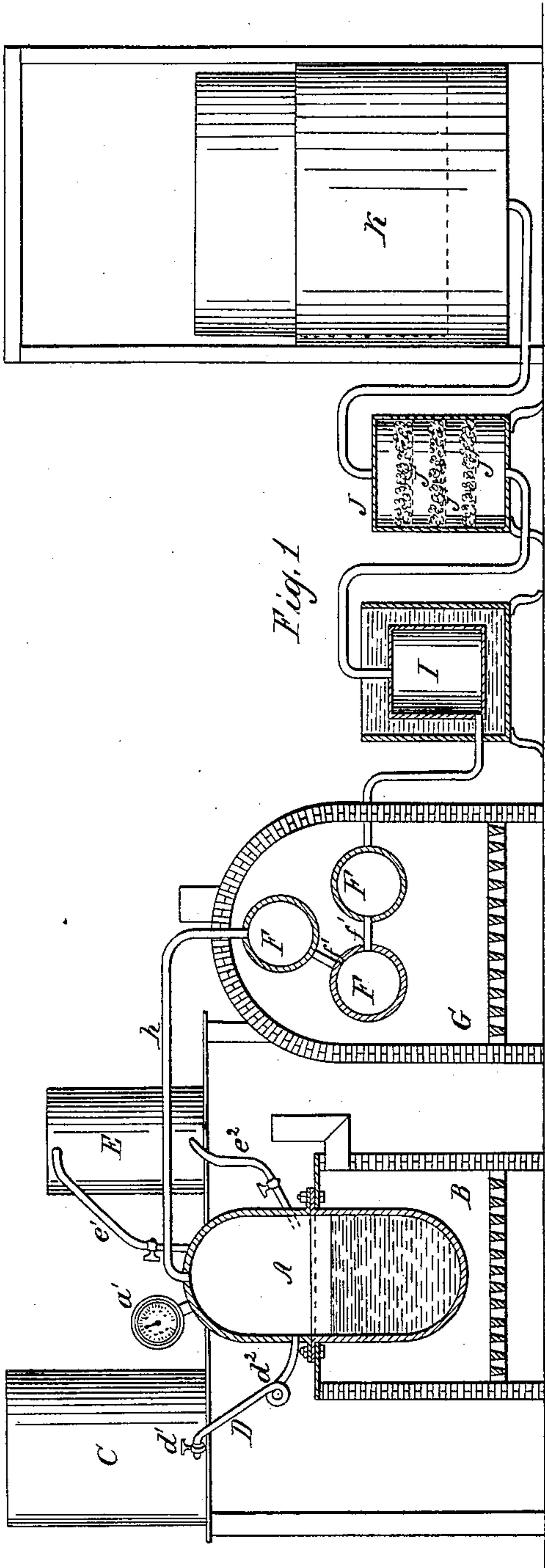


*C. Carpenter.*

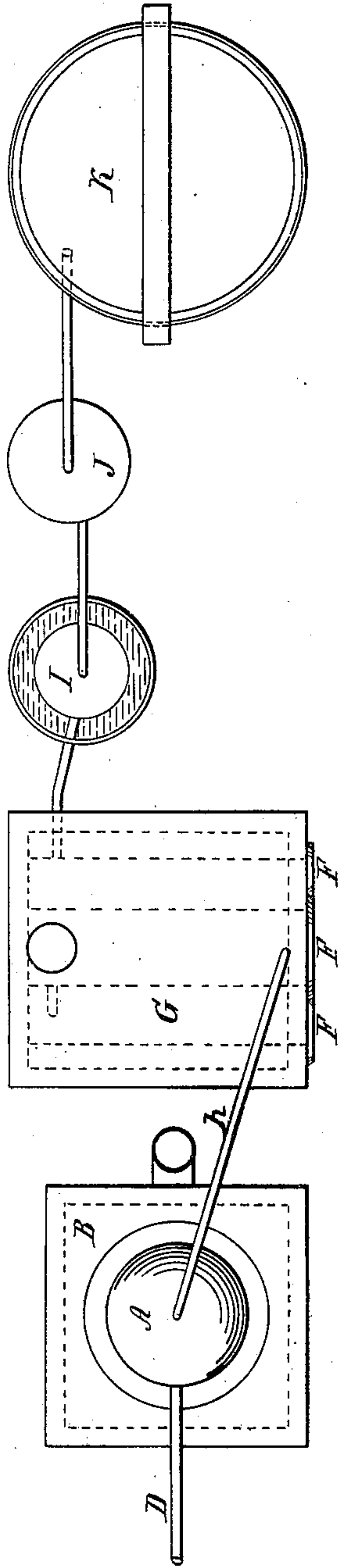
## Generating Gas from Petroleum.

No 81.136.

*Patented Aug. 18. 1868*



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## IMPROVED METHOD OF GENERATING GAS FROM PETROLEUM.

*Specification forming part of Letters Patent No. 81,136, dated August 18, 1868.*

*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 a certain new and improved method of generating gas from crude petroleum or other impure liquid hydrocarbon; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a vertical section of the parts composing the said apparatus placed in a line. Fig. II is a top plan view of a portion of the same.

The nature of this invention consists in vaporizing the petroleum or other liquid hydrocarbon in a boiler by a low boiling heat, and afterward converting said vapor into a fixed gas by subjecting it to a high heat in a separate retort. It is essential that the evaporating-boiler shall be constantly supplied with a considerable body of petroleum or other hydrocarbon in a liquid state, so that while the lighter and more volatile portions shall pass off in a state of vapor, the tar and other heavy impurities shall settle to the bottom, and be drawn off from time to time, instead of being vaporized, and thus passing over to the retorts, as heretofore.

To carry this method into effect, I employ an apparatus consisting, first, in the construction, application, and use of a boiler for converting crude petroleum into vapor, for the purpose of making a fixed illuminating-gas therefrom; second, in the combination, with said boiler, of one or more retorts for converting the vapor into a fixed gas; third, in the combination, with said boiler and retort or retorts, of one or more cooling-chambers, each composed of an open reservoir or tank filled with cold water, and a submerged air-tight chamber, through which the gas is conducted; fourth, the combination, with said boiler, retort or retorts, and cooling apparatus, of a purifying-chamber, composed of an air-tight reservoir, provided with one or more perforated diaphragms, each supporting a layer of lime or other purifying substance, the gas being conducted through said diaphragms and purifying substances successively; fifth,

the combination of said boiler, retort or retorts, cooling apparatus, and purifying-chamber with a gasometer of ordinary construction—sixth, the construction and use of a condenser in combination with the boiler, for the purpose of collecting the surplus vapor from the boiler and condensing it into its original form, in case vapor is generated in the boiler quicker than the retorts can convert it into gas, owing to the occasional increase or decrease of the heat required for the respective processes; seventh, in the combination, with said boiler, of a steam or vapor gage, which indicates how fast the petroleum is converted into vapor, so that the attendant may regulate the fires in the furnaces accordingly.

Letters of like name and kind refer to like parts in each of the figures.

A represents a boiler, which may be of any convenient size or shape, and is supported upon or within a heating-furnace, which may be built of brick or other suitable material, in a common manner, as shown, B.

C represents a tank or reservoir filled with the crude petroleum or other oleaginous substance from which it is designed to generate gas. It is placed in an elevated position, and connected with the boiler by a feed-pipe, D, with a suitable stop-cock,  $d^1$ , and a check-valve, or its equivalent,  $d^2$ , for the purpose of preventing the passage of vapor into the reservoir.

Upon the introduction of the petroleum into the boiler it is thoroughly distilled or boiled into a vapor, in which shape it rises and is discharged through an opening in the top of the boiler.

$a^1$  represents a steam or vapor gage, which is attached to the boiler in a manner to indicate how quick the petroleum is generated into vapor, so that the attendant may regulate the fires in the furnaces accordingly.

E represents a condenser, which is connected with the boiler by two pipes,  $e^1$   $e^2$ , one leading from the top of the boiler to the top of the condenser, and the latter from the bottom of the latter to a point above the middle of the boiler. This condenser is used whenever vapor is made faster in the boiler than it can be converted into gas by the second part of the process, as may be observed by reference to the



gage  $a^1$ . Upon opening the stop-cock in the pipe  $e^1$ , the surplus vapor will ascend into the condenser and there be reduced to its original form, in which state it may be again fed to the boiler, through the pipe  $e^2$ , whenever required.

This completes the first part of the process of generating gas from crude petroleum or other liquid hydrocarbon, viz., converting petroleum into vapor.

F F represent retorts placed in any desirable position within a furnace, G, which may be built either independent of the furnace B, or as a continuation or extension thereof.

These retorts are connected with each other by tubes  $f'$ , as represented in the drawings, and with the boiler by the feed-pipe  $h$ . The vapor rising from the boiling petroleum in the boiler A is conveyed through the pipe  $h$  into one of the retorts, and thence through the others consecutively, and in its passage through these retorts is converted into a fixed illuminating-gas.

This completes the second part of the process of generating gas from petroleum, viz., converting the vapor into a fixed gas. It now remains to cool the gas discharged from the retorts and to purify it.

The former is accomplished by passing it through one or more air-tight chambers, each submerged in cold water, as shown at I.

The latter process consists in passing the gas vertically through the chamber J, which is provided with one or more perforated diaphragms,  $J^1$ , each covered with a layer of lime or other purifying substance. From thence the cooled and purified gas is conducted into the gasometer K, in which it may be retained, ready for use, for any length of time, without changing the nature or impairing the quality of the gas.

The boiler A is kept constantly filled about two-thirds with the crude petroleum, and is used only for the purpose of extracting in the form of vapor the lighter qualities of the oil—such as gasoline, benzine, and all refined oil. The heavier portion and the sediment or tarry residuum of the petroleum are allowed abundant time to settle and remain

upon the bottom of the boiler, to be from time to time removed; hence there is no chance for the said sediment or tar to rise, and, mixing with the vapor, to pass into the pipes, coolers, purifier, and gasometer, a result which has not been heretofore obtained in the various contrivances of a similar nature for the like purpose.

By passing the vapor through the retorts F it is converted into a fixed gas, which, after it is thoroughly cooled and purified, is ready for use, and produces a superior and more steady light than any heretofore obtained from crude petroleum or other oleaginous substances.

It will be readily observed that in the use of my improved apparatus the process of generating gas from petroleum is divided into two distinct parts, the first converting the petroleum into vapor, and the second converting the vapor into gas.

I am well aware that a boiler or retort has heretofore been used for the purpose of generating gas from petroleum, and I do not therefore claim either broadly for that purpose; but

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

1. The method herein described of generating illuminating-gas from crude petroleum or other impure liquid hydrocarbon, consisting in first vaporizing the same by subjecting a body thereof to a low boiling heat in a boiler, and then converting said vapor into a fixed gas by subjecting it to a high heat in a separate retort, substantially as described.

2. In combination with the boiler A, constructed and operating as described, a condenser, E, substantially as and for the purpose described.

3. In combination with the boiler A, constructed and operating as described, the steam or vapor gage  $a^1$ , substantially as and for the purpose specified.

CAR CARPENTER.

Witnesses:

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FRED. W. SCOTT.