

A. SHACKLETON.
HYDROCARBON BURNER.
APPLICATION FILED MAY 13, 1908.

1,044,268.

Patented Nov. 12, 1912.

2 SHEETS-SHEET 1.

Fig 1

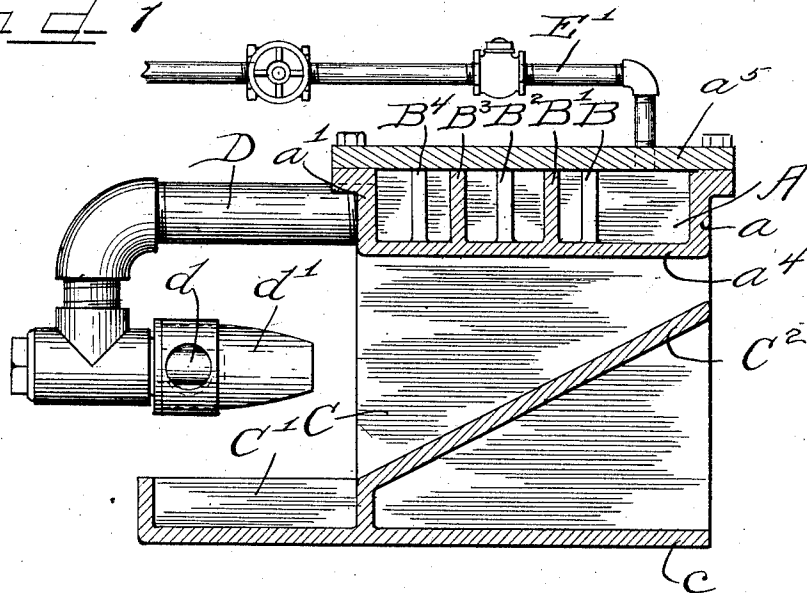
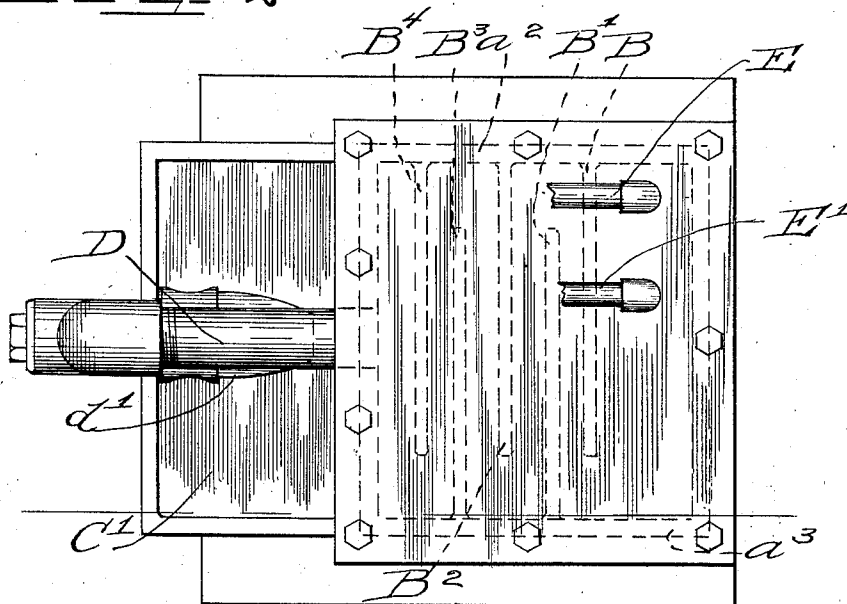


Fig 2



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3

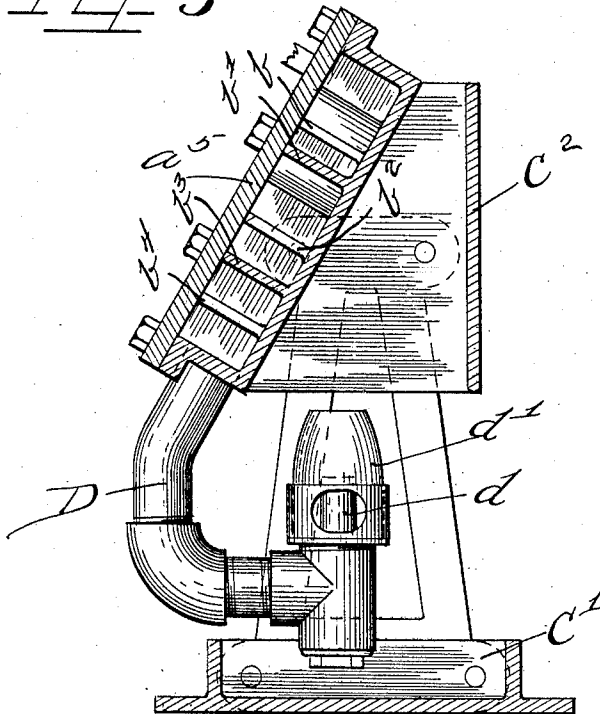
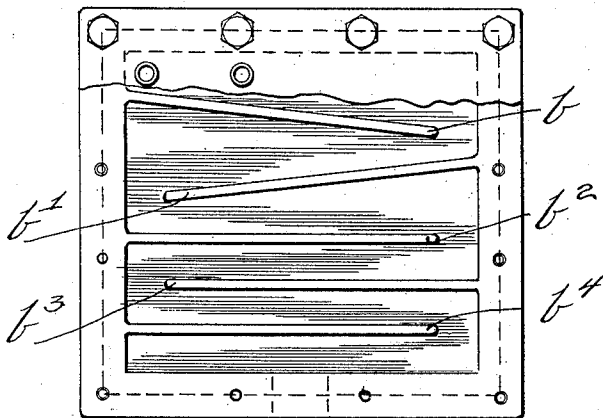


Fig. 4



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UNITED STATES PATENT OFFICE.

ALFRED SHACKLETON, OF CHICAGO, ILLINOIS.

HYDROCARBON-BURNER.

1,044,268.

Specification of Letters Patent.

Patented Nov. 12, 1912.

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To all whom it may concern:

Be it known that I, ALFRED SHACKLETON, a citizen of the United States, and a resident of the city of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Heretofore very many attempts have been made to produce a satisfactory hydro-carbon burner of the retort type adaptable for use for the various purposes for which a high degree of temperature is required, and although some of these devices have been tested quite exhaustively, none have so far proven entirely satisfactory for the production of power from the burning of such fuel. It has been found in practice also that in the best of such devices heretofore constructed a large proportion of the fuel values are lost owing to the fact that surplus carbon is deposited in the burner or generator soon clogging up the same and rendering the device inoperative.

The object of this invention is to provide a hydro-carbon burner in which all the constituents of the fuel are consumed and utilized for their full fuel value and furthermore to enhance the heating effect by means of the decomposition of water vapor, the constituents of which are combined with certain constituents of the hydro-carbon to insure perfect combustion.

It is also an object of the invention to afford in a device of the class described a long and tortuous passage through which the hydro-carbon in the form of a vapor intensely heated, must pass, mixed with water vapor also heated and to arrange the burner proper in such a manner as to heat the walls of the passage to red heat, thus assisting not only in the distillation of the hydro-carbon but as well separating the water vapor into its constituents to recombine with constituents of the hydro-carbon.

The invention consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a view partly in side elevation and partly in section of a device embodying my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a view

in vertical section of a device embodying my invention in which the generator is inclined and the burner directed vertically. Fig. 4 is a fragmentary front elevation thereof.

In said drawings: A, indicates as a whole a generator comprising side walls $a-a'$ — a^2-a^3 , and a thin bottom wall a^4 , and provided with a tight fitting cover or head a^5 , secured thereto by means of cap screws affording a tight joint with the side and end walls to afford a generating chamber. Within the chamber thus formed and extending from the opposite side walls a^2-a^3 , alternately to near the opposite side of the chamber are thin partitions or webs $B-B'$ — $B^2-B^3-B^4$, which, as shown, are of a width to extend from the bottom with which they are integral, as shown in Fig. 1, to the cover or top plate or head a^5 , thus affording a tortuous passage of considerable length through said chamber. Said generating chamber, as shown, is supported on each side by walls C, integrally connected with which is a bottom plate or bed c , extending forwardly from the side wall and beyond the generating chamber and affording a pan C' , along the front side thereof. Extending from said pan obliquely upward to near the bottom of the generating chamber at the rear side thereof is a deflector plate or web C^2 . Threaded in the front wall a' , of the generating chamber and communicating therewith is a pipe D, which is directed downwardly at its extremity and provided at its inwardly directed end with a nozzle d , constructed as is usual for Bunsen burners, and having an outer casing d' , provided with perforations to afford an air inlet and serving to direct the blast against the escaping burner against the deflecting plate C^2 .

The construction shown in Figs. 3 and 4, is identical with that before described in all important details excepting that the bottom of the generating chamber is arranged at an inclination and the burner $d-d'$ directs the flame obliquely against the bottom. Of course, in such a construction, it is desirable that the partitions $b-b'$ — $b^2-b^3-b^4$, or at least the partitions $b-b'$, which receive the initial flow of the liquid fuel, be arranged at such inclination as to facilitate the flow, as shown in Fig. 4. With such an inclination, however, practically all the constituents of the hydro-carbon are volatilized by the time the liquid has passed from the par-

tition b' , and it is not so important that the remaining partitions or walls be inclined to the same extent or at all.

Connected in the generating chamber 5 through the cover a^5 , thereof, is the pipe E, for the hydro-carbon and the pipe E', for the water, which may be admitted if preferred, in the form of steam. Said pipes are provided with suitable regulating valves, 10 whereby the flow of each fluid may be controlled relatively to the other to insure a suitable mixture to produce complete combustion. Practical experience shows that a properly regulated supply of water or steam, 15 in such conditions, will furnish smokeless burning of the mixture of gases, if a sufficient supply of air or oxygen is available and will keep the distilling vessel and its outlet absolutely free from deposits of 20 carbon or carbonaceous materials, besides increasing largely the fuel value of the resulting gases. Of course, the main consideration in such a construction is to insure the complete destructive distillation of the hydro-carbon and to consume the same 25 entirely, thus avoiding the production of smoke altogether.

Of course, it is quite evident that the particular arrangement of the parts and the 30 construction of the generating chamber may vary through a wide range, and that the water as water vapor may be introduced in superheated form or otherwise, as preferred. I therefore do not purpose limiting this 35 application for patent otherwise than necessitated by the prior art, as many details of construction and arrangement may be varied without departing from the principles of this invention.

40 I claim as my invention:

1. In a device of the class described a generating chamber comprising integral

bottom and side walls, partitions connected with the bottom and side walls, each partition providing a space between one end and 45 one of the side walls, a top plate closing the top of the chamber and the top of the partitions bearing thereagainst, an outlet pipe opening from the chamber, a water and a hydro-carbon pipe opening into the cham- 50 ber on the side remote from the outlet pipe, a deflecting wall adjacent the bottom wall of the chamber and a Bunsen burner connected in the outlet pipe and delivering a blast between the bottom of the generating 55 chamber and the deflecting wall.

2. In a device of the class described a bed plate, side walls extending upwardly therefrom, an upwardly inclined deflecting wall connected with the side walls, a hori- 60 zontal vaporizing chamber at the top of the side walls and a Bunsen burner offset from the generating chamber and directed inwardly between the inclined deflecting wall and bottom of the chamber. 65

3. In a device of the class described a generating chamber, partitions integral with the bottom and walls of the chamber and of less width than the chamber and equal in 70 height to the side walls forming the chamber, a removable top for the chamber, a deflecting wall, a pan or receptacle connected with the side walls and offset therefrom, a burner offset from and directed toward the deflecting wall and means for deliv- 75 ering hydro-carbon and water to the generating chamber.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

ALFRED SHACKLETON.

Witnesses:

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K. E. HANNAH.