No. 648,658. Patented May 1, 1900.

J. A. DUBBS.

MANUFACTURE OF GAS.

(Application filed Nov. 2, 1899.)

(No Model.)

FIG. 2.

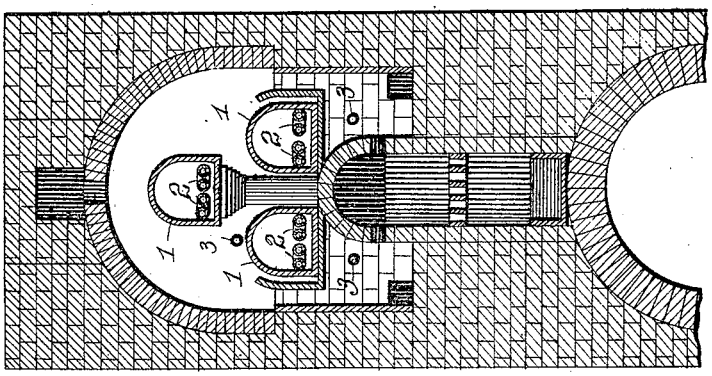
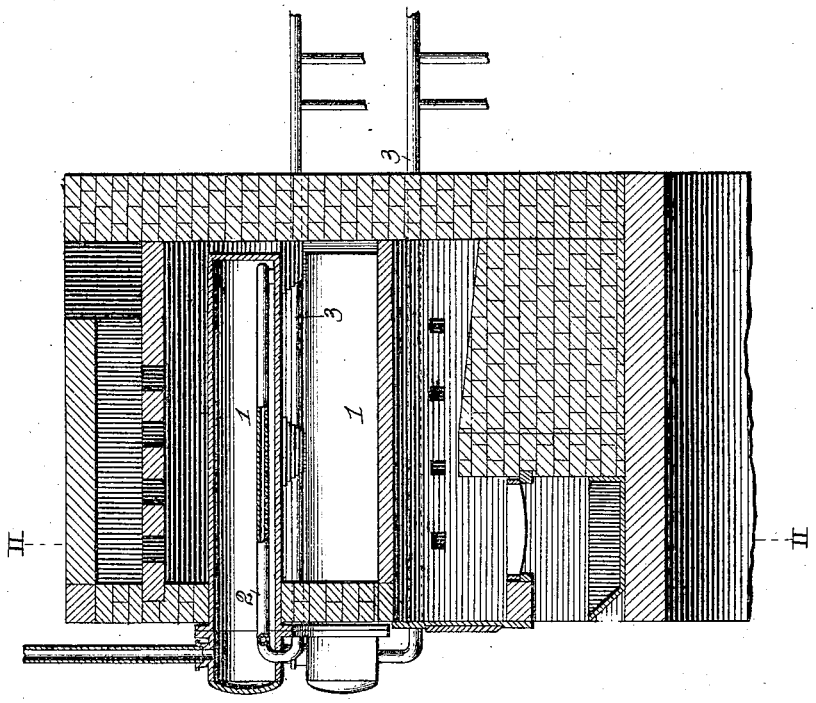


FIG. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JESSE A. DUBBS, OF PITTSBURG, PENNSYLVANIA.

MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 648,658, dated May 1, 1900.

Application filed November 2, 1899. Serial No. 735,560. (No model.)

To all whom it may concern:

Be it known that I, JESSE A. DUBBS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in the Manufacture of Gas, of which improvements the following is a specification.

The invention described herein relates to certain improvements in the manufacture of gas, the improvements being especially applicable for the production of illuminating-gas.

One of the methods heretofore generally practiced in the production of gas consists in charging the coal into retorts, which are then closed except for the outflow of gases and subjected to a very high temperature for the distillation of the volatile constituents of the coal. By this method portions of the coal—*i. e.*, the coke and tar—are not utilized in the production of gas. Another method consists in charging coal or coke into a suitable chamber, forcing air through the charge to bring it to a state of incandescence, and then forcing steam or steam and oil through the incandescent mass, thereby producing the gas desired. After the charge is cooled by the passage of steam it is again blasted up with air, another charge of coal added, and steam or steam and oil forced through the charge. The gas produced in the practice of this method during the blasting up is exceedingly thin and is seldom saved, so that there is a considerable loss involved in the practice of this method.

The object of the present invention is to provide for the utilization of all of the constituents of the coal in the manufacture of gas and the production of a uniform quality of gas.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional elevation of retorts and furnace adapted to the practice of my invention; and Fig. 2 is a transverse section, the plane of section being indicated by the line II II, Fig. 1.

In the practice of my invention the coal is charged into retorts 1, which are preferably constructed and arranged as is customary in plants for illuminating-gas. A series of two, three, or more pipes 2 are arranged in the retorts, adjacent to the bottoms thereof. The portions of these pipes within the retorts are perforated, preferably on the under side, so as to insure a diffusion of the fluids entering through the pipes and a uniform distribution of such fluids through the charge. These retorts are heated externally to such a heat—*i. e.*, a low red heat—as will effect and maintain a low incandescence—*i. e.*, a low red heat—of the coal charged into the retorts. After the coal in contact with the bottom of the retort has become incandescent steam is forced in through the pipes 2, sufficient air being mixed with the steam to maintain by the combustion of the coal a temperature of about 700° or 800° Fahrenheit in the retort. Such a temperature has been found preferable, although a higher temperature—*i. e.*, about 1,000° Fahrenheit, more or less—may be employed when a more rapid production of gas is desired. The steam and air should be thoroughly mingled and then passed through a superheater, as shown at 3, to heat the mixture to a temperature of about 700° Fahrenheit before being forced through the fuel. It is thought that by this high heating of the mingled steam and air an incipient disassociation of the elements of the steam is effected and that this disassociation is completed by the passage of the steam and air through the imperfectly-burning fuel, and, further, it is believed that by reason of this incipient disassociation carbonic oxid is immediately formed on contact of the steam and the products of combustion and that by reason of the chemical reaction which results in the formation of the carbonic oxid a reduction of temperature of the gases at and beyond such point is effected, thereby preventing combustion from extending materially beyond the zone at which the chemical reaction—*i. e.*, the formation of carbonic oxid—occurs. It will be understood that as the fuel is consumed and the carbon combined with the oxygen of the steam and air combustion will also advance to a new zone. This advance is gradual, not step by step; but the zone of combustion is maintained at an approximately-uniform depth.

It will be readily understood that as the

volatile constituents are driven off the gas will become poor in illuminating and formed other qualities. In order to compensate for this reduction in quality, oil may be forced into the air and steam prior to their passage through the superheater, and, being vaporized, pass with the air and steam through the burning fuel, thereby enriching the resulting gas.

I claim herein as my invention—

As an improvement in the art of manufacturing gas, the method herein described, which consists in charging fuel into a closed retort, raising said fuel to and maintaining it at an incandescent temperature by heat applied externally to the retort, and then forcing mingled air and steam through the fuel, the air and steam heated to or above 700° Fahrenheit while mixed together, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JESSE A. DUBBS.

Witnesses:
DARWIN S. WOLCOTT,
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