

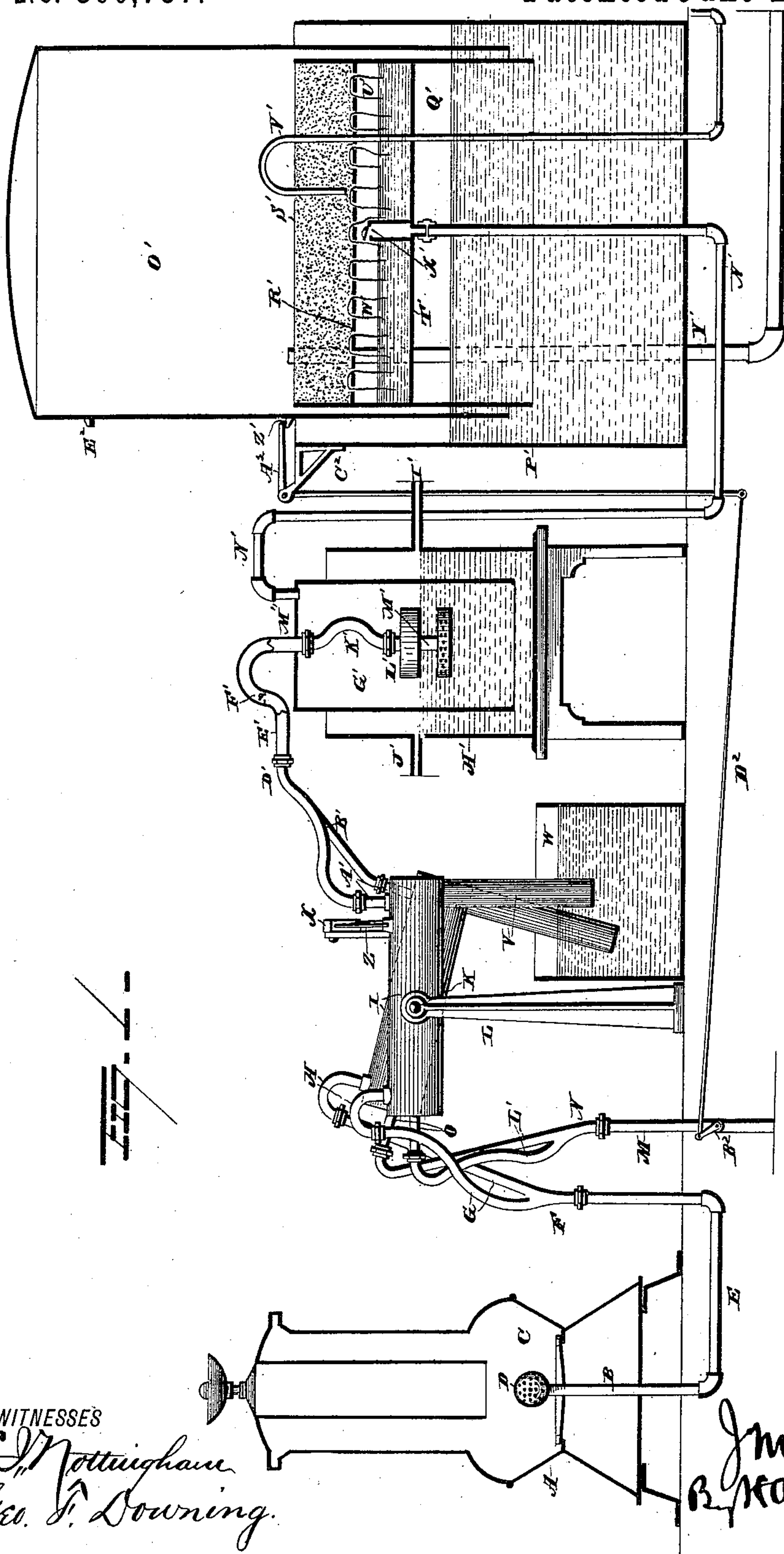
(No Model.)

2 Sheets—Sheet 1.

J. M. BOIS.
GAS APPARATUS.

No. 300,757.

Patented June 24, 1884.



WITNESSES

E. Nottingham
Geo. S. Downing.

INVENTOR

J M Bois.
R. H. S. Symons

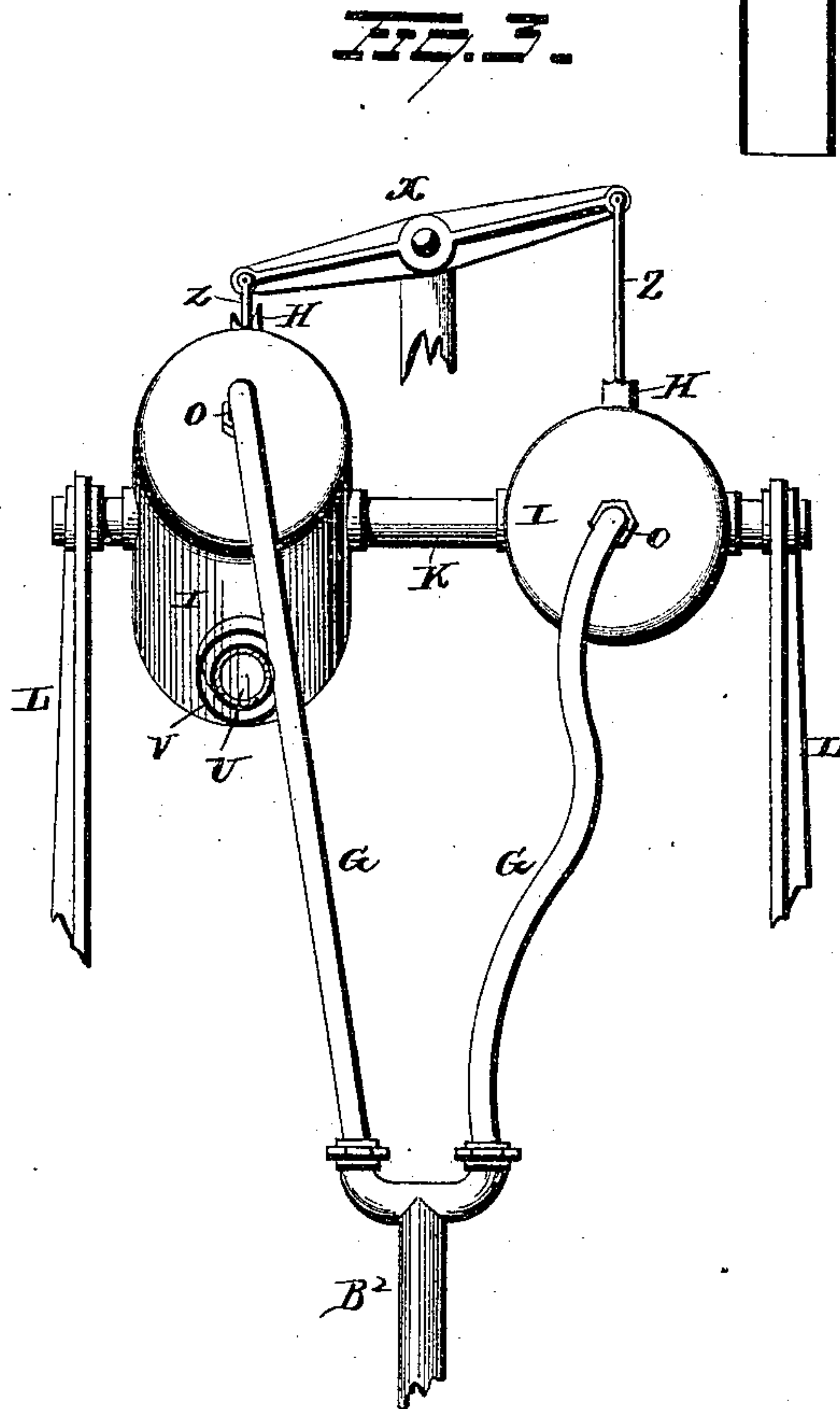
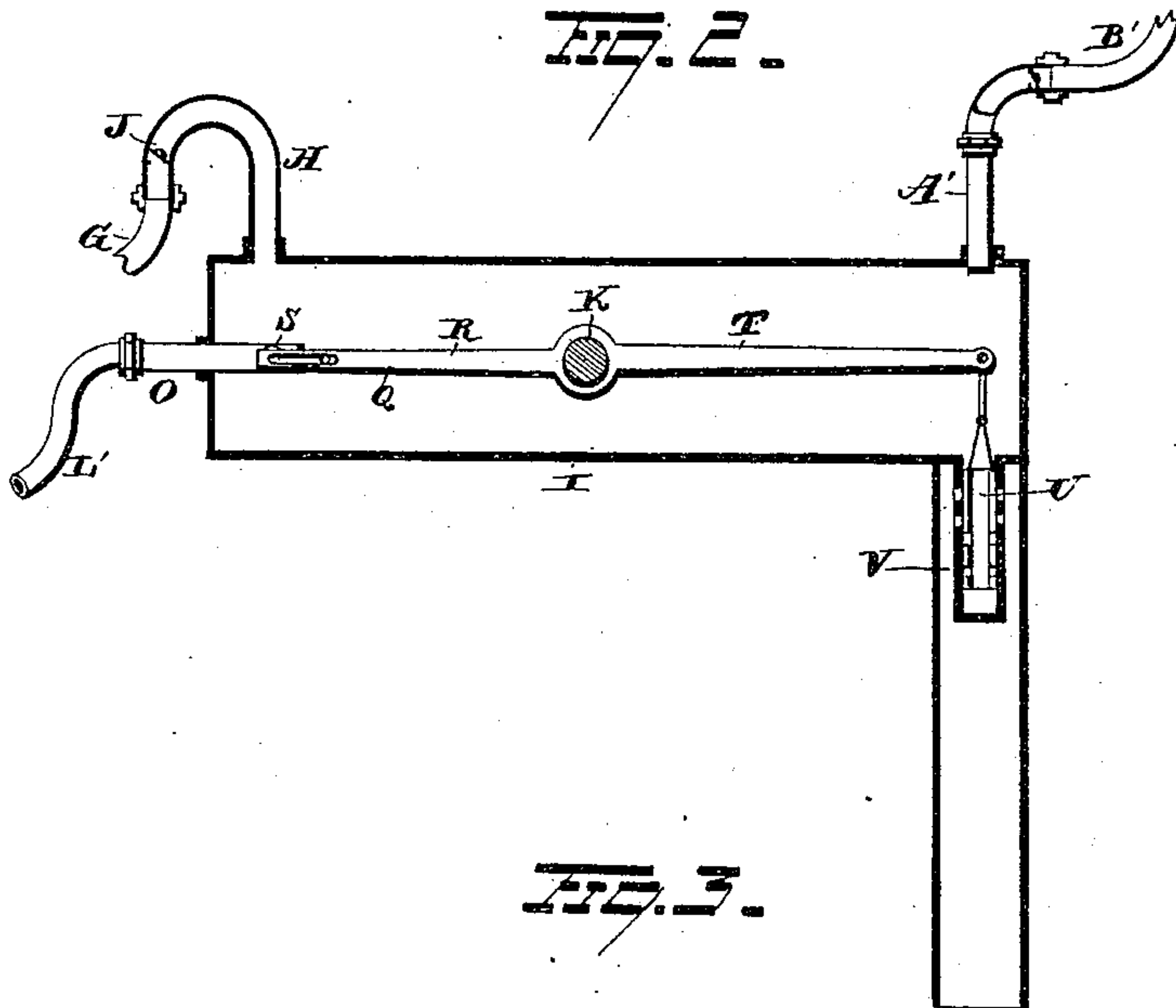
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UNITED STATES PATENT OFFICE.

JAMES M. BOIS, OF EAST AURORA, NEW YORK.

GAS APPARATUS.

SPECIFICATION forming part of Letters Patent No. 300,757, dated June 24, 1884.

Application filed July 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES MELVIN BOIS, of East Aurora, in the county of Erie and State of New York, have invented certain new and useful Improvements in Gas Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in apparatus for generating, purifying, and carbureting gas, the object being to produce an improved quality of gas at a comparatively low expense.

With this object in view my invention consists in an apparatus having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, partly in side elevation and partly in vertical longitudinal section, of an apparatus constructed in accordance with my invention. Fig. 2 is a detached view, in vertical longitudinal section, of one of the pumping-cylinders; and Fig. 3 is a view in end elevation of both of the said cylinders.

In the drawings, A represents a magazine-stove of any suitable form and construction. A pipe, B, rising centrally within the combustion-chamber C of the said stove, is surmounted by a hollow ball, D, adapted to withstand the heat of the burning fire and filled with perforations. A pipe, E, attached to the lower end of the pipe B aforesaid, communicates at a point conveniently remote from the stove with a flexible pipe, F, having two branches, G, respectively connecting with curved pipes H, secured to the outer ends of the cylinders I. Valves J, located within the said pipes H, are designed to prevent any gas from being forced back into the stove after it has once entered the cylinders, which are hung eccentrically upon a fixed horizontal shaft, K, mounted in upright bearings L, as shown, the cylinders being balanced or poised in any suitable manner. They are operated by being alternately filled with water, one being filled with water and emptied of gas while the other is being emptied of water and filled with gas, as will be hereinafter described. The

water is brought to the cylinders by a conduit, M, supplied from any convenient source, and connected to a flexible pipe, N, having two branches, L', which are respectively attached to short pipes O, mounted in and extending into the outer ends of the cylinders. Levers R, situated within the cylinders and rigidly secured to the shaft K, upon which they are mounted, are employed for controlling the inflow and outflow of water into and from the cylinders. The arms Q of the said levers are attached to stop-cocks S, located in the projecting inner ends of the pipes O, while the arms T of the levers are attached to valves U, located in pipes V, depending from the inner ends of the cylinders. The lower ends of said pipes V extend into and are constantly immersed in a tank, W, filled with water, the object being to exclude air from the cylinders and to prevent the escape of gas therefrom. The said stop-cocks and valves are arranged so that as the cylinders are respectively depressed and changed in position with respect to the stationary levers R, the stop-cocks will be closed and the valves opened. On the other hand, as they are respectively restored to their normal positions with respect to their levers, the reverse operation takes place, the stop-cocks being opened and the valves closed. Inasmuch, then, as the cylinders are depressed and elevated alternately, and as one is always depressed and the other always elevated, one will always be filling with water and the other discharging it. As the water is discharged from one cylinder, a vacuum is produced therein, and the gas from the stove flows into the cylinder as fast as the water flows out. When, therefore, the cylinder is completely empty of water, it is filled with gas. The inflow and outflow of water into and from the respective cylinders is so timed that as soon as the water of one is discharged the other is full. Here it is to be explained that each cylinder is arranged to retain its poised or elevated position until it is completely filled with water. When this occurs, the equilibrium or poise is destroyed, and the inner end of the cylinder is depressed by an excess of water therein over that in its outer end. The two cylinders are connected by a walking-beam, X, mounted in an upright standard, and having its ends con-

connected to the cylinders by means of the links Z. In virtue of being united by this walking-beam the descent of one cylinder will operate to raise the other, from which all water has been discharged, but which is filled with gas. The inner ends of the cylinders are provided with pipes A', to which the branches B' of the flexible pipe D' are respectively attached, the said pipe D' being connected to a curved pipe, E', provided with the valve F', and leading into the purifier. The operation of raising the depressed cylinder will close its discharge-valve and operate its stop-cock, allowing water to flow in and displace the gas with which it was filled while the preceding charge of water was being emptied. The gas thus expelled will be forced into the purifier through the pipes above described. The function of the valve F' is to prevent the gas from being drawn back from the purifier into the cylinders, to replace the water discharged from them.

The purifier consists, essentially, of a vessel, G', inverted in a tank, H', containing lime-water or other equivalent liquid purifier, the said tank H' being provided with an induction-pipe, I', and an eduction-pipe, J', whereby a constant circulation of the lime-water through the tank may be provided for, if desired. The gas is introduced into the water through a disk, K', having a perforated periphery, and sustained at a constant depth in the water by means of a float, L', mounted on the short pipe M', to the lower end of which the perforated disk aforesaid is attached. A flexible pipe, M'', connecting the pipes E' and M', permits the float to rise and fall, to compensate for changes in the elevation of the lime-water, and thus avoid fluctuations in the depth to which the disk is immersed. The object in keeping the disk constantly immersed to the same depth is to avoid variations in the amount of pressure required to force the gas into and through the lime-water. The purified gas is conveyed from the purifier to the gasometer by means of the pipe N' rising centrally in the gasometer, which consists, essentially, of a vessel, O', inverted in a tank, P', partially filled with water. A cylinder, Q', located within the vessel O', and having its lower end immersed in the water in the tank P', is adapted to contain the material for enriching the gas. With this end in view it is provided with a diaphragm, R', arranged to support a mass, S', of any suitable absorbent material. An imperforate diaphragm, T', located below the diaphragm R' aforesaid, incloses a chamber, U', which is partially filled with liquid hydrocarbon, supplied thereto through the pipe V'. Wicks W', depending from the perforated diaphragm, and having their lower ends immersed in the oil, operate by capillary attraction to draw the oil up into the absorbent material. The pipe N', which, as before described, rises centrally within the gasometer, terminates just below

the perforated diaphragm R', the gas being forced to rise through the saturated absorbent S'. A valve, X', located in the upper end of said pipe, is designed to prevent the gas from being forced back through the pipe should the pressure in the gasometer at any time be greater than that in the purifier. The purified and enriched or carbureted gas is conveyed away from the gasometer for use through the main or pipe Y'. As soon as the gasometer is filled to its capacity, a lug, Z', located on the side of the vessel O', engages with a bell-crank lever, A², and closes the cock B², located in the water-conduit M, the said lever A² being mounted in a bracket, C², attached to the side of the tank P', and connected with the said stop-cock by means of a link or rod, D². The pumping-cylinders are stopped by cutting the water off, and consequently no more gas will be drawn from the generator until they are started again. This is effected when the gasometer is about exhausted by the lug E², which depresses the bell-crank and opens the stop-cock.

It is apparent that the apparatus herein described is susceptible of being changed and altered in details of construction without departing from the principle involved. The stove, for instance, may be replaced by any other generator, and the purifier, gasometer, and carburetor may also be altered or replaced by other devices. I would therefore have it understood that I do not limit myself to the exact construction shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a gas apparatus, the combination, with a generator, of pumping-cylinders connected with the generator and a water-supply, and devices whereby one cylinder is filled with water and emptied of its gas while the other is being filled with gas and emptied of water, substantially as set forth.

2. In a gas apparatus, the combination, with a generator, of a gas-pipe surmounted by a perforated ball located in the combustion-chamber of the generator, and pumping-cylinders connected with the gas-pipe of the generator, and with a water-supply, and arranged to operate alternately in withdrawing the gas from the generator.

3. In a gas apparatus, the combination, with a generator, of two pumping-cylinders poised upon a common fulcrum, and arranged to be depressed when filled with water, inlet and outlet water and gas connections for each cylinder, and a walking-beam uniting the two cylinders, substantially as set forth.

4. In a gas apparatus, the combination, with a generator, of two pumping-cylinders eccentrically hung upon a common fulcrum and poised, inlet and outlet water and gas connec-

tions for each cylinder, and a walking-beam uniting the cylinders, substantially as set forth.

5 In a gas apparatus, the combination, with a generator, of two pumping-cylinders poised upon a stationary fulcrum, levers located within the cylinders and rigidly secured to the said stationary fulcrum, and inlet and outlet water-valves located in the cylinders and attached to the opposite ends of the levers, and
10 operated by the oscillations of the cylinders upon their fulcrum, substantially as set forth.

6. In a gas apparatus, the combination, with a generator, of two pumping-cylinders poised upon a stationary fulcrum, inlet and outlet
15 water connections for each cylinder, and means for discharging the water from the cylinders below the surface of another volume of water, substantially as set forth.

7. In a gas apparatus, a purifier consisting,
20 essentially, of a vessel inverted in a tank containing a purifying-liquid, and provided with

a flexible inlet-pipe, a short pipe secured to the end of the flexible pipe, perforated disk secured to the lower end of the short pipe, and a float secured to the short pipe above the
25 perforated disk, substantially as set forth.

8. In a gas apparatus, the combination, with a generator, of two pumping-cylinders arranged to be actuated by water in withdrawing the gas from the generator and gasometer, 30 and a system of levers arranged to employ the rise and fall of the gas-tank, to shut off and turn on the water-supply of the pumping-cylinders, substantially as set forth.

In testimony whereof I have signed this
35 specification in the presence of two subscribing witnesses.

JAMES M. BOIS.

Witnesses:

G. D. SERMON,

E. I. NOTTINGHAM.