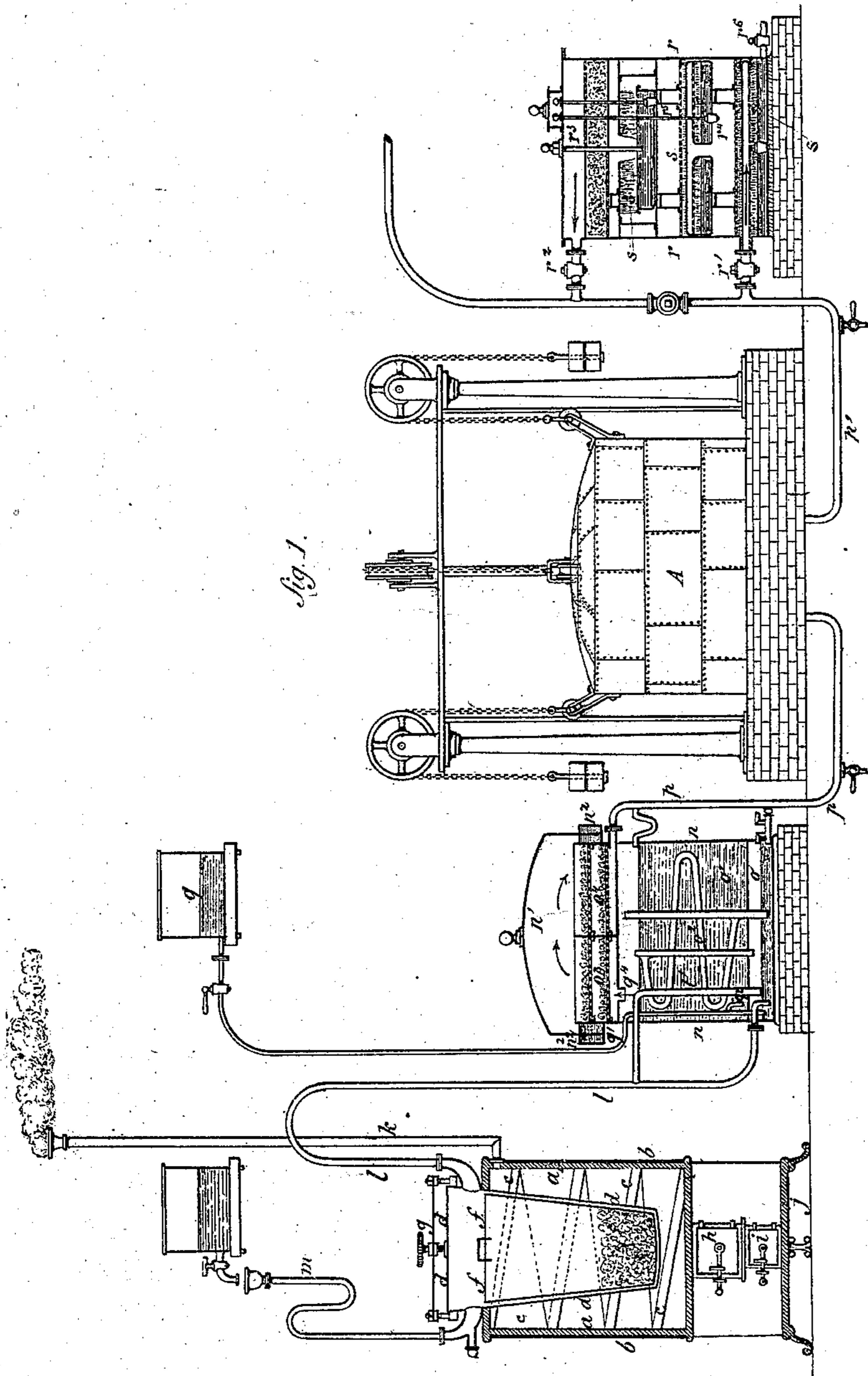


E. J. L. CAILLOT.

Apparatus for the Manufacture of Hydrocarbon Gas.

No. 133,829.

Patented Dec. 10, 1872.



Witnesses.

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# UNITED STATES PATENT OFFICE.

ETIENNE JULES LAFOND CAILLOT, OF BARCELONA, SPAIN.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF HYDROCARBON GAS.

Specification forming part of Letters Patent No. 133,829, dated December 10, 1872.

*To all whom it may concern:*

Be it known that I, ETIENNE JULES LAFOND CAILLOT, of Barcelona, Spain, chemist, have invented new and useful Improvements in the Manufacture of Lighting and Heating Gas and in Apparatus and Burners connected therewith; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention has for its object the manufacture of gas for lighting and heating purposes by means of simple and easily managed apparatus, which allows the gas to be manufactured in private dwellings, without danger, from all solid or liquid combustible matters, the gas being pure, economical, and deprived of its carbonic acid. The same apparatus enables, for the purposes of lighting and heating, the consumption of vegetable and mineral oils, petroleum, shale, and other matters of a similar nature in a state of gas without the requirement of a chimney or mechanism for giving ventilation. The combustible matters employed are peat, animal matters, black and brown coal, ligneous and vegetable matters, small wood, sawdust, spent tan, resins, the refuse of tallow, petroleum, and shale-oil; these matters being placed in the still with about thirty per cent. of vegetable charcoal obtained from the distillation of the oil. My system also includes the purification of the gas by certain mineral and vegetable matters, which separate the empyreumatical oil, sulphurets, oxide of carbon, and ammonia, thereby preventing noxious effluvia from escaping from the burners. To use or consume oils and hydrocarbons of different densities and impurities without submitting them to operations which increase the cost, the oils and hydrocarbons are consumed in a state of gas combined with super-oxygenated air, and no chimney is required. The use of this purified gas preserves the paintings and gildings in palaces, saloons, theaters, coffee-houses, and other places, which at present are rapidly deteriorated by the use of ordinary gas.

My system requires no ranges of pipes, thereby giving immense advantages to all localities, factories, houses, stations, tunnels, towns, villages, hamlets, castles, ships, and other places not supplied with ordinary gas, although the gas-

works and ranges of pipes can be employed in my system; but there is no necessity to make them in localities where they do not exist.

The figures on the accompanying drawing, in connection with the following particular description, will enable the construction and working of my improved apparatus for the manufacture and supply of gas to be used for lighting and heating purposes to be readily understood.

Figure 1 is a vertical section of the apparatus complete, comprising the gas-producing furnace or still, the washer, the purifier, the gasometer, and the carbureter.

The furnace consists of a cylinder, *a*, formed of refractory earth or fire-clay, inclosed in a wrought or cast iron casing, and has in its interior helical carneaux ribs or plates *c c*, carrying the vertical still or alembic *d d*, made of cast-iron or ceramic matters; and in this still there is a sheet-iron vessel or cistern, *f*, for containing the combustibles required for making the gas, and the still is provided with a cover and the necessary pipes and fittings. Thus combined the helical plates form a spiral flue around the still, through which the heat and products of combustion will pass from the fire to the chimney, thus distributing the heat, but giving the most intense at the bottom. The grate *h* and its ash-pit *i* are placed on masonry *j*, adapted for the purpose, and the hot gases from this grate either escape through the chimney *k* or are used in any required manner; and from the delivery-passage of the still the gas passes through the pipe *l* to the washer and purifier. The combustible liquids used for producing the gas pass through the siphon-pipe *m* into the still *d*, and by this arrangement of furnace it is easy to produce gas rapidly from solid or liquid combustible matters in a continuous manner by properly supplying the still *d*. The washer, which receives the gas by the pipe *l* and by the branch pipes *l' l'*, consists of an external sheet or cast iron casing, *n*, of any desired form, and having at the top a cover, *n*<sup>1</sup>, sealed at the bottom by passing it into water placed in the annular cistern *n*<sup>2</sup>. At the lower part of the washer there is a compartment, *o*, constituting the ordinary vessel, into which the gas from the still enters, and above this compartment there is a washing-compartment, *o*<sup>1</sup>, con-

taining water, in which is placed a spiral pipe,  $o^2$ , which allows the gas to circulate twice before it arrives at the purifier. After leaving the pipe  $o^2$  the gas passes through the orifice  $q^4$  to the beds of a first purifier,  $o^3$ , and through them into the bell-cover  $n^1$ , and then passes downward through the second beds  $o^4$ , and from thence to the gasometer through the pipe  $p$ ; and the water of the washer is conveyed from an upper cistern  $q$  by means of pipes  $q^1$  and  $q^2$ . The beds of the purifiers  $o^3$  and  $o^4$  are composed of matters corresponding with the nature of the combustible employed for producing the gas. Thus, for gas produced from combustible liquids, I employ sawdust or powdered coke; and for the gas produced from sulphurous coal I employ subacetate of lead, steam, carbonate of lime, pulverized fern and broom, large sawdust of deal, or ashes of seaweeds.

The gasometer A that I employ is of the ordinary construction. It receives the gas by the pipe  $p$  and delivers it to the carbureter, which I will now describe: This carbureter is inclosed in a case,  $r$ , of sheet-iron or other metal, the gas entering by the tap  $r^1$  and leaving by the tap  $r^2$  to the pipes or passages, leading to the burners used for lighting or heating. In the interior of the carbureter there are several compartments, containing, alternately, wool and the liquid hydrocarbons used for carbureting, the hydrocarbons being introduced through the pipe  $r^3$  by the taps  $r^4$  and  $r^5$ , worked from the top of the apparatus,

and afterward go out as heavy products through the tap  $r^6$  at the bottom. The gas is carbureted in the several compartments, and passes out through the tap  $r^2$  after having traversed the beds of wool  $s s$ , which absorb the liquid which tries to escape with the gas; and this carbureting apparatus can serve either to enrich the gas for lighting, which comes from the gasometer, or to carburet atmospheric air to make it suitable for lighting and heating.

#### *Claims.*

1. A gas-generating furnace, consisting of the cylinder  $a$ , vertical still  $d d$ , and the inner cistern  $f$ , when the chamber of the said furnace is provided with helical ribs or plates to constitute a spiral flue around the said still, substantially as set forth.

2. The herein-described gas-washer, consisting of an external casing, the compartment  $o$  to receive the gas, from which a spiral pipe,  $o^2$ , conducts the gas after traversing the said spiral pipe, to or near the bottom of the said cylinder, and the beds  $o^3$  and  $o^4$ , through one of which the gas passes up and down through the other after having passed the water below, substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

E. J. LAFOND CAILLOT.

Witnesses:

JOSÉ CROS,

GUSTAVO PUIBUSQUE.