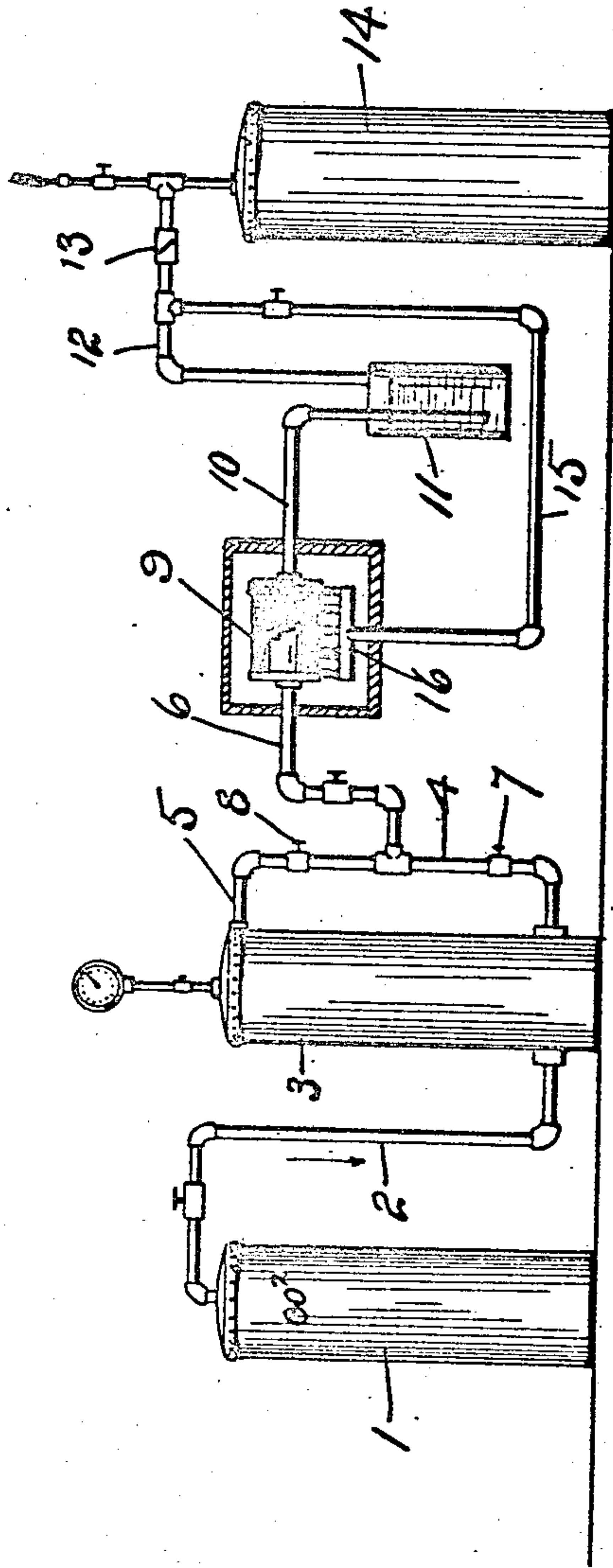


W. T. CUTTER.
METHOD OF AND APPARATUS FOR MAKING GAS.
APPLICATION FILED MAR. 30, 1910.

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Patented Dec. 20, 1910.



WITNESSES.

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METHOD OF AND APPARATUS FOR MAKING GAS.

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Specification of Letters Patent.

Patented Dec. 20, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM T. CUTTER, a citizen of the United States, residing at East Lyme, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Methods of and Apparatus for Making Gas, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to an improved process of, and apparatus for making gas and has for its object the production of a valuable gas possessing both illuminating and calorific properties by mixing together, under pressure, two comparatively inexpensive products, such as carbon dioxid and hydrocarbon oil, and then subjecting the mixture to a heat of sufficient intensity to decompose the whole and convert it into a fixed gas.

Crude petroleum oils, fuel oils or other hydrocarbon oils may be saturated with carbon dioxid (CO_2) by spraying or otherwise mixing the two together under pressure, said hydrocarbon oil being capable of absorbing a quantity of said gas in proportion to the pressure exerted, thereby producing a mechanical mixture which is more or less inflammable. The mixture may then be decomposed and converted into a fixed gas by passing the same through a heated retort, over the face of, or through highly heated asbestos, or highly heated porous refractory material. This gas is ordinarily under a natural pressure of substantially 900 pounds to the square inch, which pressure is equivalent to a definite amount of mechanical work or energy. The pressure in this gas adds considerable value to it, as the energy due to this pressure may be used for mechanical purposes, if desired. Then again, said pressure naturally serves to compress and condense the finished gas and reduce its volume whereby it may be readily distributed in comparatively small packages to be utilized for heat, light and power.

This invention is fully described in this specification and more particularly pointed out in the appended claims.

The accompanying drawing is a diagrammatic view illustrating one form of apparatus by means of which the several steps of my process may be carried out.

Referring to the drawings, 1 designates a

reservoir or represents a source of supply of carbon dioxid, commonly known as carbonic acid gas, (CO_2) which may be generated by a mixture of marble dust and sulfuric acid and is therefore very inexpensive to produce. A feature of this gas thus produced is that when confined it generates a heavy pressure of approximately 900 pounds to the square inch at 62 degrees Fahrenheit, which pressure is sufficient to hold the gas in a liquid state. This gas from tank 1 may be conducted through the pipe 2 into the lower portion of the tank or reservoir 3, which is filled with hydrocarbon oil, preferably crude petroleum or fuel oil, which absorbs a large quantity of the carbon dioxid making a mechanical mixture.

The excess or free carbon dioxid gas naturally rises through the oil toward the top of the tank, the richer heavier portion of the mixture remaining nearer the bottom. This mixture may then be led to the decomposer 9 through pipes 4, 5 and 6, and if it is found upon testing the finished gas that the same is too rich or not rich enough, the quality may be easily changed and nicely controlled and regulated by adjusting the valves 7 and 8. This decomposing device or retort 9 is subjected to a high degree of heat, approximately 1400 degrees Fahrenheit which completely decomposes the mixture and converts it into a fixed gas.

The heat may be applied to the mixture in various ways, for instance it may be passed through the ordinary gas retort common in other processes of producing gas from crude oil, or it may be passed through or over the face of highly heated porous material retained in a retort or decomposing chamber, such for instance as pottery, brick dust, iron filings, or other suitable refractory material, but I preferably fill the chamber 9 with asbestos and suitably arrange this material within the chamber so as to allow or cause the mixture to pass over its surface or through its pores and be acted upon by the heat to the very best possible advantage to separate or break up the particles and decompose the whole, converting it into a fixed gas. One analysis of this gas thus obtained has shown approximately 2.6% of illuminants, 32.7% of hydrogen, 31% of methane, 1% of oxygen, 3.1% of carbon dioxid and 29.6% of carbon monoxid,

which analysis can be made to vary considerably by the use of different qualities or grades of hydrocarbon oils, and also by varying the initial pressure under which the oil and CO₂ are mixed and which in turn controls the volume of CO₂ absorbed by the oil.

Any analysis of gas showing the presence of small quantities of CO₂ simply indicates that an excess of free CO₂ has been admitted by valve 8 through pipe 5, which has not undergone decomposition in the retort and serves only as a diluent of the finished gas.

Upon emerging from the decomposer 9 the gas is conducted through the pipe 10 to the washing tank 11, thence through pipe 12 through check valve 13 to the receiving or storing tank 14.

The decomposing chamber 9 and material therein contained may be heated by any suitable means, but I preferably heat the same by the combustion of the gas generated by the apparatus, said gas being conducted through the pipe 15 to the burner 16 beneath said retort or decomposing chamber 9.

In the operation of my improved process I obtain from the combination of two comparatively inexpensive products a fixed compound gas of commercial value, which is under a natural pressure of substantially 900 pounds to the square inch, which pressure corresponds to that of the initial mixture, this pressure lending to the gas additional value for mechanical purposes. This high pressure originally in tank 1 serves to force the contents thereof into the crude oil tank 2, to cause a thorough molecular intermixture of the two materials and then to force this mixture at a suitable velocity, which may be controlled by the several controlling valves, through the decomposing and converting chamber into the storage tank where it as fixed gas is retained at approximately its initial pressure. In addition to the value of this gas for mechanical work this pressure performs the function of reducing the volume of the gas into a very compact form greatly facilitating its storage and distribution.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The method of making a fixed gas which consists in intermixing hydrocarbon oil and isolated carbon dioxide under pressure and decomposing the mixture by subjecting the same to a high degree of heat.

2. The method of making a fixed gas which consists in intermixing hydrocarbon oil and isolated carbon dioxide under pres-

sure, decomposing the mixture by subjecting the same to a high degree of heat, and collecting the resultant gas in a receptacle at substantially the initial pressure.

3. The method of making gas which consists in saturating hydrocarbon oil with isolated carbon dioxide, and subjecting the saturated mixture to approximately 1400 degrees F. of heat to decompose the whole into a fixed gas.

4. The method of making a gas which consists in mixing isolated dioxide and hydrocarbon oil under pressure, subjecting the mixture to a high degree of heat to decompose and convert the same into a fixed gas, and collecting this gas still under pressure in a suitable receiver.

5. The method of making a fixed gas which consists in mixing hydrocarbon oil and isolated carbon dioxide under pressure, decomposing the mixture by passing the same along the face or through the pores of heated porous material, washing the gas, and then collecting the same in a suitable receiver at substantially the initial pressure.

6. An apparatus for making gas comprising a reservoir of carbon dioxide under pressure, a reservoir of hydrocarbon oil, means for permitting said carbon dioxide and said oil to mix and for preserving the carbon dioxide in isolated condition prior to such mixing, a decomposing retort, means for heating said retort, a receiver, and means for conducting said mixture from its reservoir to said retort and the resultant gas from said retort to said receiver.

7. An apparatus for making gas comprising a reservoir of carbon dioxide under pressure, a reservoir of hydrocarbon oil, means for admitting said gas into the lower portion of said oil reservoir whereby the two are mixed, said means being formed to preserve the carbon dioxide in isolated condition prior to such mixing, a retort containing refractory material, means whereby the generated fixed gas may be used for heating said retort and its contents, a receiver, and means whereby the richness of said mixture may be regulated and conducted under pressure from its reservoir through said retort and the resultant gas from said retort to said receiver.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM T. CUTTER.

Witnesses:

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CHARLES A. I. PAETERF.