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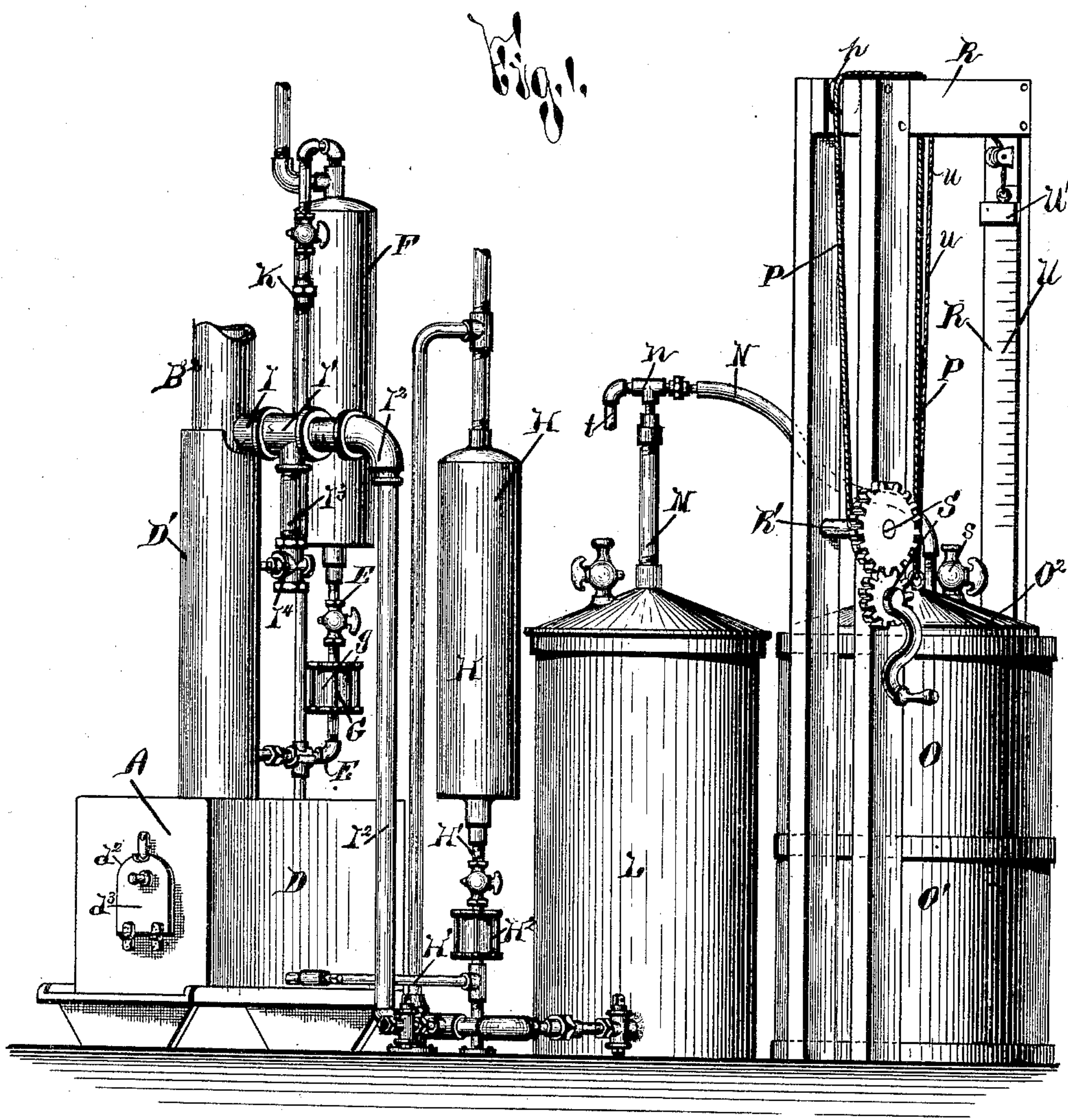
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D. E. TEAL.

# APPARATUS FOR THE MANUFACTURE OF OIL GAS.

No. 436,881.

Patented Sept. 23, 1890.



WITNESSES:

H. C. Chase,  
A. Parsons.

INVENTOR

INVENTOR  
*Daniel C. Seal*  
BY  
*George W. Hay*  
ATTORNEY



(No Model.)

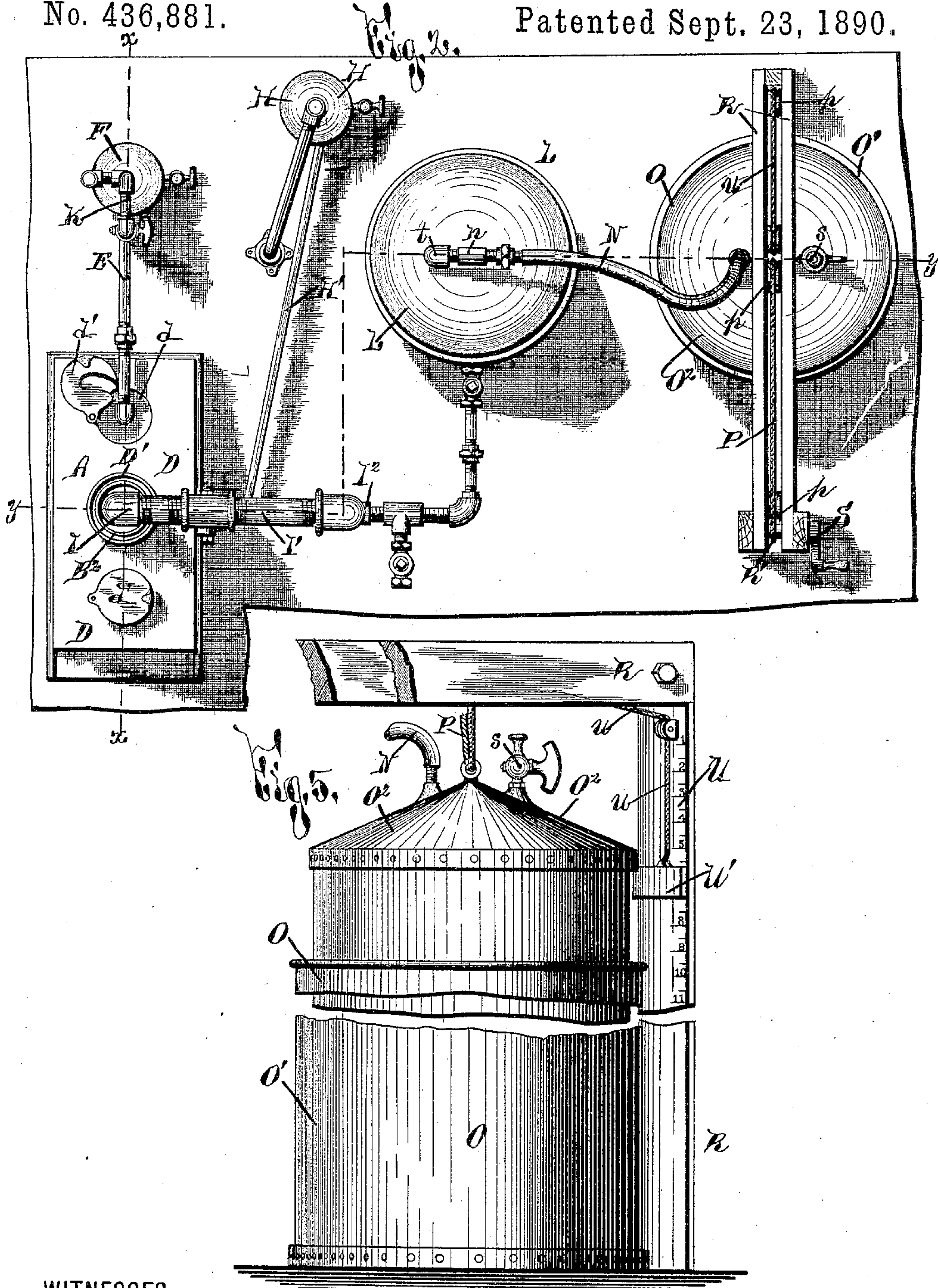
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WITNESSES:

*H. C. Chase*  
*M. Parsons*

INVENTOR

*Daniel E. Teal*

BY

*George W. Key*  
ATTORNEY



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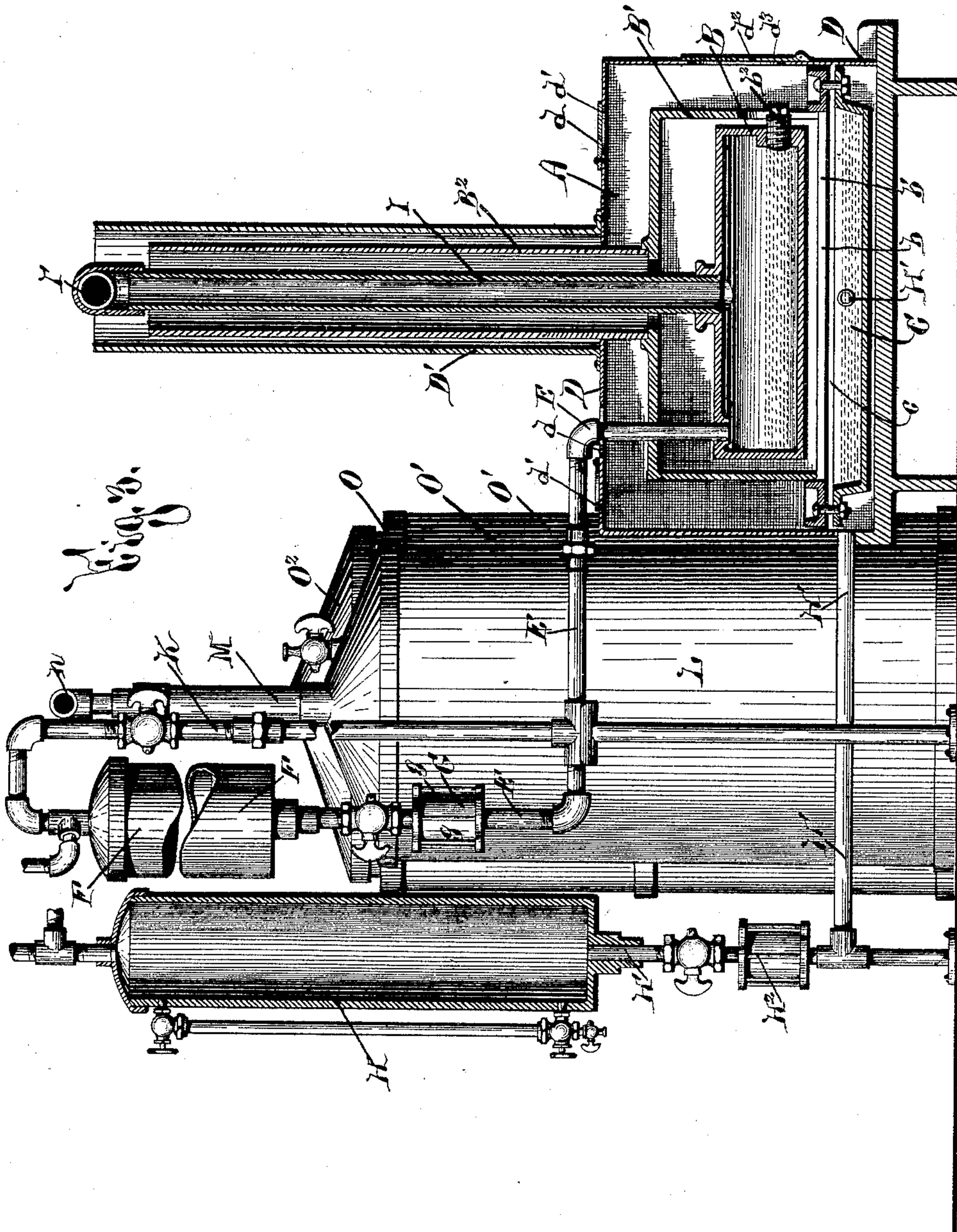
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No. 436,881.

Patented Sept. 23, 1890



WITNESSES:

*H. C. Chace,*  
*A. W. Harnes,*

INVENTOR

*Daniel E. Teal*  
BY  
*George W. Teal*  
ATTORNEY



(No Model.)

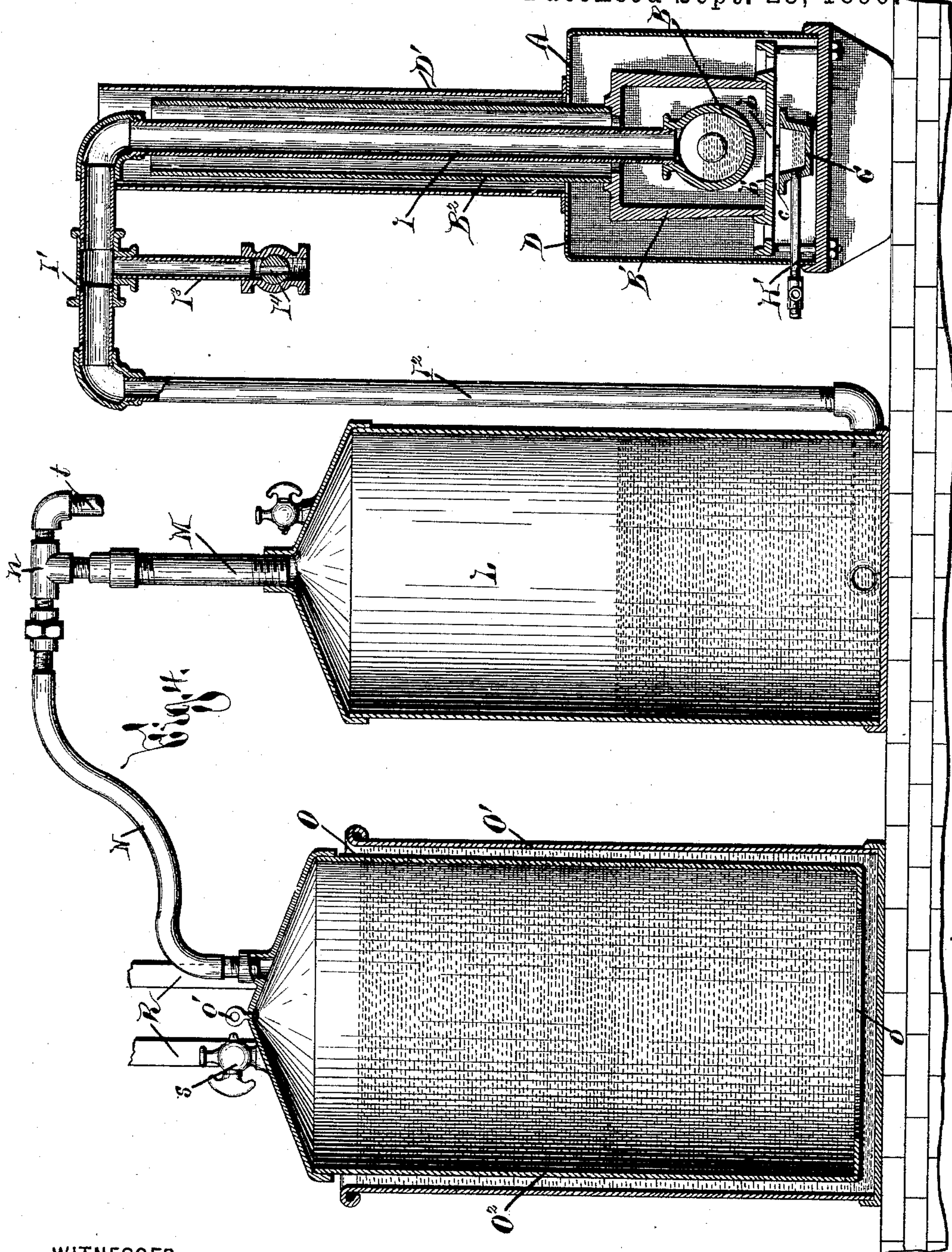
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BY

*George W. Key*  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

DANIEL E. TEAL, OF ONEIDA CASTLE, ASSIGNOR OF ONE-HALF TO HARRISON CLARK, OF NORWICH, NEW YORK.

## APPARATUS FOR THE MANUFACTURE OF OIL-GAS.

SPECIFICATION forming part of Letters Patent No. 436,881, dated September 23, 1890.

Application filed November 25, 1889. Serial No. 331,473. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL E. TEAL, of Oneida Castle, in the county of Oneida, in the State of New York, have invented new and useful Improvements in Gas-Producing Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to an improved gas-producing apparatus especially adapted for private use, but also applicable for manufacturing gas on a large scale; and it has for its object the production of a simple and effective device that is operated with but slight attention and produces at a minimum cost of expense a superior quality of gas; and to this end my invention consists, essentially, in a retort of novel and peculiar shape having a generator and a burner or heater for heating said generator, separate feeding devices for feeding oil or other suitable gas-producing material into the generator, and oil or other suitable fuel into the heater, a washer for separating the impurities from the gas, and a gasometer for storing the gas and producing a constant pressure to feed the same wherever desired.

The invention also consists in forming the gasometer of separate parts or sleeves telescoping one within the other, and in producing a vacuum in one of said sleeves, into which a desired amount of air is admitted for mixing the same with the gas and bringing it to the desired quality.

My invention furthermore consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

In describing this invention reference is had to the accompanying drawings, forming a part of the specification, in which like letters indicate corresponding parts in all the views.

Figure 1 represents an elevation of my improved apparatus, illustrating the relative arrangement of the parts. Fig. 2 is a plan view of the parts as illustrated in Fig. 1. Fig. 3 is a sectional view taken on line *x x*, Fig. 2, illustrating particularly the construction of the retort and feeders for feeding the gas containing and heating material to said retort.

Fig. 4 is a sectional view taken on line *y y*, Fig. 2, illustrating the construction of the gasometer, the washer, and the retort; and Fig. 5 is a detail view, partly broken away, illustrating the gasometer as adjusted for allowing a certain desired quantity of air to mix with the gas.

A represents the retort, which is provided with a suitable chamber or generator B for receiving the material from which the gas is to be produced, and a suitable burner C for heating said generator and evolving the gas. The generator B is of suitable form, and is constructed of any desirable material that will stand the immense heat produced by the burner C.

As best seen in Figs. 3 and 4, the chamber or gas-producer B is supported in a suitable inclosing or heating frame B', of desirable material and suitable size to enable the production of the required heat. Beneath the inclosing-case B' is the burner C, which, although it may be of any desirable form and construction, is here illustrated as a rectangular box open at the top and registered with an opening *b* in the base *b'* of the case B'.

Inclosing the described portions of my improved retort—namely, the chamber B, its heating-frame B', and the burner C—is a suitable outer inclosing-case D, formed of suitable material and of sufficient size to produce the desired draft.

As best seen in Fig. 4, a slight space *c* intervenes between the top of the burner C and the bottom of the base *b'*, which space is sufficient to allow the inlet of the desired amount of air to said burner. The outer inclosing-case D of the retort A is provided with suitable inlet-openings *d*, having suitable covers *d'*, which openings are preferably at the top, and thus admit the air at the top of said case, whence it circulates around the heated inner frame B', and becomes greatly heated before feeding to the burner C, thus producing an intense heat and a perfect combustion. The draft of the retort may be shut off by opening the cover *d'*, mounted over an opening *d* in the side of the outer frame or case D, and by this means when the heat of the burner is too great it can be regulated as desired.



I prefer to use crude petroleum both as fuel and gas-producing material, since the same is cheaply obtained, produces the best results for either purpose, and the flow thereof can be absolutely regulated, as desired.

Extending from the upper part of the generator B is an inlet-pipe E, which is connected to a suitable petroleum-containing reservoir F, for feeding the petroleum into said generator.

Interposed in the pipe E is a suitable adjuster or regulator G for varying the flow of the petroleum and provided with glass or other transparent sides  $g$ , enabling the operator to readily observe the amount of flow of the petroleum. I also provide an additional petroleum-containing reservoir H, connected by a suitable pipe H' to discharge petroleum within the burner C. This pipe H' is also provided with a suitable adjuster H<sup>2</sup> of like construction to the adjuster G, but it will be understood that these adjusters or regulators G and H<sup>2</sup> form no part of my present invention, and consequently a further description thereof is unnecessary, it being understood that these said parts enable the operator to positively gage the amount of flow of the petroleum, both to the chamber B and to the burner C. If desired, these petroleum-containing chambers H and F may be connected to a suitable prime petroleum-containing chamber, or they may be one and the same chamber having separate connections leading, respectively, to the chamber or retort B and the burner C.

Connected to the upper part of the chamber B is the gas-discharging pipe I, extending upwardly through an extension or flue B<sup>2</sup> of the inner heating-case B', surrounding the burner B. Inclosing this upward extension B<sup>2</sup> is an extension D' of the outer casing D, between which and the extension B<sup>2</sup> a suitable space intervenes, preventing radiation therefrom and retaining the heat within the outer inclosing-case.

It will be understood that when a suitable amount of petroleum is by the pipe H' fed into the burner C, a match or other suitable lighter is applied thereto and the petroleum bursts into a blaze, which quickly heats the gas-generator B. The flow of the petroleum to the burner C is then adjusted so that a constant supply is furnished equal to that consumed by combustion. The petroleum admitted by the pipe E within the generator B is soon compelled to evolve gas by the great heat produced, and it will also be understood that a constant flow of the oil is produced by means of the adjuster G, thus rendering the operation of the generator continuous.

As for the sake of cheapness I prefer to use crude petroleum, it becomes necessary to provide a means of cleaning the generator B, since there is more or less sediment deposited therein as the gas is evolved. Accordingly I provide in the end of said generator a suitable plug  $b^2$ , which can be removed when de-

sired, allowing a brush, scraper, or other suitable means to be used for removing said sediment.

When, as described, the heat from the burner C produces gas within the generator or chamber B, it will be understood that the pressure thereof will force backward the incoming petroleum in the pipe E and prevent the continuous operation of the generator. To obviate this difficulty, I provide a connection K of suitable form and construction, which extends from the pipe E to the upper part of the receptacle F, and conducts the gas to the top of said fuel-containing chamber, producing a pressure in its top which equalizes the pressure forcing backward the petroleum, and thereby allows the same to constantly feed into the generator, as desired. This equalizing of the pressure against the entrance of the gas is a feature of great advantage, rendering practical the operation of feeding the fuel directly into the said generator, and this feeding is continuous, irrespective of the degree of pressure generated within said gas-producing chamber B, since the pressure upon the incoming petroleum is absolutely equalized.

The gas generated within the chamber B passes upward and outward by means of the pipe I, but it is evident, that although the petroleum is quickly and indeed instantly changed into gas upon its entrance within the heated chamber B, there is yet more or less of the gas that is not entirely evolved, and consequently the advantage of my invention is greatly increased by means of the inclosing chamber or flue B<sup>2</sup>, which conducts the heat directly upward from the burner and brings the same in direct contact with the gas-discharging pipe I. By this superheating of the gas in the discharge-pipe I it is evident that the entire amount of gas contained in the petroleum is evolved, thus producing the maximum amount of gas from the petroleum. In practice I have observed that this entire chamber or flue B<sup>2</sup> becomes excessively hot by the immense heat generated, thus rendering its operation as a superheater extremely powerful; but this is further augmented by the cushion of air interposed between the same and the chamber D'. The pipe I, after ascending the desired distance, is extended laterally at I' for a required length, then deflected downward, and at I<sup>2</sup> afterward passed into the base of a suitable washer L, filled with water or other desirable liquid for separating the impurities from the gas.

As preferably constructed, the lateral portion I' of the pipe I is provided with the downward extension I<sup>3</sup>, provided with a suitable gate or valve I<sup>4</sup>, allowing the sediment within said pipe to be readily blown out, and also enabling any moisture which may accumulate in said pipe to feed into the portion I<sup>4</sup> and be then withdrawn when desired.

Leading from the washer L is a suitable pipe



M, provided with a connection *n*, attached to one extremity of a flexible pipe N. This flexible pipe discharges into the gasometer O, which is of peculiar construction, designed especially to mix with the gas a desired quantity of air to produce the desired quality. Experience has demonstrated that in practice the gas produced from crude petroleum is of a far better quality than is desirable to burn and that a more desirable gas for use is produced by mixing therewith a desired quantity of air, varying according to the purpose for which said gas is intended or its required brilliancy. This gasometer O consists of an outer case or receptacle O', formed of suitable material and filled with water or other liquid. Telescoping within the case or chamber O' is a gas-containing chamber O<sup>2</sup>, also formed of suitable material and provided with the opening *o* in the lower extremity thereof to allow said chamber to become filled with water and also allow for the outlet of the water when gas is discharged into the top thereof. The pipe N discharges into the upper part of the chamber O<sup>2</sup>, and it will be understood that the said chamber is constantly elevated accordingly as the volume of the gas increases.

Provided at the top of the gas containing receptacle O<sup>2</sup> is a suitable engaging means *o'*, connected to a cord P, passing over pulleys *p*, mounted upon the frame R. The opposite extremity of said cord is wound upon a drum R', and by means of suitable actuating mechanism S the said gas-containing chamber may be readily elevated after the desired amount of gas has been discharged thereinto. It is evident that a vacuum is then produced and that by opening a cock or valve *s* leading into the upper part of said chamber O<sup>2</sup> this vacuum is immediately filled with air, which then mixes with the gas. After the inlet of the air the valve or cock *s* is closed, whereupon the weight of the gas-containing receptacle causes the gas to be under a constant pressure sufficient to conduct the same through any desired pipe connected at any suitable point, as *t*, to the pipe N.

In order to accurately determine the relative proportion of the gas and the air, I provide a suitable gage U, preferably formed upon the supporting-frame for the gas-containing chamber O<sup>2</sup>. Sliding along this gage U is a suitable indicator U', connected by a cord *u* to the top of the said chamber O<sup>2</sup> and operated to slide down said gage as the said chamber is elevated and indicate its elevation.

My improved gas-producing apparatus is very simple in construction and operation, and after the desired adjustment of the adjusters or regulators the retort requires no further attention, since the feed of the fuel and the material to be converted into gas is only sufficient to supply the loss from combustion and evolution.

An additional feature of advantage of my apparatus is its adaptability for private use,

since it may be constructed on a very simple scale, and is amply sufficient for the production of gas for family use, thereby enabling farmers or other persons isolated from cities or towns having gas-works to produce their own gas with but little attention, as set forth, and with great convenience.

The operation of my invention will be readily perceived from the foregoing, and it will be understood that the detail construction and arrangement of the parts may be somewhat varied from that described without departing from the spirit of my invention.

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

1. In a gas-producing apparatus, the combination of a gas-generating chamber consisting of a closed hollow shell, an inlet-pipe of less diameter than said shell for discharging hydrocarbon within the same and allowing expansion of the hydrocarbon, an outlet pipe of less diameter than said generating-chamber for withdrawing the gas from the same, an outer closed heating-frame surrounding said closed gas-generating shell and provided with an opening for the passage of said gas-outlet pipe, a burner discharging within said heating-frame for heating the gas-generating chamber, an outer case around said heating-chamber, and an air-inlet through said outer case for passing the incoming current of air around said heating-chamber, substantially as described.

2. In a gas-producing apparatus, the combination of a gas-generating chamber consisting of a closed hollow shell, an inlet-pipe of less diameter than said shell for discharging hydrocarbon within the same and allowing expansion of the hydrocarbon, an outlet-pipe of less diameter than said generating-chamber for withdrawing the gas from the same, an outer closed heating-frame surrounding said closed gas-generating shell and provided with an opening for the passage of said gas-outlet pipe, a burner consisting of a hollow shell having a fuel-receiving cavity arranged beneath said gas-generating chamber, an air-space between said burner-shell and the gas-generating chamber for admitting the passage of air to the burner, an outer case outside of the heating-frame, and an air-inlet through said outer case for passing a current of air over the heating-frame and through the space between said burner and generating-chamber, substantially as set forth.

3. In a gas-producing apparatus, the combination of a gas-generating chamber, a gas-conducting pipe leading from the generating-chamber, a burner for heating said generating-chamber, a heating frame or chamber around the gas-generator, a flue leading from the heating-chamber and surrounding said gas-conducting pipe for passing the heat around said pipe, an outer case or frame around the heating-chamber, and an air-inlet through said outer frame for passing a cur-



rent of air over the heating-chamber to the burner, substantially as and for the purpose specified.

4. In a gas-producing apparatus, the combination of a gas-generating chamber, a gas-conducting pipe leading from said gas-generating chamber, a heating frame or chamber around the gas-producing chamber and provided with an opening in the wall thereof, a burner for passing a heated current through the opening in the heating-frame and heating the gas-generating chamber, a space between said heating-chamber and burner, a flue leading from said heating-chamber and surrounding the gas-conducting pipe for passing the heat around said pipe, an outer case

or frame around the heating-chamber, a flue leading from said outer case and surrounding said former flue, and an air-inlet through said outer frame for passing a current of air over the heating-chamber, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 12th day of November, 1889.

DANIEL E. TEAL.

Witnesses:

CLARK H. NORTON,  
M. BAXTER.