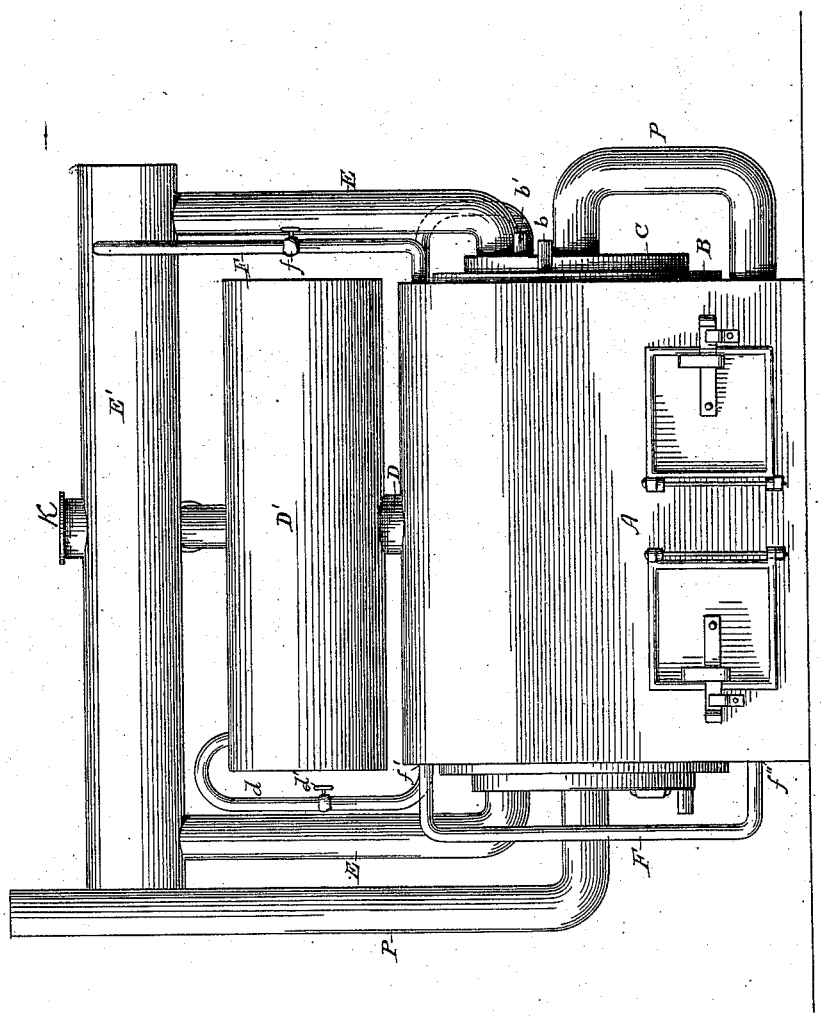
2 Sheets—Sheet 1.

A. ALEXANDER.

Hydrocarbon Gas Apparatus.

No. 211,312. **Patented Jan. 14, 1879.**

Fig. 1.



WITNESSES:

C. Clarence Poole

R. K. Evans

INVENTOR:

Abram Alexander

by A. H. Evans & Co

Attys

2 Sheets—Sheet 2.

A. ALEXANDER.

Hydrocarbon Gas Apparatus.

No. 211,312. **Patented Jan. 14, 1879.**

Fig. 3.

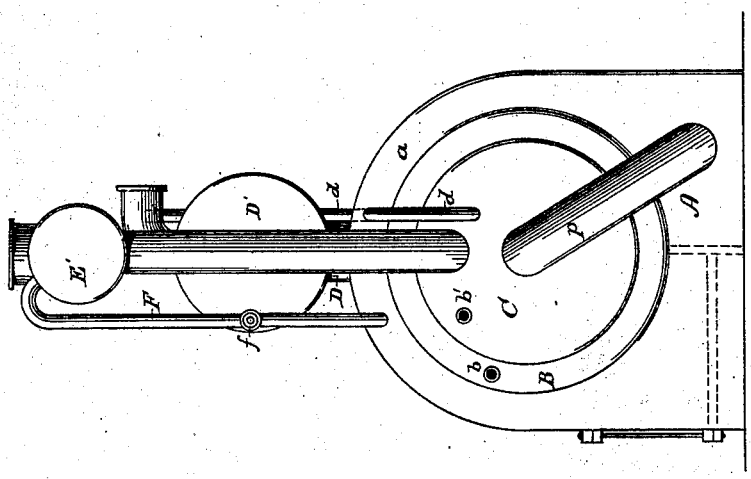
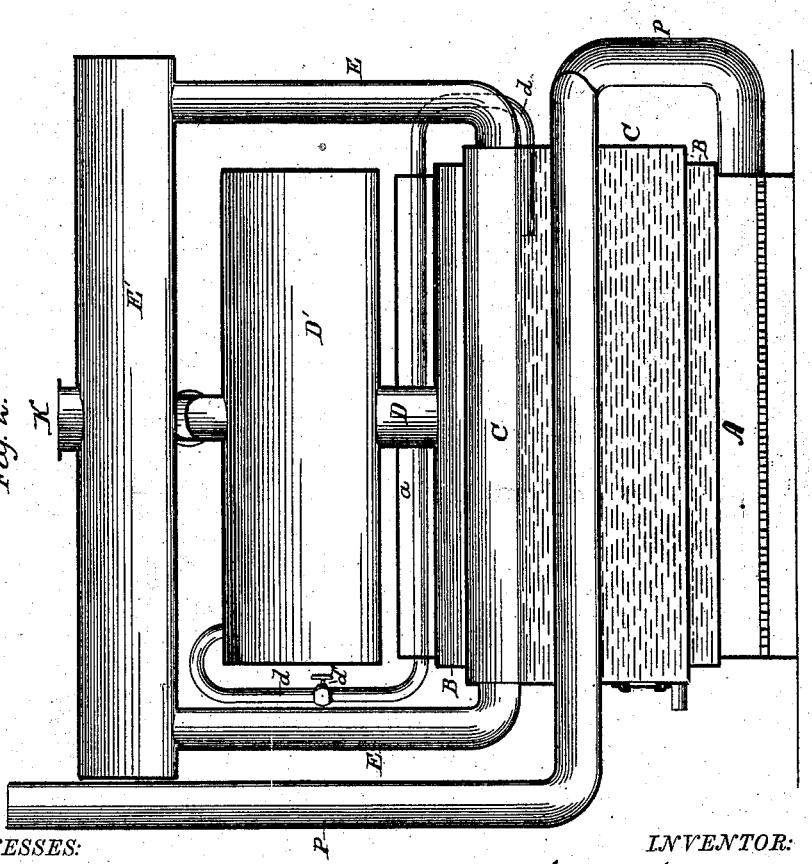


Fig. 2.



WITNESSES:

Clarence Poole

A. K. Evans

INVENTOR:

Abram Alexander

by A. N. Evans & Co.

Attys

UNITED STATES PATENT OFFICE.

ABRAM ALEXANDER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO SAMUEL M. BOYD, OF SAME PLACE.

IMPROVEMENT IN HYDROCARBON-GAS APPARATUS.

Specification forming part of Letters Patent No. **211,312**, dated January 14, 1879; application filed May 22, 1878.

To all whom it may concern:

Be it known that I, ABRAM ALEXANDER, of the city of Pittsburg, in the State of Pennsylvania, have invented a new and Improved Apparatus for Making Illuminating-Gas from the Vapors of Water and a Hydrocarbon Combined; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation. Fig. 2 is a vertical section, and Fig. 3 is an end elevation.

The object of my invention is to produce a cheap, effective, and compact apparatus for producing an illuminating-gas and other substances from the mixed gases or vapors of water and a hydrocarbon; and it consists in a furnace having an oil-reservoir and water-boiler within its casing, and two reservoirs arranged above them for the hydrocarbon vapor and steam, respectively; and it further consists in sundry pipe-connections, in combination with said boiler, furnace, oil, steam, and gas reservoirs, as hereinafter more fully described and claimed.

In order that those skilled in the art may make and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A is a furnace, provided with a fire-box and proper doors in its lower portion. Within the furnace, and supported at its ends, is a boiler, B, leaving a space, *a*, between the boiler and the casing of the furnace, so that there may be a free circulation of the products of combustion around the boiler.

Arranged within the boiler, and concentric with it, is a reservoir, C, for petroleum or any other volatile liquid or substance to be used. Thus the boiler forms, as it were, a water-jacket around the reservoir C, between it and the fire-box.

The flue of the furnace passes from the casing through curved pipe *p*, and through the center of the reservoir C to the stack P.

From the center of the boiler, and passing through the furnace-casing, is a large pipe, D, terminating in a drum, D′, or steam-reservoir. From each end of the oil-reservoir pass two upright pipes, E, communicating with and supporting a large drum or gas-reservoir, E′.

Both the oil-reservoir C and the boiler B have pipes *b b′*, for supplying them with oil and water.

A small pipe, F, provided with a cock, *f*, descends from the gas-reservoir, passes into the top of the furnace at one end, through the furnace, out of the casing at *f′*, and, passing down, enters the fire-box at *f″*, so that gas may be drawn from the reservoir, superheated, and then injected into the fire-box for fuel.

From the steam dome or reservoir D′ descends a pipe or pipes, *d*, provided with a cock, *d′*, which passes from end to end through the fire-arch of the furnace, out through the casing, and into the center of the oil-reservoir C, where it terminates with an open end.

Steam passes through pipe or pipes *d*, and in the fire-arch becomes superheated, and entering the oil agitates or beats it up, so as to produce a rapid evolution of vapor, and, if necessary, to heat the crude substances in separate still or stills before passing into the regular or inner stills for continuous distillation.

Proper connections K are made to conduct the gas to a washer or condenser, when it is ready for use.

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

1. The furnace A, having the interior concentric boiler, B, and reservoir C, in combination with gas-conducting pipe E, substantially as described.

2. In a hydrocarbon-gas generator, the combination of furnace A, boiler B, and reservoir C with the gas drum or reservoir E′ and pipe or pipes F, whereby gas is superheated after it is formed, and then is conveyed to the fire-box, as set forth.

3. The boiler B, pipe D, and steam dome or reservoir D′, in combination with the pipe or pipes *d*, furnace A, and oil-reservoir C, all constructed and arranged as and for the purpose set forth.

ABRAM ALEXANDER.

Witnesses:
H. W. STRICKLER,
J. J. MCCORMICK.