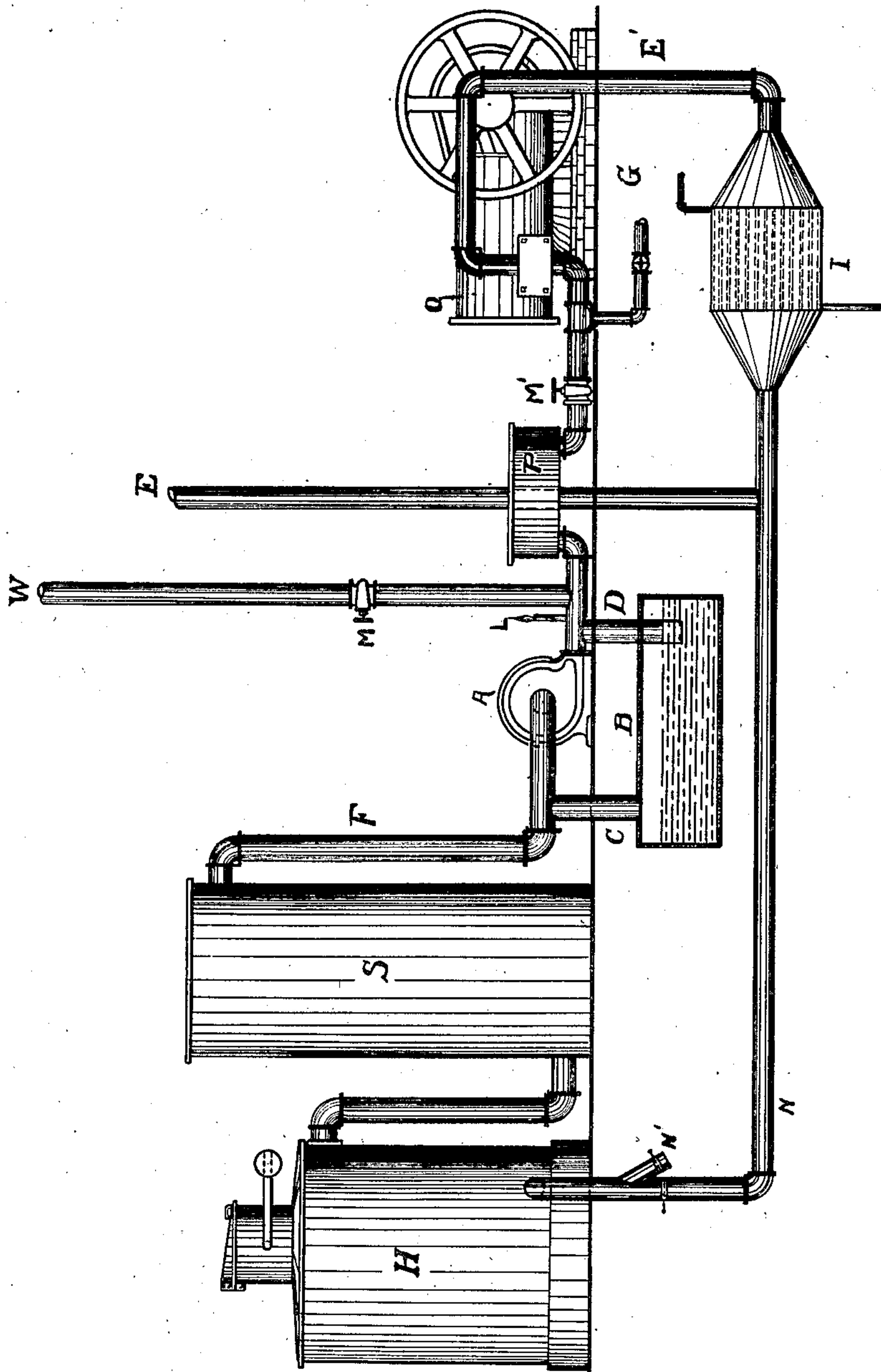


No. 810,685.

PATENTED JAN. 23, 1906.

G. M. S. TAIT.
POWER GAS APPARATUS.
APPLICATION FILED OCT. 21, 1905.



WITNESSES:

Warren E. Dixon.

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By
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Atty-

UNITED STATES PATENT OFFICE.

GODFREY M. S. TAIT, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO COMBUSTION UTILITIES COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

POWER GAS APPARATUS.

No. 810,685.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed October 21, 1905. Serial No. 283,839.

To all whom it may concern:

Be it known that I, GODFREY M. S. TAIT, a subject of the King of Great Britain, and a resident of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Power Gas Apparatus, of which the following is a specification.

This invention relates to power gas apparatus in which a partial vacuum is maintained in the gas-producer, while at the same time the gas is delivered under a constant predetermined pressure to the engine.

The objects of this invention are to provide a means for automatically maintaining a constant gas-pressure at the engine regardless of the rate at which the gas is consumed, to provide a visual means for testing the quality of the gas when the plant is running without changing the conditions of operation at the time of making such test, and to reduce the time and labor attendant upon the operation of starting and stopping the apparatus.

My apparatus comprises a gas-producing chamber or gas-producer, or series thereof; a gas purifier or washing device, such as a scrubbing-tower; an internal-explosion engine wherein the potential energy of the gas is converted into mechanical motion, and a means for the automatic regulation of the gas-pressure at the gas-producer and at the engine, as will be hereinafter described.

My apparatus is preferably operated in conjunction with apparatus for cooling the products of combustion of the engine and for their introduction in such amount as may be required into the gas-producer in a manner described and claimed in United States Patent No. 795,258, granted to Carleton Ellis July 18, 1905.

In the accompanying diagrammatic drawing the gas-producer, scrubber, and internal-combustion engine are shown in elevation and the automatic controlling device for the regulation of the gas-pressure is shown partly in section.

In the drawing, H is a gas-producer provided with a hopper for the introduction of fuel and with other accessories customary in the usual practice of the present day, although it is not deemed necessary to here show such features of construction, they being well known in the art. Connected to the

gas-producer is the scrubbing-tower S of any well-known type.

F is the outlet-pipe leading from the scrubber to the fan-blower A, the outlet of which leads to a purifier P and from thence to the cylinder of the engine.

The pipes C and D, together with the chamber B, form a by-pass around the fan A. The chamber B is partially filled with water in order to seal the extremity of the pipe D, which projects downwardly into the chamber B for some distance on the outlet side of the chamber, and between the fan-purifier is placed a burner L, at which point the gas may be sampled or tested for quality by ignition. In this portion of the gas-conduit is placed the exhaust-pipe W, having the valve M, through which gas from the producer may be discharged when not needed at the engine.

M' is a valve regulating the flow of gas to the engine. An inlet-pipe G at this point serves to admit illuminating-gas for the purpose of starting the engine. The exhaust of the engine passes through the pipe E' to the cooler I, which consists in this case of a spindle-shaped receptacle containing a nest of pipes, through which water may be passed and around which the waste gases of the engine may be caused to flow, thereby reducing their temperature to the desired degree. From thence a pipe N conveys the gases to the producer. An air-inlet N' is situated in this pipe, and dampers are provided to regulate the flow of air and products of combustion. A discharge-pipe E is also connected with the pipe N in order that the excess of waste gases may be discharged at any suitable point.

The operation of the apparatus is as follows: A fire of suitable depth is built in the producer H in accordance with the usual practice, the draft, however, in this case being an induced one; thereby differing from the present suction type of producer in which a blower supplies pressure for starting, while the engine supplies the suction while running. The engine is started on illuminating-gas or gas from a storage-tank, and as the blower A is belted thereto an induced draft is formed from the producer H, through the scrubber S and pipe F, to the blower, at which point the gas is placed under pressure and passes out through the waste-pipe W, the valve M being

open. Some of the gas will also escape through the burner L and when rich enough burns with a blue flame. When gas of this quality is secured, the valve M is closed and the valve M' is opened. The gas then flows through the purifier or gas-filter P to the engine O. The auxiliary gas-supply G may now be cut off, as the engine will thenceforth draw sufficient gas directly from the producer. The exhaust passes through the pipe E' to the cooler I. Part of the gases escape through the pipe E to the atmosphere and the balance passes through pipe N to the producer and mixes with the air entering at N', thereby making a mixture containing carbon dioxid, which subsequently is reduced in the producer to carbon monoxid. By suitably proportioning the air to the products of combustion a mixture may be found which will maintain the gas-producer at the temperature demanded for effective gasification. Should the engine require less gas than the blower A is delivering, the excess will pass down pipe D into the water-seal chamber B and out through the pipe C back into the gas-main thereof, thus by-passing or short-circuiting the blower A and preventing any change in pressure of the gas supplied to the engine O. By regulating the depth of water in the chamber B any desired pressure can be obtained at the engine. It will be seen that this arrangement permits of the use of gas under pressure for other than power purposes, which heretofore has been practically impossible, owing to the utilization of the suction of the engine for the withdrawal of the gas from the producer.

Should it be deemed desirable, the blower A may be operated by some source of power other than by the engine O, in which case the gas connection G may be omitted. The location of the waste-gas outlet W need not be necessarily at the point indicated, but may be placed elsewhere, if desired. For starting

purposes connections may be made between the producer and engine around the fan and seal, thereby permitting the engine to be started as in present suction-producer practice.

I do not limit myself to the construction herein described and have therefore diagrammatically indicated the various features comprising my invention organized into a plant or apparatus suitable for the purpose; but it will be evident to those skilled in the art that numerous modifications may be made of the construction herein set forth without departing from the scope of this invention.

What I claim is—

1. A combination of a suction-producer; an internal-explosion engine; a connecting-conduit; interposed in said conduit a fan-blower having a liquid-seal by-pass, whereby gas may be delivered under a constant predetermined pressure to the engine, substantially as described.

2. A combination with a suction-producer; a scrubber; a gas-purifier; and gas-engine; a connecting-conduit, of a fan-blower interposed between the gas-producer and the engine having a water-seal by-pass whereby gas is withdrawn from the producer and is supplied to the engine under predetermined pressure.

3. Power gas apparatus which comprises a gas-producer; an internal-explosion engine; a connecting-conduit; a mechanical draft appliance interposed in said conduit and a water-seal by-pass around said mechanical draft appliance whereby producer-gas is delivered to the engine under constant predetermined pressure.

Signed at New York city, in the county of New York and State of New York, this 4th day of October, A. D. 1905.

GODFREY M. S. TAIT.

Witnesses:

JAS. K. CLARK,
CARLETON ELLIS.