

(No Model.)

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APPARATUS FOR MANUFACTURING HEATING AND ILLUMINATING GAS.

No. 361,641.

Patented Apr. 19, 1887.

Fig. 1.

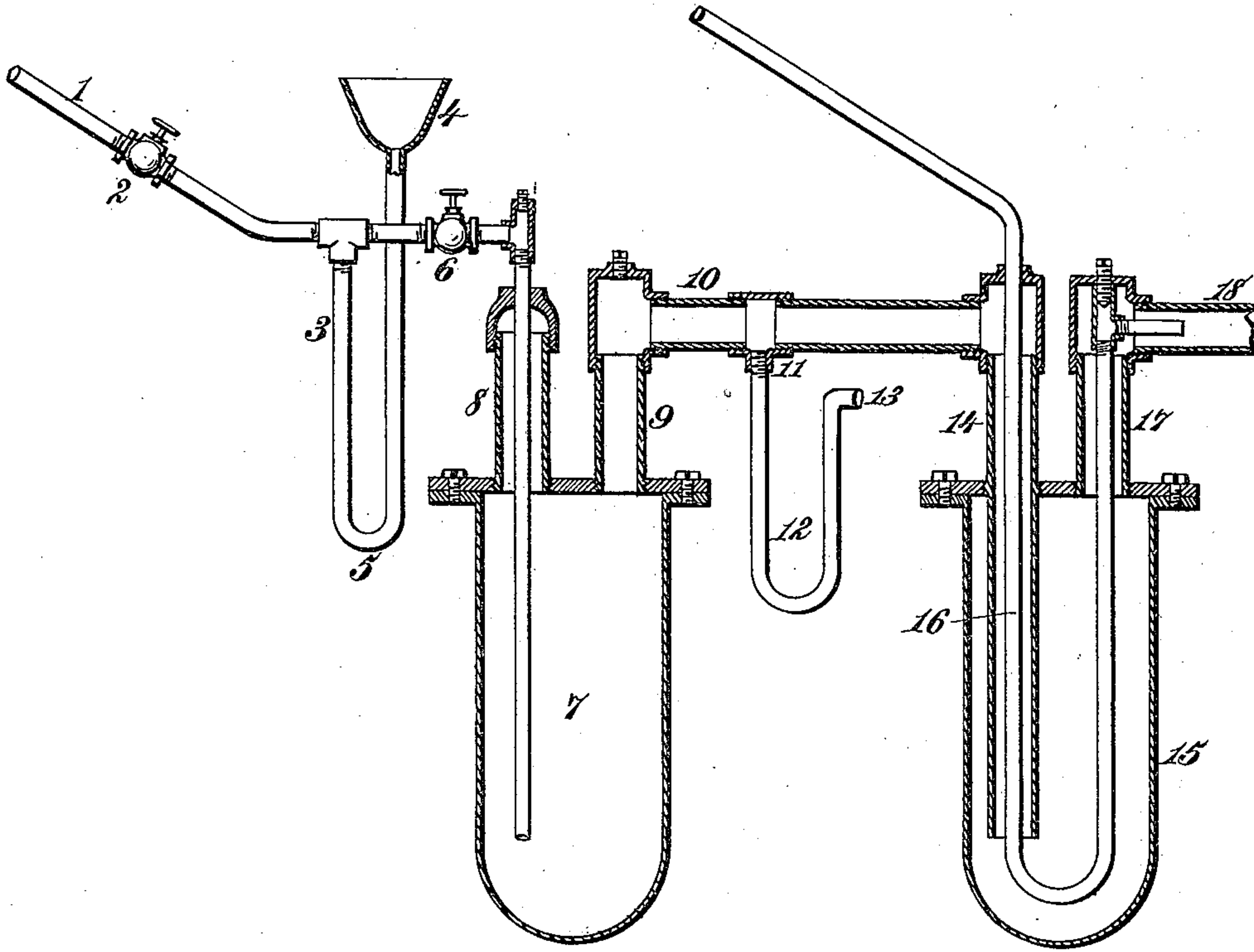
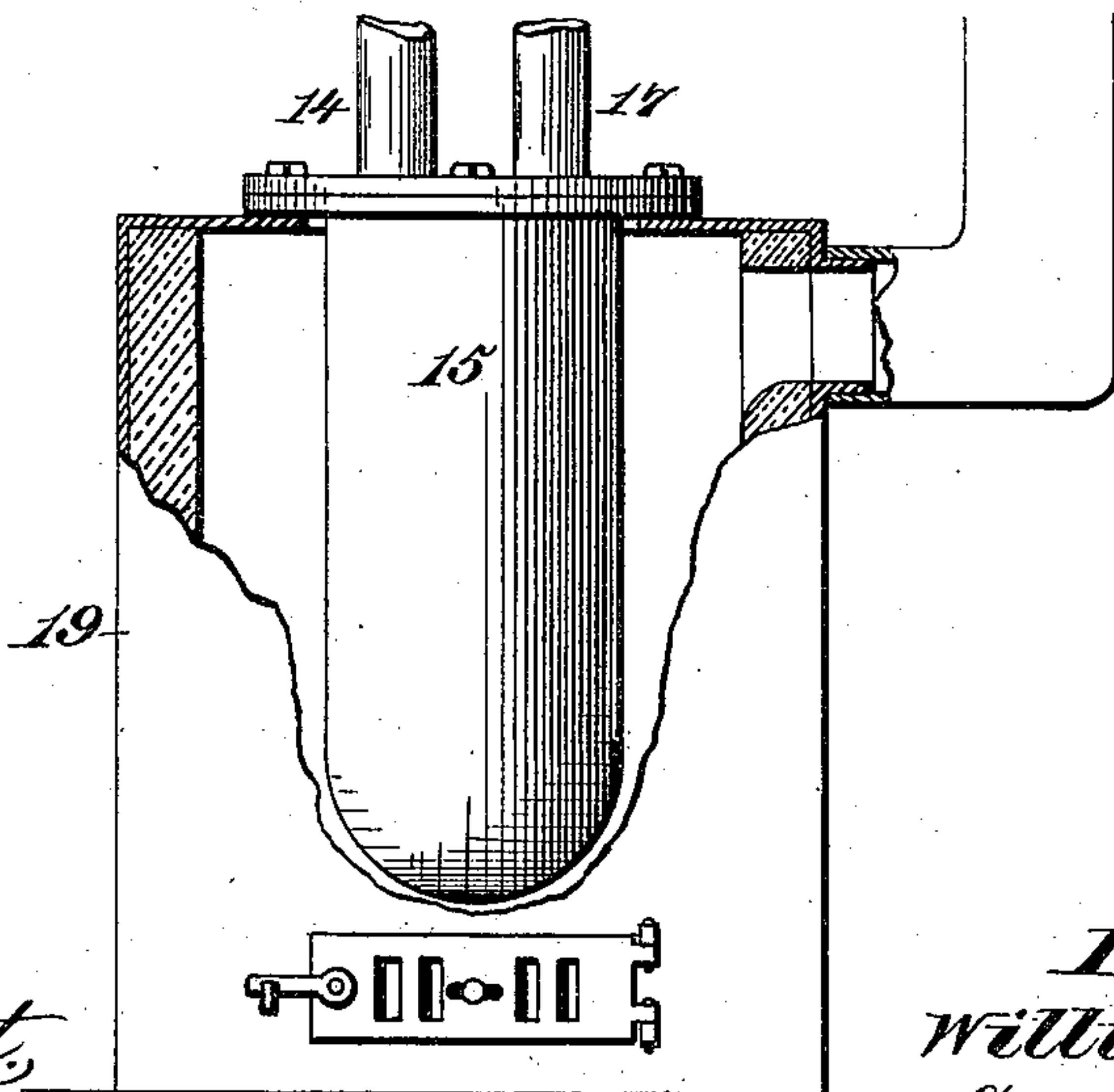


Fig. 2.



Witnesses.
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APPARATUS FOR MANUFACTURING HEATING AND ILLUMINATING GAS.

SPECIFICATION forming part of Letters Patent No. 361,641, dated April 19, 1887.

Application filed February 21, 1887. Serial No. 228,375. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM A. MYERS and SAMUEL H. ALTICE, citizens of the United States, residing at Bolivar, in the county of Allegany and State of New York, have invented new and useful Improvements in Apparatus for Manufacturing Illuminating-Gas and Heating and Fuel Gas, of which the following is a specification.

Our invention relates to an apparatus for manufacturing heating and illuminating gas from all kinds of oils, but more particularly from liquid hydrocarbons, such as crude petroleum; and the purpose thereof is to provide a simple mechanism whereby gas may be generated on any required scale, and wherein the hydrocarbon employed is not only fully utilized, and a larger percentage of gas produced, but the quality thereof is improved and the heavy products—such as tar, sulphur, and empyreumatic oils—are completely removed by gravity.

It is a further purpose of our invention to provide an apparatus adapted for use with an ordinary boiler or furnace, whereby the heat required to operate the same can be obtained from the gas produced by the apparatus, making the running of the boilers nearly automatic as long as the petroleum is supplied to the generator, the only heat from an extraneous source being that required to initiate the generation of gas in the retort.

The invention also contemplates the production of a superior article of carbureted hydrogen gas by subjecting the crude petroleum to successive generation, in the manner fully set forth hereinafter.

The invention consists in the process and apparatus hereinafter fully set forth, and definitely pointed out in the claims following this description.

In the accompanying drawings, Figure 1 is a sectional view illustrating our apparatus. Fig. 2 is a sectional view showing the manner of applying the gas-retorts to an ordinary heater.

In the said drawings, the reference-numeral 1 denotes a pipe communicating with any suitable

reservoir, from which air or steam, or both mingled together, may be taken. This pipe has a cock, 2, by which the inflow of air or steam may be regulated or wholly cut off.

Situated at a point beyond the cock 2 is a pipe, 3, entering the pipe 1, and communicating at its other end with a reservoir, 4, containing crude petroleum, said reservoir being elevated above the point of union of the two pipes, and the pipe 3 being preferably constructed with an elbow or return-bend, 5. A second cock, 6, serves to regulate or shut off the flow of the mingled oil and air or steam through the pipe 1.

Beyond the cock 6 a retort, 7, is placed, having any suitable heating apparatus surrounding or partly surrounding the same. The pipe 1 enters the top of said retort through a stand-pipe, 8. The pipe 1 passes downward to the bottom of the retort, which is heated to a temperature that may range from 1,500° to 2,300° Fahrenheit, and never be less than the first-mentioned degree, discharging the oil and air or steam upon the heated bottom, heated to 1,000° Fahrenheit, or more.

Opening from the lid of the retort is a pipe, 9, with which a horizontal section of piping, 10, communicates. This section has a joint, 11, from which depends a siphon, 12, communicating with the said section. The siphon-pipe discharges at the point 13, and may empty into any suitable receptacle adapted to receive the tar and other heavy products of distillation.

Beyond the siphon the section 10 communicates with a stand-pipe, 14, which enters the lid of a second retort or superheater, 15, and, passing downward, opens a little above the bottom of said retort, to which the volatile products of generation yielded by the first retort are delivered. Entering the top of the stand-pipe 14 is a pipe, 16, which passes down entirely through the stand-pipe, then returns upon itself after traversing the second retort, passes up through a second stand-pipe, 17, and empties into a main, 18. The pipe 16 is concentric with the two stand-pipes 14 and 17, and communicates with any suitable reservoir by

which steam or air, or both, may be supplied to said pipe. For convenience, it may be connected to the reservoir supplying the pipe 1. A third retort may be employed, if desired, in which case the arrangement and combination of parts will be substantially the same as that already set forth in connection with the second. It will be understood that the several joints and fittings, as well as the lids, of the retorts, are gas-tight.

A second siphon, similar to the siphon 12, may be placed in the main 18; but ordinarily this will not be required.

The service-pipes are tapped into the main 18, and from the latter, also, may be led one or more pipes for supplying gas, by the combustion of which the retorts 7 and 15 are heated. The vessel 4 being supplied with a liquid hydrocarbon, and the cocks being adjusted, the mingled oil and air or steam flows through the pipe 1 and are discharged into the heated retort 7, where the oil is at once volatilized and a portion thereof completely decomposed, so as to produce at once carbureted hydrogen, which is already a fixed gas, requiring no subsequent treatment, except to improve it by additional heating. The remaining product of volatilization is a hydrocarbon gas, which, together with the carbureted hydrogen and the heated air or steam, passes over into the section 10. Here a sufficient condensation takes place to eliminate the tar, empyreumatic oils, and other residual products, which are carried off by the siphon 12; hence the heated gas and air pass to the stand-pipe 14, by which they are delivered to the superheater or second retort, 15. In this retort the hydrocarbon gas and the air or steam passing over from the first retort, together with the carbureted hydrogen generated therein, are brought in contact with the intensely-heated bottom of the superheater. This bottom is heated, like that of the first retort, to a degree of heat ranging from 1,500° Fahrenheit upward, whereby the hydrocarbon gas carried over from the first retort is decomposed again and converted into carbureted hydrogen. Leaving the latter, the gas enters the main 18, at or near the entrance of which it is mingled, when a fuel-gas is to be produced, with the air, steam, or air and steam from the second pipe, 16, which is carried entirely through the retort 15, where the contents of said pipe are raised to the proper temperature.

For the illumination of dwellings the retorts may be connected with any ordinary heater, 19, as in Fig. 2, the arrangement for the second retort or superheater being the same as that shown in Fig. 2.

The superheating of the volatilized gas in the manner described produces a gas of a high degree of purity and of increased illuminating power. The air or steam or air and steam, as the case may be, entering through the pipe 1 into the retort 7, becomes decomposed; and is intimately mingled with the gaseous pro-

ducts entering the pipe-section 10, where the tar and other products of distillation are eliminated.

We are aware that hydrocarbons and steam or air have been introduced into heated retorts for making gas; but our invention is distinguished from all previous processes by this peculiarity—viz., that a mixture of oils or hydrocarbons and air or steam is brought in contact with the intensely-heated bottom of a retort, which at once causes a conversion of the mixture into a fixed carbureted hydrogen gas and into hydrocarbon gas, after which the products of generation are carried through a pipe in which the condensable or residual matters are collected, and the gases are delivered into a second retort or superheater, in order to be completely converted into carbureted hydrogen. In this superheater an additional supply of steam or air is also intensely heated by its passage through a pipe which runs through the superheater and discharges into a main or pipe leading directly to a gasometer; or said main may have the pipes of the consumption devices directly connected with the same.

In prior processes it has been found impossible to produce a fixed illuminating or heating gas from hydrocarbon oils by retort action alone, and it has been found necessary to use scrubbers or washers for purifying the gas passing from the retorts. Our gas, after generation in the retorts and after having been charged with decomposed air or steam heated by passage through the superheater, is at once ready for consumption, and it no longer contains condensable matters.

It will be understood that when an illuminating gas is to be the resultant product of our process the same must be fixed and not contain condensable matters, and this is accomplished by omitting the step of admitting air or steam into the gas-main, such admixture of steam or air with the fixed gas passing from the last retort only taking place when the gas is to be used for supplying the furnace which heats the retorts, or any other furnace in which a gas is employed as fuel.

Having thus described our invention, what we claim is—

1. An apparatus for manufacturing carbureted hydrogen gas from oils, consisting, essentially, of a vertical retort, a pipe for admitting a mixture of oil and steam or air into said retort, terminating in proximity to the bottom of the retort, a gas-discharge pipe, a second retort or superheater, a gas-inlet pipe terminating in proximity to the bottom of said second retort, a gas-main at the top of the latter, and a steam or air heating pipe passing through the second retort and discharging into the gas-main at the top of said second retort, substantially as described.

2. The combination, with the retort, of the air or steam pipe having a communicating pipe leading from an oil-reservoir, a super-

heater connected to the retort by a horizontal
section of pipe, a siphon-pipe communicat-
ing with said section to receive the tar, and a
second pipe conveying air or steam and trav-
5 ersing the superheater and delivering its
heated contents to be mingled with the super-
heated gas at or near the entrance to the main,
substantially as described.

In testimony whereof we affix our signatures
in presence of two witnesses.

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