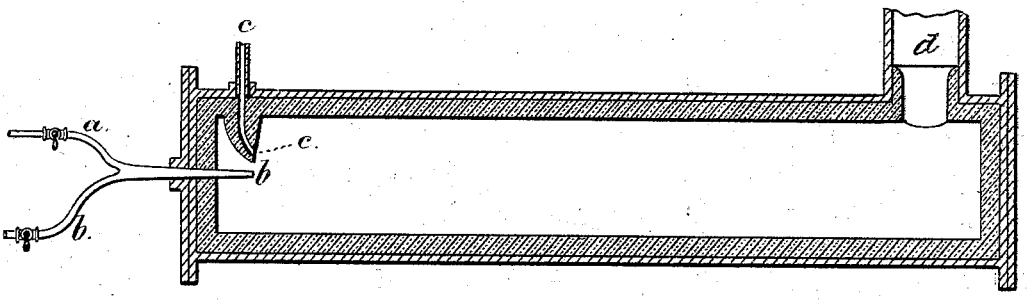
W. H. SPENCER.

Manufacture of Illuminating Gas.

No. 166,036. Patented July 27, 1875.



Witnesses

Chas. F. Smith

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UNITED STATES PATENT OFFICE.

WILLIAM H. SPENCER, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. **166,036**, dated July 27, 1875; application filed December 28, 1874.

To all whom it may concern:

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

In the process of gas-making known as the Spencer process, described in and covered by Letters Patent Nos. 123,950, 128,918, 131,035, 141,090, the increase in volume which accompanies the reduction of light-giving power is effected by a double decomposition—first, of the rich gas into its elements, and the subsequent decomposition of watery vapor by the incandescent carbon thus liberated.

The invention about to be described may be considered as an improvement on the first-mentioned process, in that the two have a common object—viz., the obtaining of a commercial illuminating-gas from petroleum by like means. However, by the following process the operation may be conducted with a great economy of space, far more rapidly, employing a minimum of labor, and largely reducing the apparatus both in quantity, complexity, and cost, rendering it peculiarly applicable to small towns whose consumption of gas will not warrant a large outlay, while it is no less important in the case of larger works, whose space is circumscribed and valuable.

The decompositions referred to in the previous patents are here effected by means of the oxyhydrogen flame, the gases being so adjusted that the sole product or residuum is water. The hydrogen used is obtained by purifying the commercial product of the operation, while the oxygen is procured by any of the processes now in use. The retort used is preferably an iron tube, lined with lime to a suitable thickness, said lime being molded into place by pressure, or turned from coherent blocks, as recommended by Deville in his description of an oxyhydrogen-furnace for smelting platinum. The jet used for the combustion may be the same used in the various modifications of Haris blow-pipes, and is fixed at the center of an iron plate or cover, which is clamped firmly to the end of the retort, and luted air-tight, after the manner of the lids of coal-gas retorts. Thus located at the closed end of a tube or retort, the flame, from its nature, requires no admission of atmospheric air to support combustion, and the water which alone results displaces the air originally contained in the tube, itself being heated to a degree which approximates the total temperature of the oxyhydrogen flame. Into this atmosphere of intensely-heated vapor I introduce a portion of hydrocarbon in any form, as gas, vapor, or liquid, in which its flow may be easily regulated or controlled. The resulting decompositions are essentially the same as those effected in the retorts used in the Spencer process, but, owing to the intense heat obtained, take place with a rapidity and thoroughness entirely disproportionate to the size of the retort used, while by the use of the iron casing, protected by the internal coating of lime, whose non-conduction of heat is a matter of record, leakage is impossible and an exhauster unnecessary, provided the oxygen, hydrogen, and hydrocarbon are introduced at a pressure sufficient to overcome the resistance of the holder and intervening purifiers and meter.

According to the well-defined figures of analysis the combustion of (approximately) one thousand cubic feet of oxygen with two thousand cubic feet of hydrogen is equivalent to the production of one hundred pounds of water, which would require the carbon of about six gallons of oil for its decomposition. Returning the two thousand cubic feet of hydrogen originally employed, plus one thousand feet due to the hydrocarbon and one thousand feet of carbonic acid, while the excess of heat over and above that necessary to effect the above decomposition is left applicable to the decomposition of an additional quantity of hydrocarbon and steam introduced by the same jet as the original hydrocarbon, additional heat at the same time being generated by the combination of the oxygen and carbon, the total heat of the flame, therefore, being used in raising the material from atmospheric temperature to a point at which dissociation takes place.

The process, hereinbefore described, of decomposing liquid or gaseous hydrocarbon and aqueous vapor by an oxyhydrogen flame results in a double decomposition, wherein the

aqueous vapor and the water produced by the combustion of the oxygen and hydrogen are decomposed by the carbon in the presence of the heat, so as to form carbonic acid and a small proportion of carbonic oxide, and a large volume of hydrogen is liberated and may be used as a diluent of olefiant gas, and the required proportion of hydrogen retained for subsequent use with oxygen, for the purposes before named.

In the drawing the retort is represented by a vertical section. *a b* are the pipes for admitting oxygen and hydrogen; *b*, the nozzle at which the oxyhydrogen flame burns; *c*, the pipe for admitting liquid hydrocarbon, and *d* the escape-pipe for the hydrogen-gas.

I claim as my invention—

The method herein specified of decomposing hydrocarbons and aqueous vapors by the direct application of an oxyhydrogen flame within a retort, substantially as set forth.

Signed by me this 22d day of December, A. D. 1874.

WM. H. SPENCER.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.