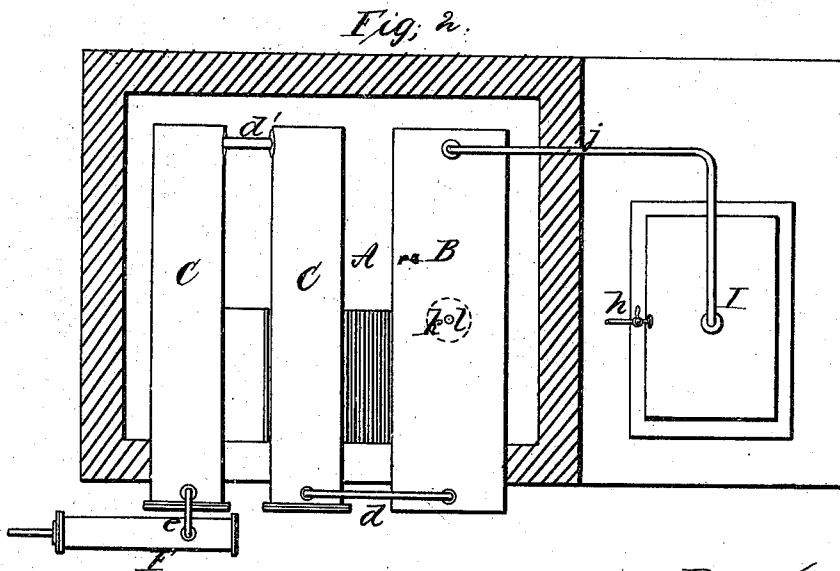
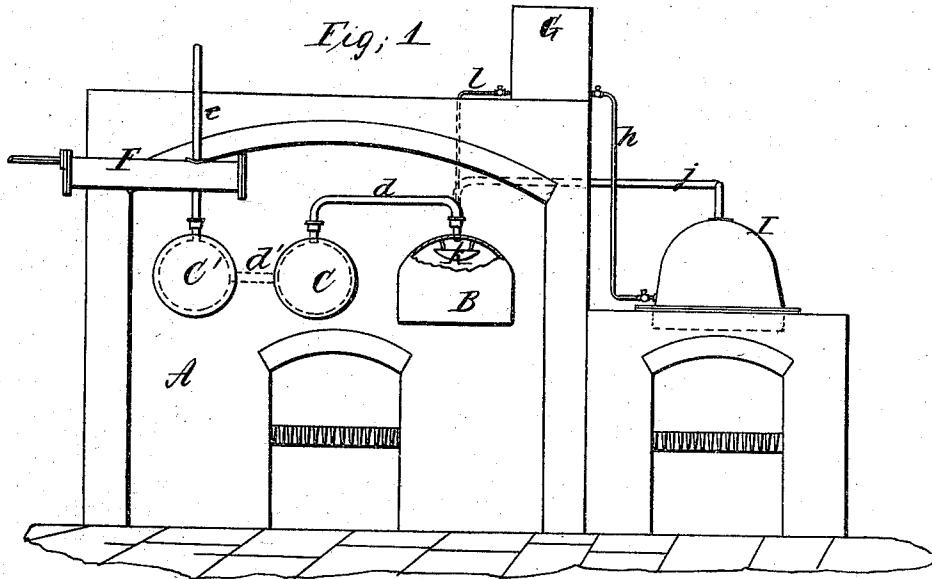


C. Carpenter,

Gas Machine.

No. 87,466.

Patented Mar. 2, 1869.



Witnesses,
Edward Wilhelmus
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UNITED STATES PATENT OFFICE.

CAR CARPENTER, OF BUFFALO, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 87,466, dated March 2, 1869.

To all whom it may concern:

Be it known that I, CAR CARPENTER, of the city of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in the Manufacture of Gas, and of the apparatus therefor; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

In carrying this invention into effect, I pass coal-gas, mixed with the vapors of crude petroleum, gas-tar, or other impure liquid hydrocarbons, after it leaves the generating-retort, through one or more additional retorts, maintained at a proper temperature, wherein a large proportion of the hydrocarbon elements contained in the vapor and condensable gases that usually collect by condensation in the receiver, as tar, &c., and afterward in the distributing-pipes, are resolved into fixed gases, and thereby utilized by producing a correspondingly-increased amount of gas; and the invention consists, first, in the introduction into the retort containing the coal from which gas is being generated of the vapor of crude petroleum or other impure liquid hydrocarbons, and then passing the gaseous mixture into a second retort, for the more complete resolution of the same into fixed gas, whereby a gas of superior illuminating power is produced; second, in the combination and arrangement of the following apparatus for manufacturing gas from tar and naphtha, or petroleum and coal—viz., a reservoir for containing the tar and naphtha, an iron boiler or retort, into which the mixture is let for vaporization, a retort containing the coal, in which the vapor from the tar-boiler is mixed with the gas evolved from the coal, and one or more additional retorts, through which the gaseous mixture from the first retort is finally passed; third, in the arrangement, within a retort containing coal for the generation of gas, of a vaporizing-pan to receive petroleum or other crude liquid hydrocarbon, which is vaporized therein, whereby the liquid is prevented from coming in contact with the retort, which would have a tendency to crack the same.

In the accompanying drawings, Figure I is

a front elevation of a furnace containing my improved apparatus. Fig. II is a horizontal section of the furnace, showing a plan of the retorts.

Like letters of reference designate like parts in each of the figures.

A is the furnace; B, a retort of ordinary construction, such as is employed in the distillation of gas from coal. *c c'* are the additional retorts, through which the gas and vapor from the first one, B, are passed. *d d'* are the connecting-pipes. *e* is a pipe leading from the last retort to the hydraulic main F. G is a reservoir for containing tar and naphtha or other liquid hydrocarbon; *h*, a pipe leading thence to a closed boiler or vessel, I, in which the liquid is vaporized. *j* is a pipe, conducting the vapor from this latter vessel into the top of the coal-retort B. *k* is a shallow vaporizing dish or pan, arranged in the top of the retort B; and *l*, a pipe leading direct from the reservoir G into this dish, by which means the hydrocarbon can be let into the retort in a liquid state when required, and readily vaporized or distilled in the pan *k* without coming in contact with the retort. The pipes *h l*, leading from the reservoir G, are provided with suitable stop-cocks for regulating the flow of the liquid therefrom. The retorts *c c'* may be made of much less size than the retort B, which contains the coal.

It is a well-known fact, in the manufacture of coal-gas, that the gaseous products from a charge are very different at different periods, owing in part to the difference in the temperature of the charge.

The opening of a retort for the withdrawal of the exhausted charge and the introduction of a fresh one causes a reduction in the temperature of the retort during the first stages of the distillation, when considerable vapor is evolved and passes off, and is condensed in the receiver or hydraulic main without being converted into gas. This reduces very considerably the amount of gas that would otherwise be produced, and impairs the quality of the gas, as the vapor that thus condenses is rich in carbon, the luminiferous element.

By my improved process, (the passing of the gas through one or more additional retorts, which can be kept at a uniform temper-

ature,) the greater portion of the vapor contained therein is converted into gas, so that but comparatively little of the gaseous products that escape from the last retort is condensed, while the gas is not only greatly increased in quantity, but also improved in quality. The temperature of these auxiliary retorts *c c'* should not be so high as to decarbonize the gas as it passes through them.

Oil-gas being rich in olefant gas, and possessing two or three times the illuminating power of coal-gas, various expedients have been resorted to for improving the quality of the latter by passing it through vessels containing some volatile liquid hydrocarbon. By my improved process and apparatus not only can crude petroleum and other hydrocarbon liquids be employed for the purpose, but also tar, which has hitherto been considered a refuse and comparatively worthless article.

Another advantage is, that by my improved arrangement the coal-gas is not improved by saturating it with hydrocarbon-vapor, which is liable to condensation, but has mixed with

it a fixed gas of the greatest luminosity. I am also enabled by these means to produce a gas of superior richness at a considerably less expense than that produced from coal alone.

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

1. In the manufacture of gas, the introduction of the vapor generated in a suitable vessel from crude petroleum or other impure liquid hydrocarbon into the retort containing the coal, and then passing the gaseous mixture therefrom through one or more uncharged retorts, substantially as set forth.

2. The combination of the reservoir *G*, the tar-vaporizing boiler *I*, and retorts *B C*, substantially in the manner and for the purpose specified.

3. The arrangement within the retort *B* of the vaporizing-pan *k*, in combination with the reservoir *G*, substantially as set forth.

CAR CARPENTER.

Witnesses:

JAY HYATT,

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