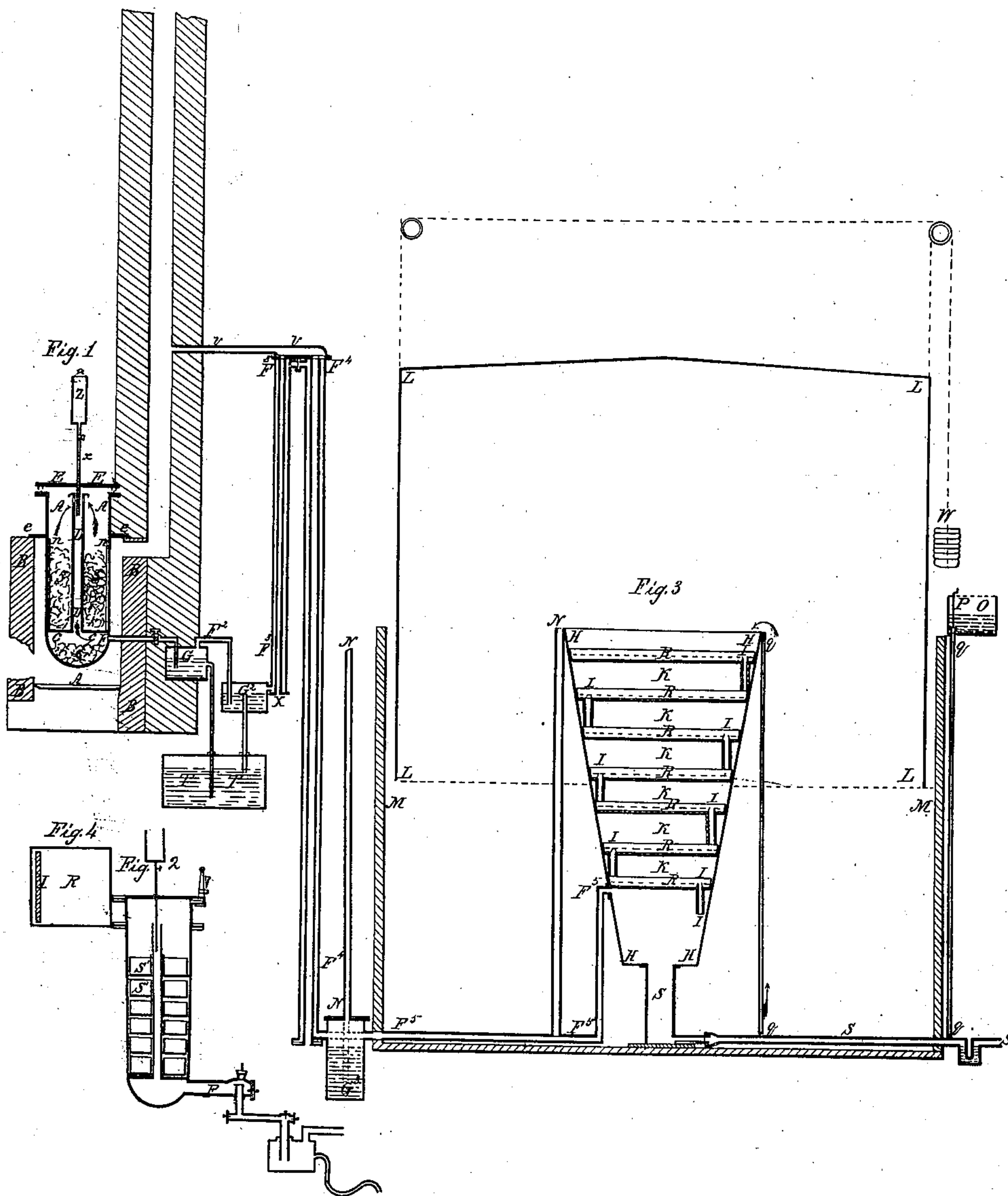


R. Foulis.

Making Coal and Water Gas.

N^o 9,318.

Patented Oct. 12, 1852.



UNITED STATES PATENT OFFICE.

ROBERT FOULIS, OF ST. JOHNS, NEW BRUNSWICK.

ILLUMINATING-GAS APPARATUS.

Specification of Letters Patent No. 9,318, dated October 12, 1852.

To all whom it may concern:

Be it known that I, ROBERT FOULIS, of St. Johns, in the Province of New Brunswick, have invented certain new and useful Improvements in Making Gas, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the usual manner of making, modifying, and using the same.

In the usual mode of manufacturing gas from coal, or other hydrocarbonaceous matter, by destructive distillation in retorts, the escape pipe is placed near the door or cover at the coldest end of the retort, so that a considerable portion of the bituminous vapors pass off without the necessary decomposition, which causes the elements to assume a permanently elastic form, so that the result of refrigeration is the condensation of said vapors into coal tar, &c.

The principal objects which I contemplate in improvements which I wish to secure by Letters Patent, are as follows:

Firstly, my object is to effect, by the use of my invention, a more effectual decomposition of the vapors arising from heated masses of coal, or other hydrocarbonaceous matter, and effect this before any condensation of the vapors can take place. My improvements also embrace a new mode of gas refrigeration, which is effected by a current of air passing up pipes placed in the interior or exterior, or both in and over pipes containing illuminating gas. My invention also places the purifying apparatus in the center of the tank, and under the gas-holder or exterior to the same, and communicating therewith, so that the water of the said tank may surround perpendicularly the sides of the purifying vessel, the gas escaping from the upper surface of the said purifying vessel into the gas-holder, or by a communication with pipe or pipes, said purifying vessel being supplied from a tank containing the purifying liquids to be used in the manner hereafter described, in which a number of flat vessels, called trays, in the interior of said apparatus, are supplied with a purifying liquid, or the same removed by washing out with a force pump, or by rendering the cleaning and discharging the same, self-acting, by the gravity of the fluids employed. I employ, under an efficient and convenient arrangement for diluting the gas which may be too rich in carbon for clear illumination,

hydrogen formed by the decomposition of water dropping upon red hot anthracite coal or charcoal, with or without fragments of iron. Description of a sectional drawing of "Foulis' Hydro Olofiant Gas Apparatus."

A, A, Figure 1, is a vertical retort suspended in furnace B, B, by the flange *e, e*. In the interior of the retort is placed a false bottom, C, C, from which arises the pipe D, D. Above this false bottom, C, C, is placed the coal or other substances, 5, 5, to be decomposed within the surrounding false case or lining (*n, n,*), which rests upon the false bottom. The return tube serves not only a special purpose in the economy of the gas; but is the means by which the false bottom and false lining, together with the charge, can be lifted out and replaced. When the heat is applied to the retort, the gas or vapor arising therefrom, in place of escaping in the usual way, has to pass downward through the pipe D, D, and comes in contact with that portion or chamber of the retort *b*, which is heated to a decomposing temperature, and which contains the anthracite, &c.; after which the permanent gaseous matter passes off by the exit pipe F, F, Figs. 1, and 2. Through the retort, or otherwise, I introduce a small pipe (*x,*), which passes downward into or over the upper opening of the pipe D. The upper part of this small pipe communicates with a cistern Z, which contains water, which is allowed to drop on heated portions of anthracite coal or charcoal with which may be mixed fragments of iron or other substances capable, when heated, of decomposing water, the hydrogen of which, in its nascent state, combines or mixes with, or dilutes, the permanent gases given out by the coal or other substances used in the manufacture of gas in the retort A, A. Said water-pipe and cistern are also useful for regulating the temperature of the bottom of the retort A, A. The false bottom C, C, and pipe D, D, also hold a number of trays, one over the other, leaving a space between them for gas to escape, and for the swelling of the material in special cases, such as the one immediately to be described. This is shown in Fig. 4, and is intended to be used when the gas is manufactured from substances easily liquefied, and apt to swell by heat. The difficulties and danger of swelling up in various retort operations, where large quantities of materials are used in one entire mass, are well known, as for

instance in the making of oxygen from nitrate potash; these are obviated by the employment of the trays, each containing a comparatively small mass. For every retort
 5 there is a number of duplicate false bottoms, with the tubes, etc., which are kept charged with the material intended to be used for the manufacture of gas, so that when the charge
 10 drawn by means of a chain and winch, or otherwise, one previously filled is inserted in its place. After the gas has passed into the vessel G, and deposited by refrigeration, the ammoniacal or bituminous matter that may
 15 have escaped decomposition, (said vessel also serving the purpose of the ordinary hydraulic main), it may pass off by any of the modes commonly in use. In cases where air refrigeration is used, the gas will pass
 20 into the double F_3 and F_{4x} . The gas thus refrigerated descends, passing through pipe F_5 , into the purifying vessel H, H, which is surrounded perpendicularly with the water of the gas-holder tank, and under the gas-
 25 holder, or it may be placed exterior to the same, and communicating therewith by means of pipe or pipes. When placed beneath the gas-holder L, L, the top of the purifier is above the water of the tank, and
 30 is open to the holder containing gas. The purifying vessel is furnished with a series of trays R, R, a ground plan of which is shown in Fig. 4; from each of these trays proceed downward a pipe I, I, &c., and this pipe also
 35 rises above the bottom of the trays R, R, so that when they are placed level, they will contain a portion of liquid by the dotted lines; but all above the mouth of the pipe must escape downward through the various

trays, leaving in each a shallow stratum of liquid, the overplus descending into the escape pipe (S,) which passes outward from the bottom of the tank M, M. The liquid mixture, which is intended for the purification of the gas, is put in the cistern O, which
 45 is placed above the level of the top of the purifier.

P, is a wire gauze partition, through which the solution passes into the pipe q, q , first downward, and then upward, discharging
 50 ing into the upper tray of the purifying vessel H, H. The surplus liquid above the mouth of the pipe I, passing off as before stated. I may also use a force pump for the charging and discharging the said trays, by
 55 the pipe (q, q) or a similar one. The gas passes from the gas-holder into the mains, in the usual manner, for illumination.

What I claim as my invention, and desire to secure by Letters Patent, is— 60

1. The return pipe D, in combination with the retort, substantially as set forth.
2. I claim, in combination with said pipe, the false bottom and lining, as described.
3. I claim the arrangement of the decomposing chamber b , in combination with the return pipe in the vertical retort. 65
4. I claim the employment of the series of decomposing trays under the arrangement in the vertical retort, substantially as described in combination with the central pipe. 70
5. I claim refrigerating the gas by air, substantially in the manner described.

ROBERT FOULIS.

Witnesses:

WM. GREENOUGH,
 J. G. WOODWARD.