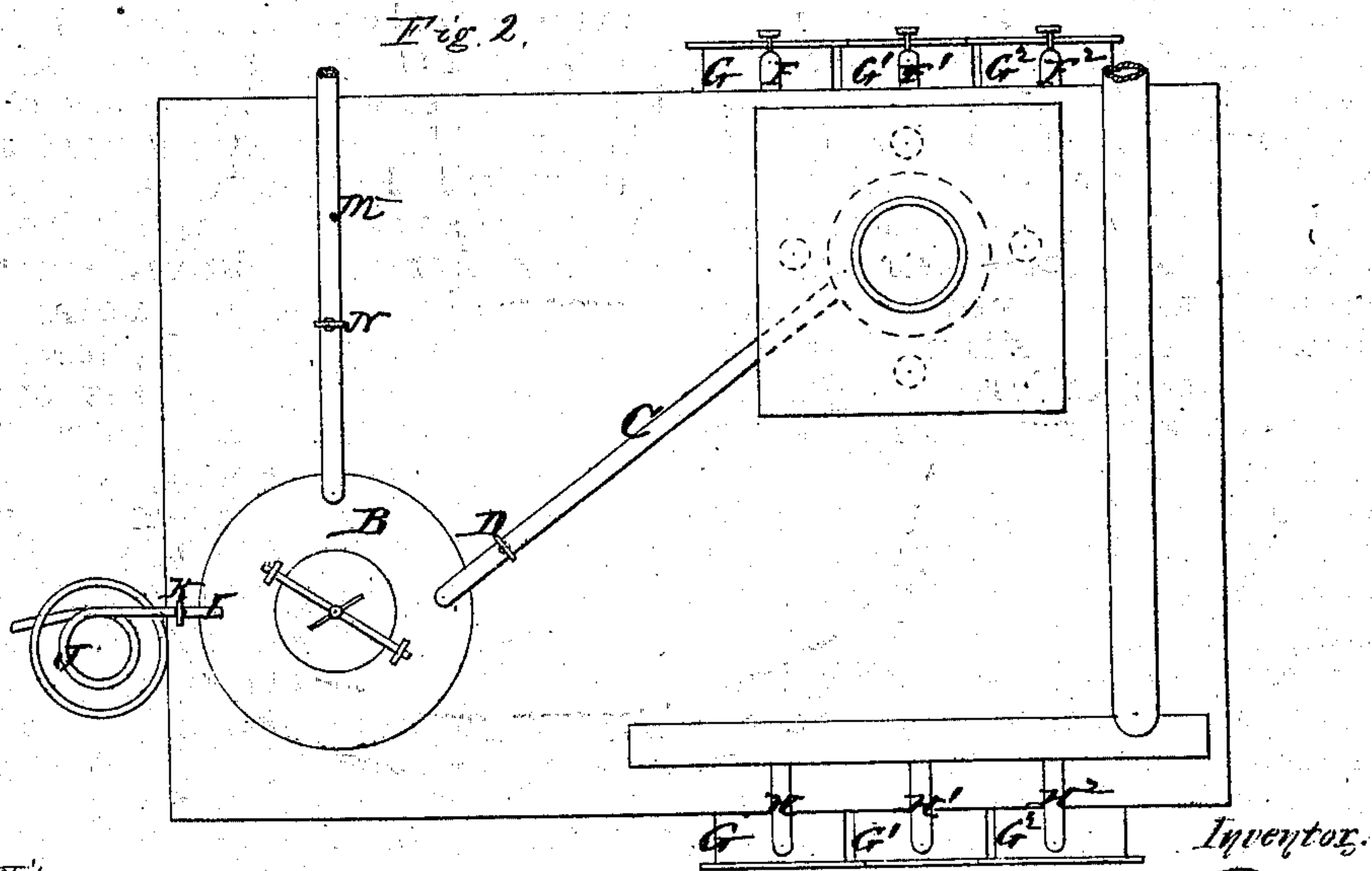
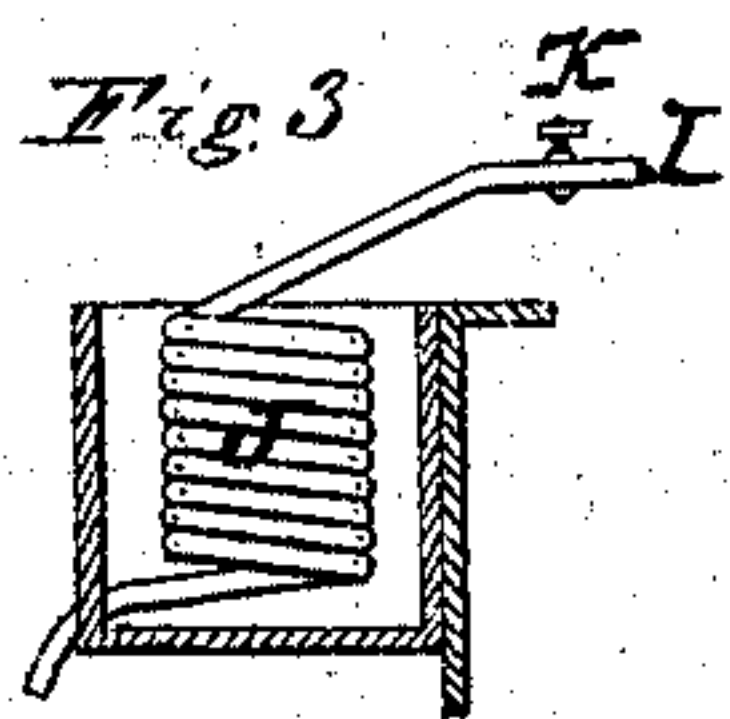
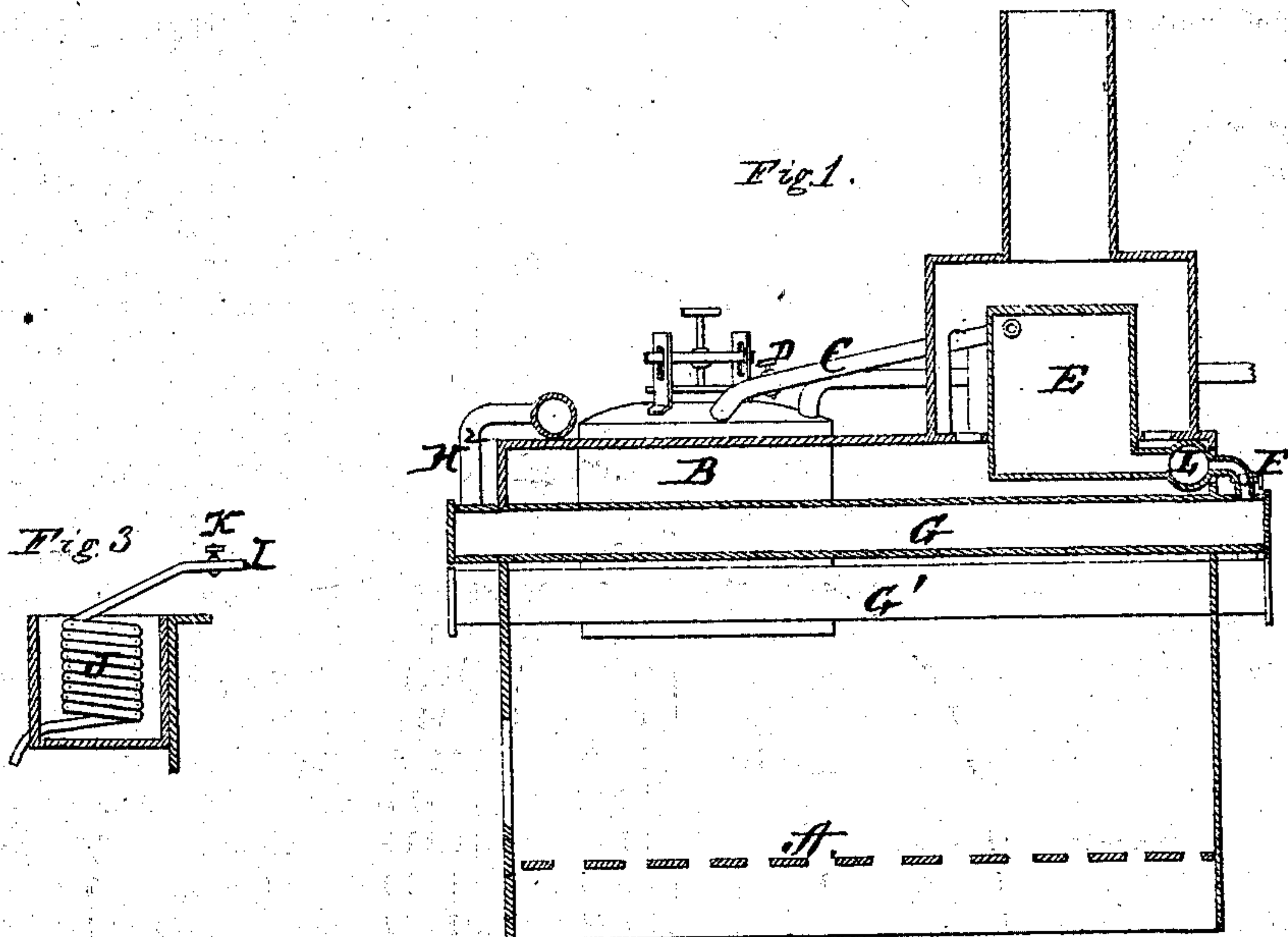


A. C. Rand, Manf. Gas.

No 100,668.

Patented Mar. 8. 1870.



Witnesses.

Harry King
Chas. L. Clevy

Inventor.

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per
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UNITED STATES PATENT OFFICE.

ALONZO C. RAND, OF NEW YORK, N. Y., ASSIGNOR TO WM. J. NICHOLS,
ALDEN D. RAND, AND RICHARD H. BROWN, OF SAME PLACE.

IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 100,668, dated March 8, 1870.

To all whom it may concern:

Be it known that I, ALONZO C. RAND, of New York, in the county of New York and in the State of New York, have invented certain new and useful Improvements in the Manufacture of Illuminating-Gas; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the employment of a vaporizing-vessel in connection with a superheater or superheaters and the ordinary clay or iron retorts, for the purpose of making an illuminating-gas of a uniform quality.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a vertical cross-section, and Fig. 2 is a plan view, of my machine. Fig. 3 is a view of a condensing-coil, the use of which will be hereinafter set forth.

From experience it is found that it is very essential that the vapor arising from the liquid hydrocarbons should be heated up to a point where thorough decomposition takes place, and not to a greater or lesser temperature. An excess of heat will produce destructive decomposition, and not sufficient will so imperfectly decompose the vapor as to produce condensation. Now, as the boiling-point of most of the lighter specific gravities of hydrocarbon liquids ranges from 100° to 200°, and the heavier or last products of the distillation of the ordinary crude petroleum approximates 400° Fahrenheit, and the proper temperature necessary for the perfect decomposition of the vapor is about 1000° Fahrenheit, it most certainly follows that if the vapors that have been created at the low boiling-points mentioned are permitted to come into immediate contact with retorts heated to 1000° Fahrenheit, a diminution of temperature in the retorts will be the result, and a large portion of the vapor pass through the retorts and condense. To prevent this the vapors are carried into a superheater that is heated by the

waste heat of the furnace under the retorts. Now, as the retorts are only heated to a cherry-red heat, and the superheaters are raised above and in the rear of them, it follows that the temperature of the superheaters will always bear a relatively lesser amount of heat than the retorts themselves, and as the temperature of the vapor in passing into and through the superheaters before it enters the retorts is largely increased, the retorts are not cooled off, but we are enabled to keep up the necessary cherry-red heat.

In the annexed drawings, A represents an ordinary furnace under the still or vaporizer B. C is a vapor-pipe, provided with a stop-cock, D, and communicating with the superheater E, and has an upward inclination to the superheater, so that any condensation that occurs before reaching the superheater may return to the vaporizer. This superheater is connected with an additional horizontal superheater, L, in the brick masonry in the rear of and below the superheater E, by a pipe entering the superheater near its bottom. The horizontal superheater L is connected with the backs of the retorts G G¹ G² by the pipes and stop-cocks F F¹ F². The gas is now thoroughly decomposed by passing through the retorts, and makes its exit into the stand-pipes H H¹ H², thence into and through an ordinary condenser or cooler, and from thence into the gas-holder. I is an additional vapor-pipe leading from the vaporizer B into an ordinary condensing-coil, J, and is provided with a stop-cock, K. The object of this is to test at any time the rapidity of the production of vapor. This is accomplished by shutting of the stop-cock D on the pipe C leading from the vaporizer B to the superheater, and opening the stop-cock K, and measuring the condensed vapor for a specified time. The hydrocarbon liquid is supplied to the vaporizer B through the pipe M provided with a stop-cock, N.

This apparatus or combination furnishes a very compact, reliable, and perfect hydrocarbon-gas generator, unlike the older process of permitting the liquid hydrocarbons to drop upon the hot surfaces of the retorts, where either destructive or imperfect decomposition is always taking place, by reason of the coke

or dry carbon forming upon the hot retorts, and preventing the liquid from coming into contact with the hot surface of the retorts, thus impartially decomposing the liquid and condensing the vapors into tar. By this process no dry carbon is formed, neither is there any condensation of the vapor possible.

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

1. The combination of the vaporizer B and retort or retorts G¹, and the superheater E, incased in masonry, with suitable apertures between the superheater and casing, which

communicate with the furnace, whereby the waste heat from the furnace is utilized, all constructed and arranged substantially as set forth.

2. The test-pipe I, arranged and operated in combination with the above, substantially as and for the purposes described.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of February, 1870.

A. C. RAND.

Witnesses:

J. M. MASON,

W. J. NICHOLS.