M. H. STRONG.

Process and Apparatus for the Manufacture of Gas

No. 197,062. Patented Nov. 13, 1877.

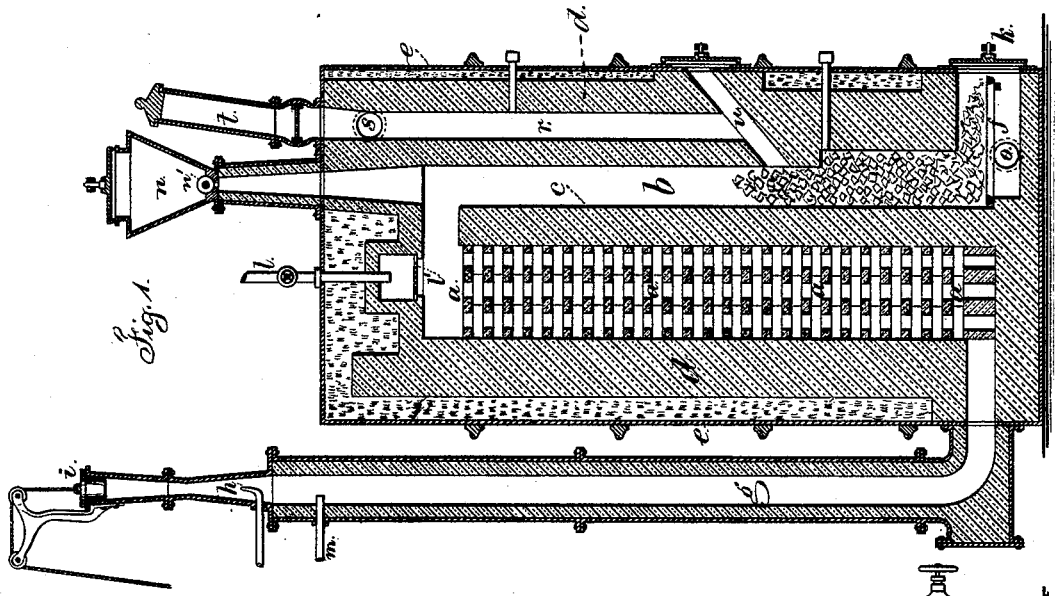

Fig. 1.

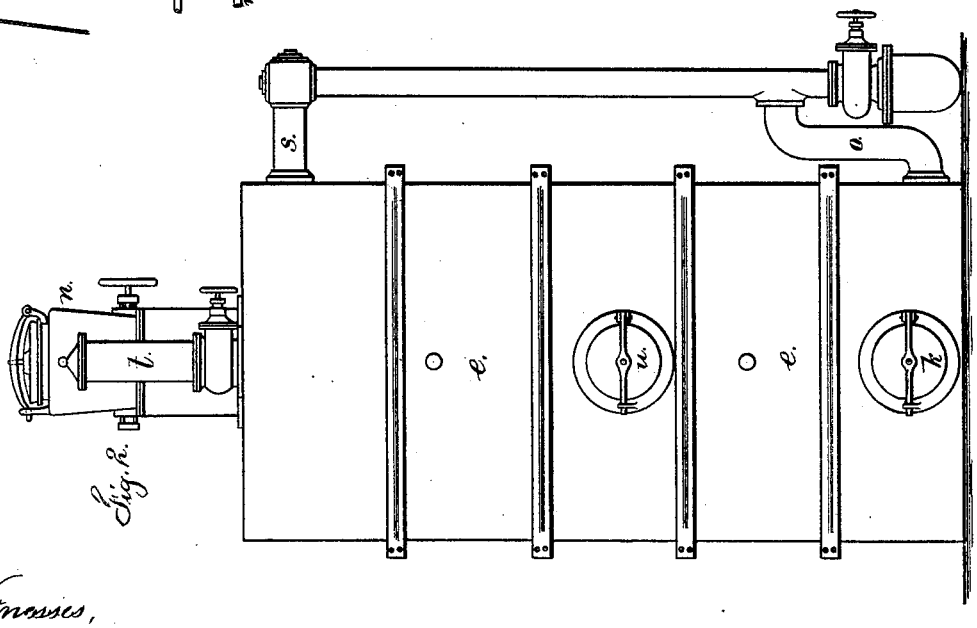

Fig. 2.

Witnesses,

Chas. H. Smith

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UNITED STATES PATENT OFFICE.

MYRON H. STRONG, OF BROOKLYN, NEW YORK, ASSIGNOR TO LEMUEL W. SERRELL, TRUSTEE FOR SAID STRONG, SIDNEY CORNELL, HENRY M. PIERSON, AND WALTER E. LAWTON.

IMPROVEMENT IN PROCESSES AND APPARATUS FOR THE MANUFACTURE OF GAS.

Specification forming part of Letters Patent No. **197,062**, dated November 13, 1877; application filed January 24, 1877.

To all whom it may concern:

Be it known that I, MYRON H. STRONG, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in the Manufacture of Gas, of which the following is a specification:

The principal features of my invention relate to a compound retort having two vertical chambers. The first contains fire-brick or similar material; the second, fuel upon a fire-bed. The chambers are heated by the combustion of the fuel, the heated products of combustion passing off by a pipe or chimney, in which is a jet-exhauster to promote the draft. When the chambers are sufficiently heated the escape-chimney is closed and steam allowed to pass into the first chamber and ascend through the heated brick and become highly superheated. At the upper part of the second chamber carbon is supplied either in the form of a liquid hydrocarbon or solid carbon in a pulverulent condition, in detail or gradually in small quantities. This descends in the second retort and is exposed to a high temperature, so as to become decomposed in the presence of the superheated steam, and the gases pass through a bed of incandescent carbon. The result is that the oxygen of the steam and the carbon combine, liberating the hydrogen, and the carbonic acid or carbonic oxide and hydrogen, more or less carbureted, pass through the fire to the gas-holder. Where the condition of the gases passing through the fire is such that additional carbon is taken up, the illuminating power of the resulting gas will be increased, and if bituminous carbon is employed the gases will be of higher illuminating power. Where a third chamber is employed in the compound retort to contain carbon through which the gases pass, the said gases may be carbureted, so as to increase their illuminating power.

Whenever the heat of the compound retort becomes too low to perform properly its duties, the gas-making operation is suspended and the carbon on the fire-bed is consumed by the admission of air to the extent necessary to thoroughly heat up the retort, after which the gas-making operations are resumed.

In the drawing, Figure 1 is a vertical section of the retort complete, and Fig. 2 is an elevation of the case and tubes.

The compound retort is made with the two chambers *a b*, separated by the partition *c*, and the inclosure or walls *d* of such retorts may be in a square or cylindrical form, preferably the former, and the whole is inclosed in a metal casing, *e*, with an intervening packing of ashes, fire-clay, or other non-conducting material.

The walls of the chambers are of fire-brick, and the first chamber, *a*, is filled with fire-bricks or similar material, and at the bottom of the second chamber, *b*, is the fire-bed *f*. There is a tube or chimney, *g*, connected with the lower part of the chamber *a*, and in this is the jet-exhauster *h*, that promotes a draft through the retort when the valve *i* is open.

The fuel on the fire-bed *f* is consumed when the exhauster *h* is in operation, air being admitted by the door *k*, and it is preferable to admit a second supply of air to the chambers in the upper part, where the chambers *a* and *b* unite.

I have shown a tube, *l*, passing down to a perforated fire-till, *l'*, as the means for furnishing this second supply of air. There should be a valve or cock to regulate the quantity of air passing in at this pipe *l*. The object of admitting air at this point is to consume any carbonic oxide present, and thus obtain the maximum heating power from the fuel. The result of this construction of the retort, and the operations thus far described, are that the chambers can be highly heated at intervals whenever required.

In order to manufacture combustible gas, I close the valve *i*, stop the exhauster *h*, and admit steam in the proper quantity by the pipe *m*, and the same descends in the pipe *g* and passes up through the chamber *a*, and becomes highly heated. I introduce carbon at or near the junction of the chambers *a* and *b*. The same may be in the form of a liquid hydrocarbon from a pipe, or preferably carbon in the form of finely-ground coal is introduced through the hopper *n* in small regulated quantities by a feeding-screw, *n'*, or otherwise, so that the carbon falls through the highly-heated steam

in detail or a shower, and in so doing it is caused to combine with the steam, there being a decomposition and recomposition, as aforesaid, and the coke or refuse falls upon the incandescent fuel upon the fire-bed *f* and within the chamber *b*. The resulting gases pass through the incandescent fuel, and receive an additional quantity of carbon, as aforesaid, and are taken off by the pipe *o* to the hydraulic main, or, if it is desired to further carburet the gas to make illuminating-gas, it is passed up through bituminous coal supplied into the third chamber *r* of the compound retort, and from there the gas is led to the hydraulic main by the pipe *s*.

I provide a hopper, *t*, for the supply of coal to the chamber *r*, and a stoke-hole or stirring-hole, *u*, is provided to pass the fuel down from the chamber *r* into the chamber *b*.

The proper valves or covers are provided to the respective openings, and sight-holes also should be introduced, through which to inspect the condition of the interior of the retort.

I am aware that carbon has been supplied gradually into a retort into which steam is admitted, and that in some instances hollow walls have been used to heat the steam in its passage into the retort containing carbon.

I claim as my invention—

1. The process herein specified of making gas, consisting in heating steam to a high temperature, and bringing the steam into contact with carbonaceous material supplied gradually or in detail into a retort, and passing the two together down through the heated retort, and then completing the process and fixing the resulting gases by passing such gases through a bed of incandescent carbon, substantially as specified.

2. The compound retort with two vertical chambers, *a b*, separated by a partition-wall, *c*, and the whole inclosed in one casing, the retort *a* having a filling of fire-brick or similar material, in combination with means for supplying steam at the lower end of the chamber *a*, and for supplying carbon gradually or in detail at the upper end of the chamber *b*, and a fire-bed at the bottom of such chamber *b*, substantially as specified.

3. The retort *b*, having a fire-bed, *f*, at the bottom, the superheating-retort *a*, and the carbureting-chamber *r*, in combination with the steam-supply pipe *m*, the connection from the retort *a* to the retort *b*, the gradual fuel-supply apparatus at the top of the chamber *b*, the inclosing casing, and the gas-delivery tube connected to the third chamber and the fire-bed, substantially as set forth.

4. The compound retort made with two vertical chambers, in combination with the fire-bed at the bottom of the second chamber, the air-supply pipe at the junction of the two chambers, and the chimney and exhauster connected to the bottom of the first chamber.

Signed by me this 13th day of January, A. D. 1877.

MYRON H. STRONG.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.