2 Sheets—Sheet 1.

E. J. JERZMANOWSKI.

Apparatus for the Manufacture of Illuminating Gas.

No. 212,943. Patented Mar. 4, 1879.

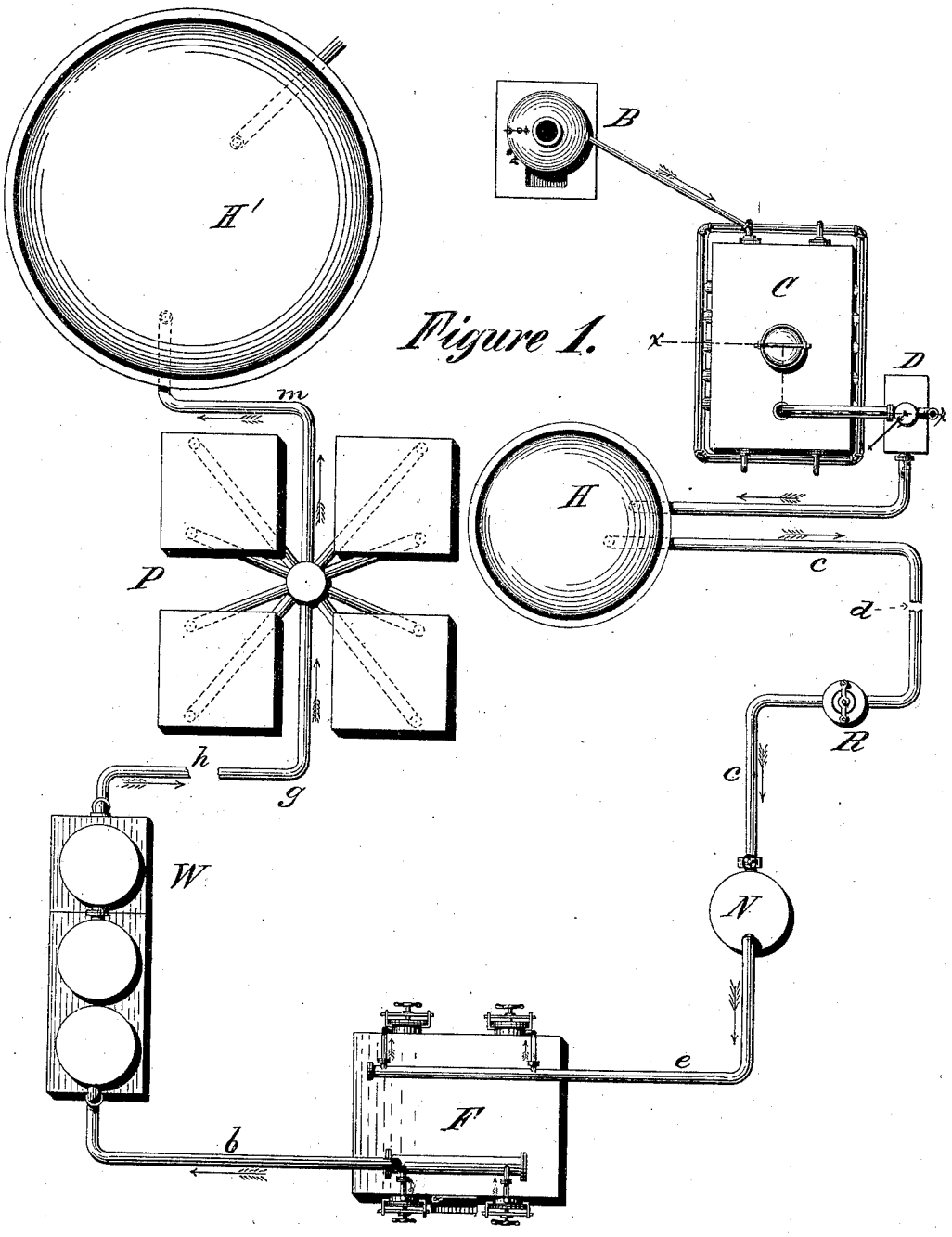

Figure 1.

Witnesses:

Geo. H. Miatt
Geo. T. Evans

Inventor:

Erazm J. Jerzmanowski
By his attorney
E N Dickerson Jr

2 Sheets—Sheet 2.

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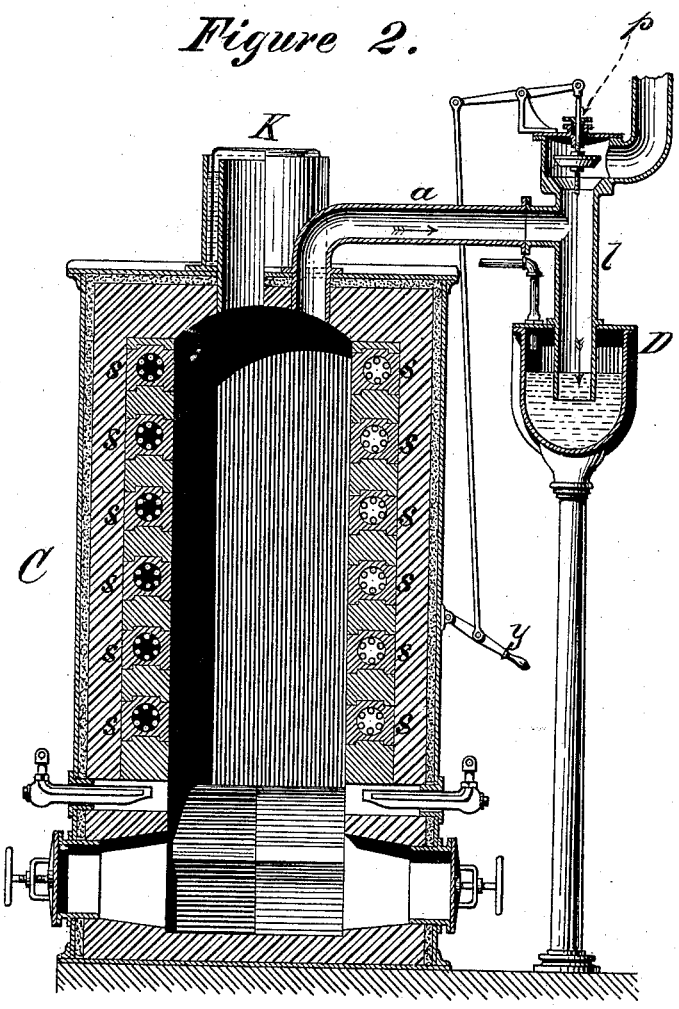
Figure 2.



Witnesses:
Geo. W. Miatt
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UNITED STATES PATENT OFFICE.

ERAZM J. JERZMANOWSKI, OF NEW YORK, N. Y., ASSIGNOR TO EDWARD STERN, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. **212,943**, dated March 4, 1879; application filed January 11, 1879.

To all whom it may concern:

Be it known that I, ERAZM J. JERZMANOWSKI, of the city of New York, State of New York, have invented a new and useful Apparatus for the Manufacture of Illuminating-Gas, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

In the drawings, Figure 1 represents a plan, showing the entire apparatus in position. Fig. 2 represents a cross-section through the decomposing-cupola, taken on the line *x x*, Fig. 1, showing the left of the cupola in section, the right partly in elevation.

B represents a steam-boiler, which may be of any construction. C represents my decomposing-cupola, which is shown more clearly in Fig. 2. This decomposing-cupola is provided with steam-superheating pipes in its walls, and also with the water-tight cap K, consisting of a cup inverted in water, by means of which fuel can be supplied to the decomposing-chamber. The use of this contrivance makes an absolutely gas-tight joint, and it also serves the purpose of a safety-valve in case of any excessive pressure in the decomposing-cupola.

This cupola is filled with peat, charcoal, coke, or anthracite coal, which is brought to a high heat by means of a current of air, which may be heated or cool, and which enters the decomposing-cupola at its bottom and escapes through the valve *p*, connected with the exit-pipe *a*. During this operation no gas is formed. Subsequently the air is shut off, and steam, preferably superheated, allowed to enter the cupola. At first this steam, partly decomposed and charged with impurities, is allowed to escape through the valve *k*, which is known as the "purging-valve." Subsequently said valve is closed, when the steam which continues to flow through the decomposing-cupola is decomposed by highly-heated incandescent coal, and passes through the pipes *a* and *b*, and into a condenser or washer, D. By passing through the water in this condenser or washer the steam remaining undecomposed is condensed, and the gas is cooled. The gas passes through the decomposing-cupola and hydraulic main, as indicated by arrows.

The water-gas, which consists generally of hydrogen and carbonic oxide and a trace of carbonic acid, with some sulphur impurities, passes into the regulating intermediate holder, H. This intermediate holder, H, I consider the most important part of my invention, as will be presently explained. From this intermediate holder the gas passes through the pipe *c* to the regulating-valve R. The object of this valve is to allow the gas to flow regularly through the pipe *c*, and by means of it a constant flow of the water-gas through the pipe *c* is maintained. This regulator-valve may be of any of the ordinary forms, provided that it automatically regulates the pressure of the gas which flows through it, so that gas at the same pressure is constantly flowing through the fixing-retorts. Next the gas passes through the carbureter N, containing hydrocarbon, through which it passes; or, if preferred, it may be caused to pass over pans containing some liquid hydrocarbon, which may be somewhat heated. The carbureter is adapted to give out a constant quantity of vapor; and in order that the gas passing through it be of a constant candle-power or richness, and contain a given quantity of the hydrocarbon vapor for a given quantity of gas, it is absolutely necessary that the same volume of gas pass through the carbureter in each successive period of time. This result could never be obtained without the use of the intermediate holder, H, for the reason that the decomposing-cupola C is at times producing much more water-gas than at others, and at times is not producing water-gas at all, so that it is imperatively necessary to insert an intermediate holder, which can receive the varying amounts of water-gas from the cupola and retain them until they pass into the carbureter. From the carbureter the water-gas, carrying with it a constant amount of hydrocarbon vapor in the form of a mechanical mixture, passes through the highly-heated bench of retorts F. These retorts it is advisable to keep as hot as possible, provided they are not so hot as to burn the gas and produce lamp-black. In passing through these highly-heated retorts, the water-gas, carrying in suspension the hydrocarbon vapor, undergoes a chemical transformation, and leaves the retort a fixed or permanent gas. Thence, by

means of the pipe *b*, it passes through the condenser or scrubber W, which may be of any of the ordinary forms of scrubbers; but I prefer to use a vessel containing coke and an injected spray of water. Thence, through the pipe *g*, the gas passes through the purifier P, which contains hydrate of lime or other suitable compound, by means of which the carbonic acid and sulphur impurities are removed and the gas is purified. Thence it passes by the pipe *m* to the distributing-holder H′. The gas contained in the holder H′ is now ready for the consumer. The purifier P might be introduced in the pipe *c* at the point *d* without altering my apparatus. An exhauster might also be advantageously employed at the point *h* in the pipe *g*.

The passage of the superheated steam through the incandescent carbon in the decomposing-cupola cools or deadens the fire, and it becomes necessary to pass a current of atmospheric air through it. This is done, as has been previously described, by opening the air-passages into the cupola, and opening the exit-valve *p*, controlled by the handle *y*. During this operation it is plain that no gas is formed and delivered. And it is to avoid this period of non-production, and also the variation in the production of the water-gas, that I interpose the governing-holder H; also for the purpose of maintaining a constant production of illuminating-gas during the operation of the apparatus.

The intermediate governing-holder contains constantly a sufficient supply of water-gas, and a sufficient pressure is maintained to keep up an uninterrupted flow through the carbureter and converting apparatus. By this means I keep the conditions constant in the parts of my apparatus between the governing-holder and the distributing-holder, which is a matter of the utmost importance. The retorts, for instance, having an even and continuous flow of the gas through them, are maintained at the same temperature, which has the double advantage of preventing the destruction of the converting-retorts by overheating, and also of applying to the gas which passes through them always the same amount of heat, therefore maintaining constant the quality of gas which is produced by this apparatus.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the steam-boiler B, decomposing-cupola C, washer D, governing-holder H, automatic pressure-regulating valve R, carbureter N, and fixing-retort F, substantially as described.

2. In an apparatus for manufacturing water-gas, a governing-holder and an automatic pressure-regulating valve, placed intermediately between the gas-generator and the carbureter, substantially as and for the purposes described.

ERAZM J. JERZMANOWSKI.

Witnesses:

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