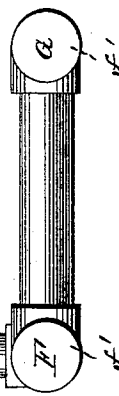
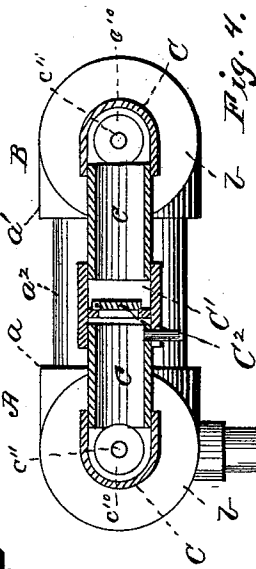
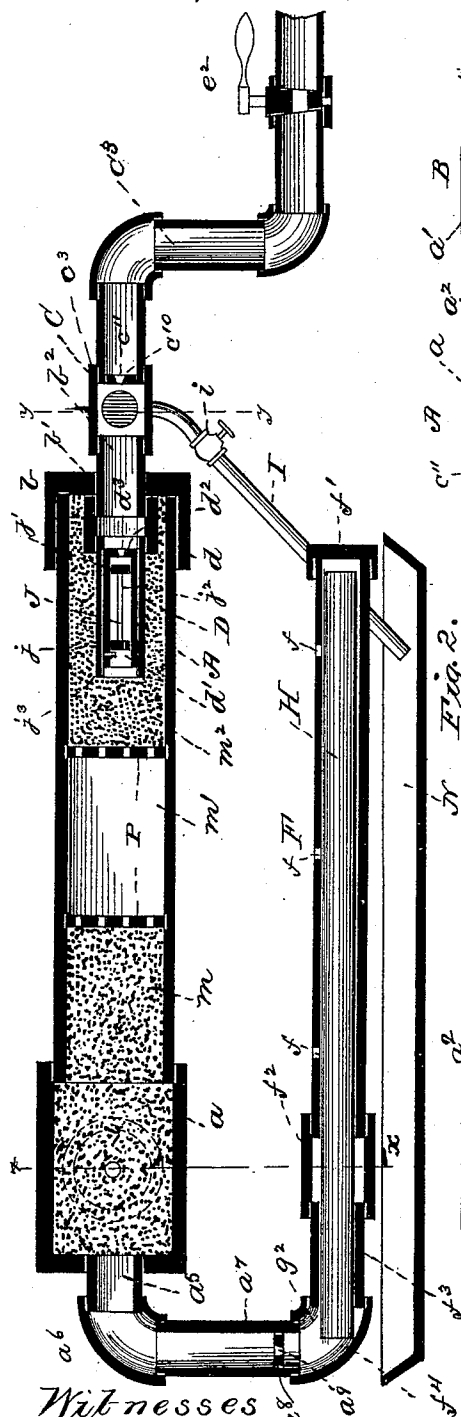
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UNITED STATES PATENT OFFICE.

WILLIAM F. OTIS, OF NORWALK, OHIO.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 460,653, dated October 6, 1891.

Application filed March 30, 1891. Serial No. 386,967. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. OTIS, a citizen of the United States, residing at Norwalk, in the county of Huron and State of Ohio, have
5 invented certain new and useful Improvements in Hydrocarbon-Burners; and I do 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 ap-
10 pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention has relation to improvements
15 in hydrocarbon-burners; and it consists in the construction and novel arrangement of parts, as hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the appended claims.

20 The objects of my invention are to provide a simple and inexpensive hydrocarbon-burner that may be easily and readily attached to stoves, ranges, furnaces, grates, andirons, or steam-boilers, &c.; further, to provide means
25 for overcoming the roaring sound of the gases as they escape through the burners; further, to provide means for a regular and even feed of the oil and water, whereby the flickering of the lights is overcome; further, to provide
30 the device with an automatic valve and to provide a filter whereby the oil and water are freed of all sediment or foreign matter before they enter the burner, thus removing
35 all danger of the burner-openings becoming clogged; further, to so construct the burner that oil may be used alone; but, as the use of an admixture of oil and water is less expensive and at the same time gives a greater degree of heat, I prefer to use such.

40 In the drawings, Figure 1 is a perspective view of a hydrocarbon-burner embodying my improvements, partly in section. Fig. 2 is a vertical longitudinal section of the device on the line *xx* of Fig. 1; Fig. 3, a transverse section on the line *xx* of Fig. 2; Fig. 4, a transverse section on the line *yy*, Fig. 2; Fig. 5, a
45 detail sectional view of the automatic valve and its chamber.

Referring to the accompanying drawings,
50 in which like letters of reference indicate corresponding parts in all the figures, A and B are the generators, which by preference con-

sist of two cylinders placed parallel to each other and are united at one end by the pieces
a a' and the section *a²*, which is somewhat
55 smaller in diameter than the cylinders. At their opposite ends the cylinders are provided with heads *b*, which have formed in them a central screw-threaded opening *b'*, in which are fitted screw-threaded nipples *b²* of a
60 length greater than the thickness of the heads *b*. Within the cylinders and connected to the nipples *b²* by means of sleeves *d* are sections D, in which are fitted valve-chambers *d'*, closed at one end by the head *d²*, provided
65 centrally with a tapering opening *d³* for a purpose hereinafter explained.

Upon the extended ends of the nipples *b²* are fitted T-couplings C, connected by means of the sections *c* and the valve-chamber C';
70 and to allow of oil passing into the water-cylinder B, should it be desired to use oil alone, I place within said chamber a valve C², which may be hinged to its seat on the side next to the water-cylinder, as shown, or otherwise ar-
75 ranged, so as to allow oil to enter the water-cylinder, but prevent water from entering the oil-cylinder.

Fitted in the arms C³ of the T-coupling C are the supply-pipes C³, which lead to casks
80 or reservoirs containing oil and water, located in any desired and convenient place, and said supply-pipes are provided with suitable stop-cocks *e² e³*.

The cylinders A B are preferably provided
85 intermediate of their ends with perforated diaphragms P, so as to divide said cylinders into three compartments *m m' m²*, and as it is intended to filter the oil and water before they pass to the burners I pack the compartments
90 *m* and *m²* with flint gravel or asbestos, or the entire cylinders may be packed, if desired or found desirable. Extending laterally from the piece *a'* is a section *a⁵*, its opposite end engaged by an elbow *a⁶*, which in turn has at-
95 tached to it a threaded section *a⁷*, provided at its lower end with a diaphragm *a⁸*, having formed in it, centrally, a tapering opening *a⁹*.

F and G designate the burners, provided in-
100 termediate of their length and upon their upper faces with perforations *f*, which by preference are three in number and are closed at one end by caps or heads *f'*. The burners at one end are connected to the generators by

the elbow g^2 , section g^3 , and the T-coupling j^2 , which in turn is connected to the section a^i by means of the section f^3 and elbow-piece f^4 .

In burners of this description it has been found, in practice, impossible to overcome the roaring sound made by the gases as they escape through the burner-openings, as well as to prevent the flickering of the light. To overcome this I place within the burners and running their entire length cores H and H', which tend to distribute the gases equally along the burners. A third core H² is placed within the section between the burners F and G, and, as will be noticed, these cores, while fitting the burners snugly, leave sufficient room to the escape of gas.

Beneath the burners is a pan N for the reception of oil to be burned in order to generate the gases, which may be supplied to said pan through a small branch pipe I, leading from the valve-chamber C' or elsewhere in the supply-pipe and provided with a small valve i . At the ends of the supply-pipes C³ are placed diaphragms c^{10} , provided with a central tapering opening c^{11} , which feeds the oil and water to the generators in a fine stream and also has a tendency to spray the same.

To regulate the flow of oil and water to the cylinders A and B, I provide them with automatic reciprocating valves J, which consist of the heads j and j' , connected by a rod j^2 , and are adapted to fit within the chambers d' . To limit their movements within the chambers, I secure in said chambers stops j^3 , and to permit of the even flow of the oil and water into the filters, I provide the inner heads j with a tapering opening j^4 , located to one side of the center of said head.

The operation of my improved hydrocarbon-burner, taken in connection with the above description and accompanying drawings, may be briefly described as follows: The stop-cock in the oil-supply pipe having been opened the required distance and the valve i in the small pipe I opened, oil is permitted to flow into the pan N. When the required amount has been run in, the valve i is closed and a light applied to the oil in the pan and the oil therein allowed to burn out, during which time the oil and water that are within the generators are vaporized. The stop-cock in the water-supply pipe is now opened. Oil and water enter the cylinders or generators A B, and before entering the middle chamber m' , which may be justly styled "superheaters," and where the water and oil are vaporized, they pass through the filters in the compartments m^2 , where they are cleaned of a certain per cent. of foreign matter. The gases which are formed by the admixture of oil and water are then forced through the filters in the compartments m by the pressure of the oil and water in the main supply-pipes, and, passing through said second set of filters, enter the burners, where they pass through the opening in said burners. Should the water and oil, or either, at any time flow too

freely and generate gas faster than it can be consumed or until the pressure of the gases in the generators is greater than that exerted by the oil and water in the supply-pipes, the valves J are forced back against their seat and the heads j' caused to close the openings d^3 in said seat, which stops the flow of oil and water. As soon as the pressure is equalized or that occasioned by the oil and water is greater upon the back of the valves, the valves are forced away from the openings d^3 through their seats and the oil and water permitted to enter the generators to be vaporized.

The expansible nature of the material forming the valve-chambers and valves prevents any leakage of the oil or water when the burner is not in use that may be in the supply-pipes between the stop-cocks and generators.

The automatic valve herein described is positive in its workings, and as it is my intention to construct the valve-chambers of a composition of an expansible nature it will be readily seen that when the generator is cold the chamber will contract and bind against the valves, which will prevent oil or water from the supply-pipes entering the generators, and when it is desired to start the burners in the manner hereinbefore described the heat from the burning oil in the pan N causes the valve-chamber to expand and allows the free run of the oil and water through the opening d^3 in the valve-seat and through the perforated head into the generators.

While I have shown the generators constructed in sections, it will be readily seen that they may be cast in one piece.

I do not desire to confine myself to the precise construction herein shown and described, as many minor changes may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a hydrocarbon-burner, a set of generators divided into compartments, a filter at each end of said generators, an automatic valve for each generator, a superheating-chamber in each generator intermediate of its length, located above a set of burners, each provided with a solid core, as set forth.

2. In a hydrocarbon-burner, a set of generators divided into compartments by perforated diaphragms, a filter at each end of the generators, an automatic valve within the filters at the feeding end of the generators, the connecting-pipes provided with perforated diaphragms, and a set of burners below said generators, as described.

3. In a hydrocarbon-burner, the combination, with the generators, of an automatic valve provided with a perforated head located within said generators, for the purpose set forth.

4. In a hydrocarbon-burner, the combina-

tion, with the generators, of an automatic piston-valve provided with two heads connected by a rod and adapted to be unseated by a pressure within the supply-pipes and seated by pressure in the generators, for the purpose set forth.

5 5. In a hydrocarbon-burner, the combination, with a generator having located within it an automatic valve, and a supply-pipe for
10 said generator, of a burner provided with a core, located below the generator, and a pipe connection between the burner and generator, provided with a perforated diaphragm, substantially as described.

15 6. In a hydrocarbon-burner, the combination, with a generator having located within it an automatic valve, a filter for said generator, and a supply-pipe, of a burner located below the generator, provided with a core, and a
20 connection between the generator and burner, substantially as described.

7. In a hydrocarbon-burner, the combination, with the generators constructed as described, each having a supply-pipe with trans-
25 verse connection having an automatic valve, of a perforated diaphragm in the supply-pipes

at each side of the said valve in the said transverse connection of the supply-pipes, and the burners below the generators, each provided with a core, as described.

30 8. In a hydrocarbon-burner, the combination, with the generators, each provided with an automatic valve, and a valve in the transverse connection of the supply-pipes of said generators, of the burners below the genera-
35 tors, and a pan having a connection with the supply-pipes, as described.

9. A set of burners, each provided with a solid core, and a transverse connection between said burners, also provided with a core,
40 located below a set of generators having a filter at each end and an automatic valve, a supply-pipe for each generator, having a perforated diaphragm, and a transverse connection between said generators having an auto-
45 matic valve, substantially as described, for the purposes specified.

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Witnesses:

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