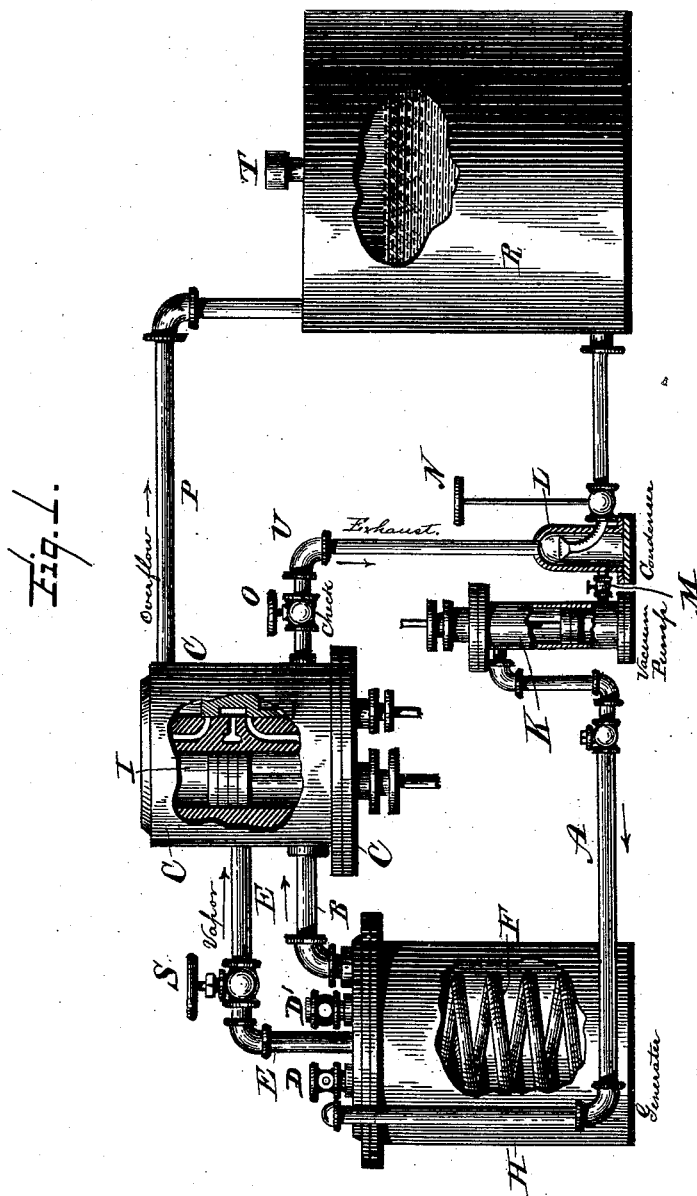


P. J. McMAHON.

AMMONIACAL GAS GENERATOR.

No. 343,598.

Patented June 15, 1886.



WITNESSES:

L. C. Hill
Wm. S. Small

INVENTOR

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

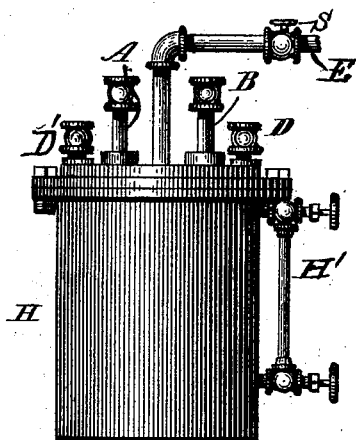


Fig. 3.

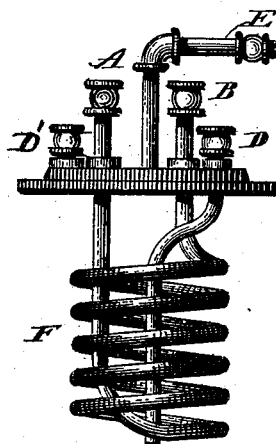


Fig. 4.

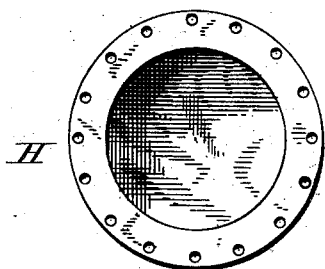
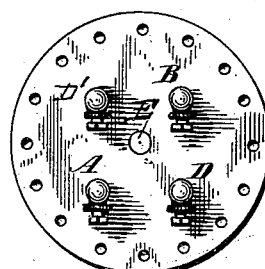


Fig. 5.



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UNITED STATES PATENT OFFICE.

PATRICK J. McMAHON, OF TANGIPAHOA, LOUISIANA.

AMMONIACAL-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 343,598, dated June 15, 1886.

Application filed February 9, 1885. Serial No. 155,423. (No model.)

To all whom it may concern:

Be it known that I, PATRICK J. McMAHON, a citizen of the United States, residing at Tangipahoa, in the parish of Tangipahoa and State of Louisiana, have invented a new and useful Improvement in Ammoniacal-Gas Generators, which invention is fully set forth in the following specification and accompanying drawings.

The object of this invention is to provide a method for vaporizing liquid ammonia for the purpose of generating gas for operating a motor or engine; and the invention consists in the method hereinafter described, and particularly pointed out in the claim.

Referring to the drawings, which illustrate one form of apparatus which may be employed for practicing the method specified, Figure 1 is a side elevation, with portions in section, of the entire apparatus. Fig. 2 is a side elevation of the generator; Fig. 3, a similar view of the coil detached from the generator; Fig. 4, a plan of the casing, and Fig. 5 a plan of its cover.

Like letters indicate like parts in all the figures of the drawings.

H is the gas-generator, inclosing the coil F, which generator may be provided with any ordinary glass gage, H', to indicate the amount of contents of the generator.

C is the jacket inclosing the cylinder I.

R is a common tank to contain the liquid for reabsorbing the gas as it is exhausted from the engine.

K is the vacuum-pump, and L the condenser.

S is the throttle-valve in the pressure-pipe E, which admits the gas from the generator to work the engine.

U is the exhaust-pipe from the engine to the condenser L.

O is a check-valve in the exhaust-pipe.

N is an injection-valve to admit the solution of reabsorption to the condenser as may be required.

M is a check-valve between the condenser and pump.

A is the discharge-pipe from the pump K, and is connected with one end of the pipe forming the coil F in the generator H. The pipe B is connected with the other end of said coil and with the jacket C, inclosing the cylinder I. The pipe P is an overflow from the top of the jacket C to the tank R.

D D', Figs. 2 and 3, are pipes or openings for charging the generator, the former extending to the bottom thereof, in order to serve the purpose of completely emptying the generator by blowing out whenever it may be necessary to do so for any purpose.

The mode of operation is as follows: The gas taken from the generator, after operating the piston of the engine, is exhausted into the condenser L, where it is met by a jet of the solution or liquid of reabsorption, admitted through the injection-valve N, in a quantity proportionate to the quantity of exhaust-gas passing from the cylinder, and gives out in this solution the heat it took to evaporate it in the generator. This heated solution is withdrawn from the condenser L and circulated by the pump K in measured quantities. The proportions, capacities, and strokes of the pump are regulated in accordance with the requirements of the generator and the exhaust of the engine. Thus measured predetermined quantities of commingled exhaust and reabsorbing liquid are positively forced through the pipe A, coil F, pipe B, jacket C, pipe P, and finally into the tank R. While passing through the coil F, which is immersed in the liquid ammonia in the generator, it (the commingled exhaust and liquid) transmits the heat back to the liquid ammonia, which heat is being continually taken from it during the evaporation thereof to produce the gas, and thus the evaporation is continuously maintained.

The operation taking place in the generator is as follows: The body of the generator is charged with liquid or anhydrous ammonia, surrounding the coil F up to within a short distance of the top or cover, the space above the liquid, being the gas-chamber, is for a similar purpose as that of a steam-dome of a steam-boiler. The surface of the coil is the heating-surface through which the heat is transmitted to the liquid ammonia, and therefore corresponds in function with the heating-surface of a steam-boiler. The valve S is opened as gas is required to operate the engine. During the generation of the gas in the generator a portion of the sensible heat in the body of the liquid is taken up and becomes latent in the formation of the gas, and is taken off with it. In order to keep up the generation of the gas, it is necessary that this heat be

repeatedly and rapidly returned to the liquid. This is done by circulating the gas absorbing liquid through the coil. As the gas is absorbed by the liquid of absorption, it gives out
5 in that liquid the heat which it took to evaporate it in the generator, and this liquid thus heated is circulated through the coil F, thus maintaining the generation of gas.

Heretofore the reabsorbing-liquid and exhaust-gas have been conducted into the generator, but not positively forced therein, except by getting a sufficient back-pressure in the generator and cylinder of the engine to force it through the coils, while a sufficient
15 force for this purpose would have a tendency to prevent the entrance of the reabsorbing-liquid into the exhaust, whereas by my method of positively measuring and commingling the quantities of exhaust-gas and reabsorbing-liquid, which are predetermined in accordance
20 with the requirements of the exhaust, and which commingling takes place apart from the generator, and then (that is, subsequently) positively forcing the commingled reabsorbing-liquid and exhaust-gas through and along
25 the heating-surface of the generator, which is surrounded by anhydrous ammonia, a partial vacuum is maintained in the exhaust and back-pressure overcome in the generator and cylinder, and a rapid return of the heat taken from
30

the anhydrous ammonia to evaporate the gas is accomplished, and this without the application of artificial heat and remote from any stationary heat-applying apparatus for preparing an anhydrous ammonia for use in the generator, which latter apparatus has heretofore been employed in connection with a stationary motor.

I do not claim any of the apparatus herein shown and described, as the same forms the subject-matter of companion applications pending herewith.

What I claim is—

The method herein described of vaporizing liquid ammonia in the process of generating gas for operating an engine, which consists in injecting into a condenser a predetermined quantity of a reabsorbing-liquid to meet the requirements of the quantity of gas exhausted by the motor, and subsequently positively circulating said predetermined quantities of commingled reabsorbing-liquid and exhaust-gas through and along the heating-surfaces of the generator, which are surrounded by anhydrous ammonia, substantially as and for the purpose specified.

P. J. McMAHON.

Witnesses:

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WM. B. BARNETT.