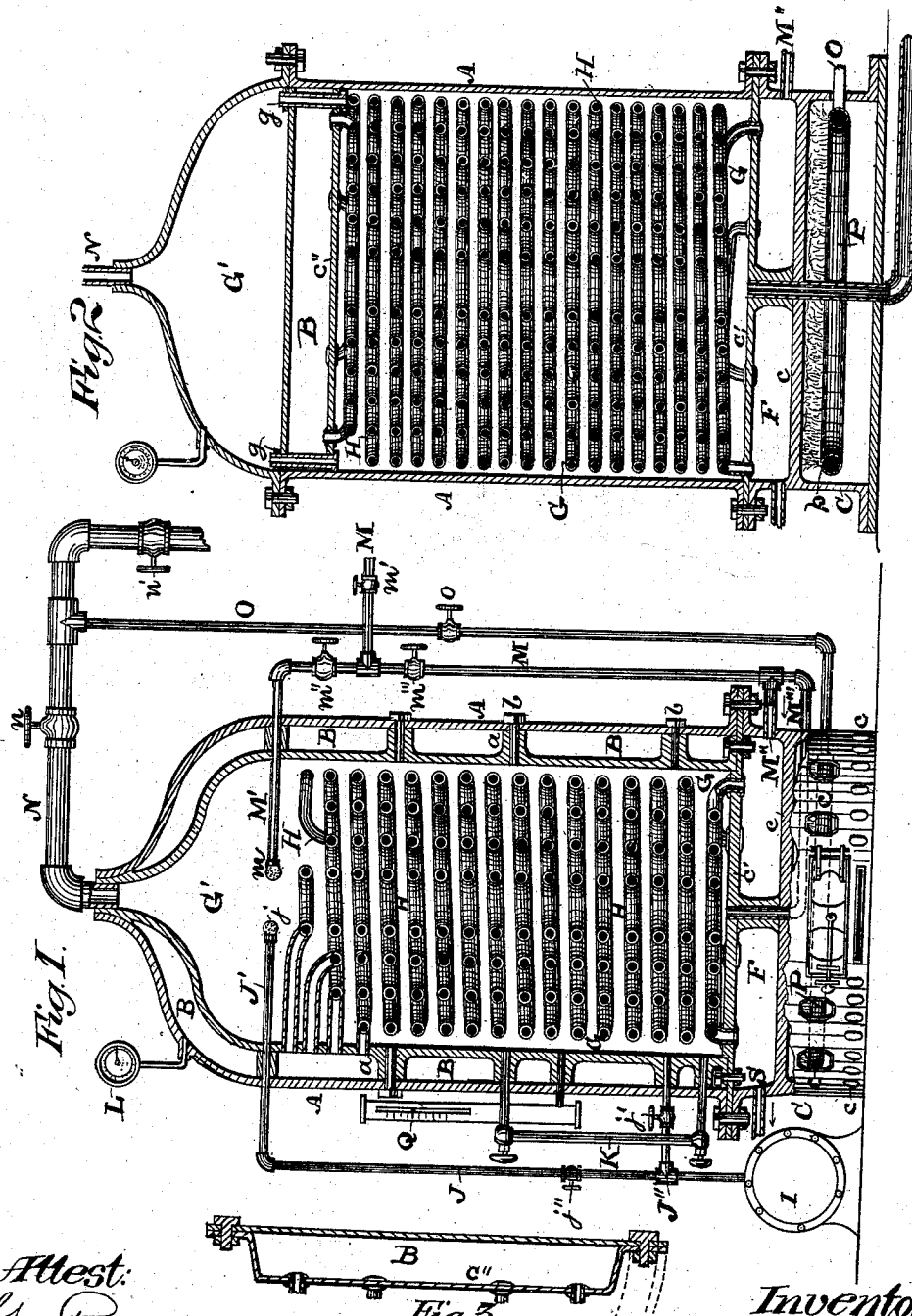


A. I. AMBLER.  
Vapor Fuel Generator.

No. 211,369.

Patented Jan. 14, 1879.



Attest:  
D. G. Stuart,  
F. B. Brock.

Inventor:  
Augustus J. Ambler  
by A. M. Ballou  
Atty.

# UNITED STATES PATENT OFFICE.

AUGUSTIN I. AMBLER, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENT, TO S. M. WHIPPLE, OF GRANTVILLE, MASS.

## IMPROVEMENT IN VAPOR-FUEL GENERATORS.

Specification forming part of Letters Patent No. 211,369, dated January 14, 1879; application filed June 11, 1878.

*To all whom it may concern:*

Be it known that I, AUGUSTIN I. AMBLER, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Vapor-Fuel Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to devices for generating gases or hydrocarbon vapors which are intended to be used as fuel; and the invention consists of a suitable vessel, formed preferably of one or two cylinders or casings of sheet metal, provided with suitable partitions to form steam and oil chambers, and with nests of coiled tubes connecting the steam-chambers, through which steam is passed for the purpose of vaporizing the oil, in combination with a fire-chamber provided with a burner and supplied with gas in manner substantially as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a vertical sectional view of an apparatus embodying my invention. Fig. 2 is a similar view of an apparatus in modified form. Fig. 3 is a sectional view of the upper steam-space in modified form.

Referring to the parts by letters, A represents the casing, constructed, as shown in Fig. 1, of an outer and inner shell, united together by annular flanges or rings *a* and bolts *b*, the space, B, between the two shells forming an additional steam-space.

The vessel rests upon a cylindrical casing, C, which forms the furnace or fire-chamber, to be hereinafter more fully described. Above the fire-chamber, and between it and the bottom of the casing, is formed a steam-chamber, F, said chamber being formed by two diaphragm-partitions, *c c'*.

G is the oil-chamber within the casing, the upper portion of which, G', is dome-shaped, and constitutes the gas or vapor reservoir. H represents coils of tubing, arranged in nest form within the oil-chamber, the ends of the tubes

connecting with the steam-space at top and bottom by passing through the inner shell, so as to communicate with the space B, and, through the diaphragm *c'*, to communicate with the lower steam chamber or space, F, the connections being such as to constitute tight joints. I is the oil-pump, which supplies the apparatus with oil through a suitable connecting-pipe, J, branches of which are led into the interior of the oil-chamber, either at the lower or upper ends, or both. The upper of these branch pipes, J', may be provided with a rose or spray-nozzle, *j*, so as to deliver the oil in the form of a spray on or over the heating-coils H. The lower branch, J'', is provided with a valve or cock, *j'*, and the upright pipe J is also provided with a valve or cock, *j''*, and by means of these cocks the oil may be made to pass in altogether by the lower branch or by the upper branch; or both cocks may be left open and the oil pass in above and below.

K is a glass gage-tube, by means of which the height of the oil in the oil-chamber can be ascertained, and the supply be regulated accordingly. L is a steam-gage, to indicate the pressure of steam within the apparatus.

M is the supply steam-pipe, receiving steam from a boiler or generator. (Not shown.) This steam-pipe has an upper lateral branch, M', passing into the interior of the oil-chamber, and provided with a rose or spray-nozzle, *m*. It is also provided with a lateral branch, M'', which passes into the steam-space F beneath the oil-chamber; and, further, it is provided with a lateral branch, M''', which passes into the furnace, and then up through the chamber F into the oil-chamber G. The pipe M is also provided with suitable cocks *m' m'' m'''*, by means of which the flow of steam is regulated or shut off, as desired.

N is the gas-pipe, which conducts away the gases or vapors generated in the oil-chamber to the grate or furnace wherein they are to be used as fuel. This pipe N is provided with suitable valves or cocks *n n* to regulate the flow as desired. O is a gas-pipe of smaller dimensions, having a valve, *o*, and connected in a suitable manner to pipe N, and carried down to the furnace or fire-chamber C, as shown by Fig. 1 of the drawings, where it

passes into and connects with a burner-tube, P, which is provided with a suitable burner-opening, *p*, through which the gas can pass.

The shell of the furnace C is pierced with a number of air-holes, *c*, and it may also be provided with suitable dampers to regulate the draft and doors for convenience of access to the interior. Q is a pyrometer, which is employed to indicate the degree of heat attained.

The operation of the device is as follows: Steam being supplied from a generator or boiler, (not shown,) and the valves or cocks in the pipe M being open, steam will pass into the chamber F, and from thence into and up through the coils H, and from thence into the space B, thereby heating the oil in the chamber or generator G, which, as before described, is supplied with oil by pump I and pipe J.

When the proper amount of heat is attained and the vapor so generated begins to pass from the oil, connection with the fire-chamber C may be formed, and the gas passing through the burner-pipe P be ignited, thereby materially increasing the heat of the steam, which may be thus kept up until the proper degree of heat is indicated by the pyrometer.

For some purposes a greater degree of heat is required than for others; but, as will readily be seen by those skilled in the art, by the aid of the pyrometer and the fire-chamber, by increasing or decreasing the flow of gas into the burner, the degree of heat can be easily regulated.

The necessary amount of steam which is required to commingle with the oil and hydrocarbon vapors is supplied through the pipes M and M'', which, as before stated, pass into the interior of the oil-chamber through the shell.

Any excess or surplus of steam is allowed

to escape through the tube S, which may be provided with a suitable valve, and said tube and valve may be located in any suitable or convenient position.

Fig. 2 of the drawings shows an apparatus of modified form, that is made with a single casing or shell, A, and a lower and upper space, F B, the ends of the coiled tubes passing through and being secured to suitable diaphragm-plates *c'* and *c''*, and the oil-chamber G being connected with the gas-dome G' by means of tubes and tubular bolts *g*.

With such an arrangement the tubes *g* may be dispensed with, and the vapors be allowed to pass up around the periphery of the plates which form the upper steam-chamber, B, and which, for this purpose, may be fluted around the periphery, as shown at Fig. 3 of the drawings.

The arrangement of the pipes connecting the apparatus, Fig. 2, with the oil-pump and steam-generator, and also the gas-pipes connected therewith, are substantially the same as those shown in Fig. 1, and need not, therefore, be herein again described.

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

The fire-chamber C, burner P, and gas-pipes O and N, in combination with the steam-chambers and coiled tubes, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

AUGUSTIN I. AMBLER.

Witnesses:

W. R. AMBLER,  
MARTIN CONNOLLY.