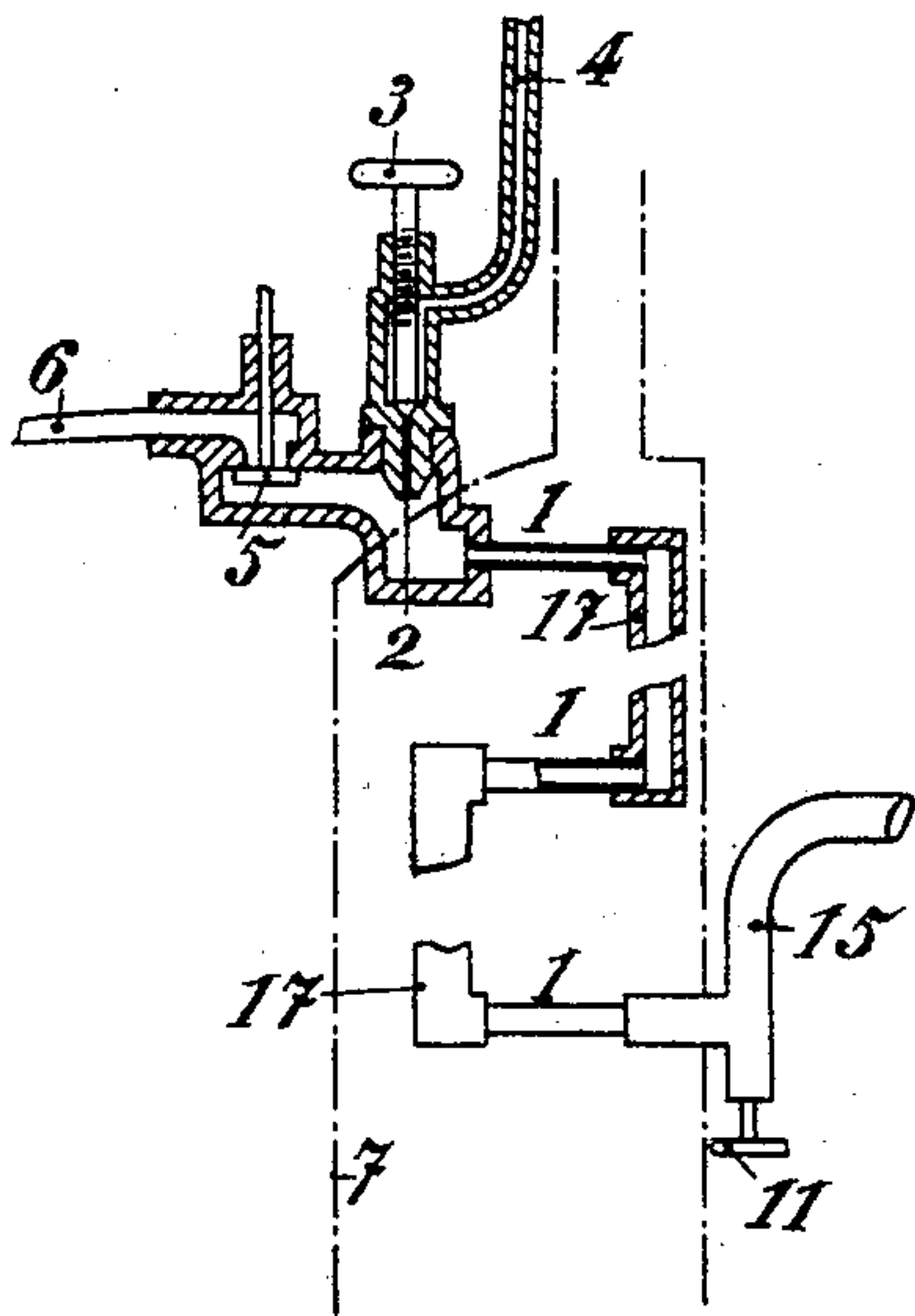


No. 803,557.

PATENTED NOV. 7, 1905.

C. H. CLAUDEL.
PROCESS OF GENERATING GAS.
APPLICATION FILED MAY 25, 1903.



Witnesses:

Arthur T. Randall.
Joseph H. Ryan.

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UNITED STATES PATENT OFFICE.

CHARLES HENRI CLAUDEL, OF ARGENTEUIL, FRANCE, ASSIGNOR TO
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PROCESS OF GENERATING GAS.

No. 803,557.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed May 25, 1903. Serial No. 158,632.

To all whom it may concern:

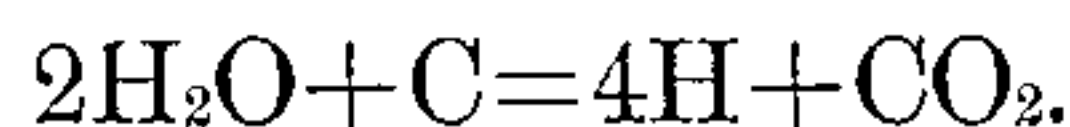
Be it known that I, CHARLES HENRI CLAUDEL, engineer, a citizen of the Republic of France, residing at 25 Rue Nationale, Argenteuil, in the Republic of France, have invented an Improved Process for the Gasification of Combustible Liquids, of which the following is a specification.

When it is desired to utilize combustible liquids, such as petroleums and alcohols, for illuminating purposes, heating, or the production of motive power, it is for the most part necessary to bring them to a gaseous condition in order that they may be intimately mixed with the comburent air. Usually all that is done is to vaporize the liquids for this purpose; but the vapors in contact with the cold comburent partially condense, thus giving rise to numerous well-known difficulties. Attempts have been made to obviate these difficulties by raising the combustible liquids to a sufficiently high temperature to effect their conversion into fixed gases by dissociation; but, on the one hand, a partial recomposition of the primitive hydrocarbons takes place as soon as the temperature falls below the point of dissociation, and, on the other hand, deposits of coke are formed in the gasification apparatus, which obstruct them, and consequently prevent the practical application of the process. The formation of coke may be obviated to a certain extent by the introduction of steam into the gasification-retorts; but this necessitates the employment of a steam-generator and a considerable expenditure of fuel.

This invention relates to a process whereby the partial recomposition and the formation of coke above mentioned may be completely obviated without a generator or supplementary expenditure of fuel. On the contrary, considerable quantities of heat which are generally lost are recuperated.

This process consists in mixing with the combustible liquid to be gasified and in causing to circulate with it while it is highly heated burnt gases—such as the exhaust gases of explosion or combustion motors, blast-furnace gases, lime-kiln gases, or the like which contain carbonic acid mixed with inert gases, such as nitrogen, and also a greater or less quantity of steam. The method of action of these burnt gases may be explained as follows: Nitrogen and other inert gases act, by

their interposition between the molecules of the products of dissociation, so as to prevent the recomposition of the primitive hydrocarbons. The carbonic acid prevents the deposits of coke by absorbing the nascent carbon as it is formed, converting it into oxid of carbon in accordance with the equation $\text{CO}_2 + \text{C} = 2\text{CO}$. The steam acts in a similar manner, as shown by the equations



At the same time there are recuperated quantities of heat, sometimes very considerable, contained in the waste gases employed, as it is obvious that the heat supplied by these gases to the retorts will reduce by the same amount the heat which it is necessary to supply to these latter by means of external heating.

In the accompanying drawing is represented diagrammatically an apparatus which permits of carrying the process into practice. This apparatus consists of a series of retorts 1—of cast-iron, for example—arranged in a suitable manner in a furnace 7 to insure their being heated sufficiently and as methodically as possible. These retorts are connected in series by unions 17. The combustible liquid is introduced continuously in a thin stream or in drops by means of an appropriate distributor 2, which receives this liquid from a higher level and permits of regulating its flow. In the case represented in the drawing the petroleum is introduced through the pipe 4 and the flow is regulated by the pin-cock 3. The gases produced are discharged toward the place at which they are to be utilized or stored by a pipe 15, provided with a drain-cock 11. The burnt gases enter the distributor 2 through a conduit 6, and their admission may be regulated by means of a valve 5.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The process of converting hydrocarbonaceous liquids into combustible gases which consists in heating the liquid in circulation sufficiently to cause vaporization and dissociation, and mixing and causing to circulate therewith, during heating and in the absence of steam other than that found in the products of combustion, gaseous products of combustion which are rich in carbonic acid and

inert gases, substantially as and for the purpose set forth.

2. The process of converting hydrocarbonaceous liquids into combustible gases which
5 consists in heating the liquid in circulation sufficiently to cause vaporization and dissociation, and mixing and causing to circulate therewith, during heating and in the absence
10 of steam other than that found in the products of combustion, uncooled gaseous products of combustion which are rich in carbonic acid and inert gases, substantially as and for the purpose set forth.

3. The process of converting hydrocarbonaceous liquids into combustible gases, which

consists in heating the liquid in circulation sufficiently to cause vaporization and dissociation, and mixing and causing to circulate therewith during heating, burnt gases consisting of the exhaust gases from internal-combustion motors, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 2d day of May, 1903.

CHARLES HENRI CLAUDEL.

Witnesses:

J. ALLISON BOWEN,

HENRI AUGUSTE BERTIN.