

No. 617,632.

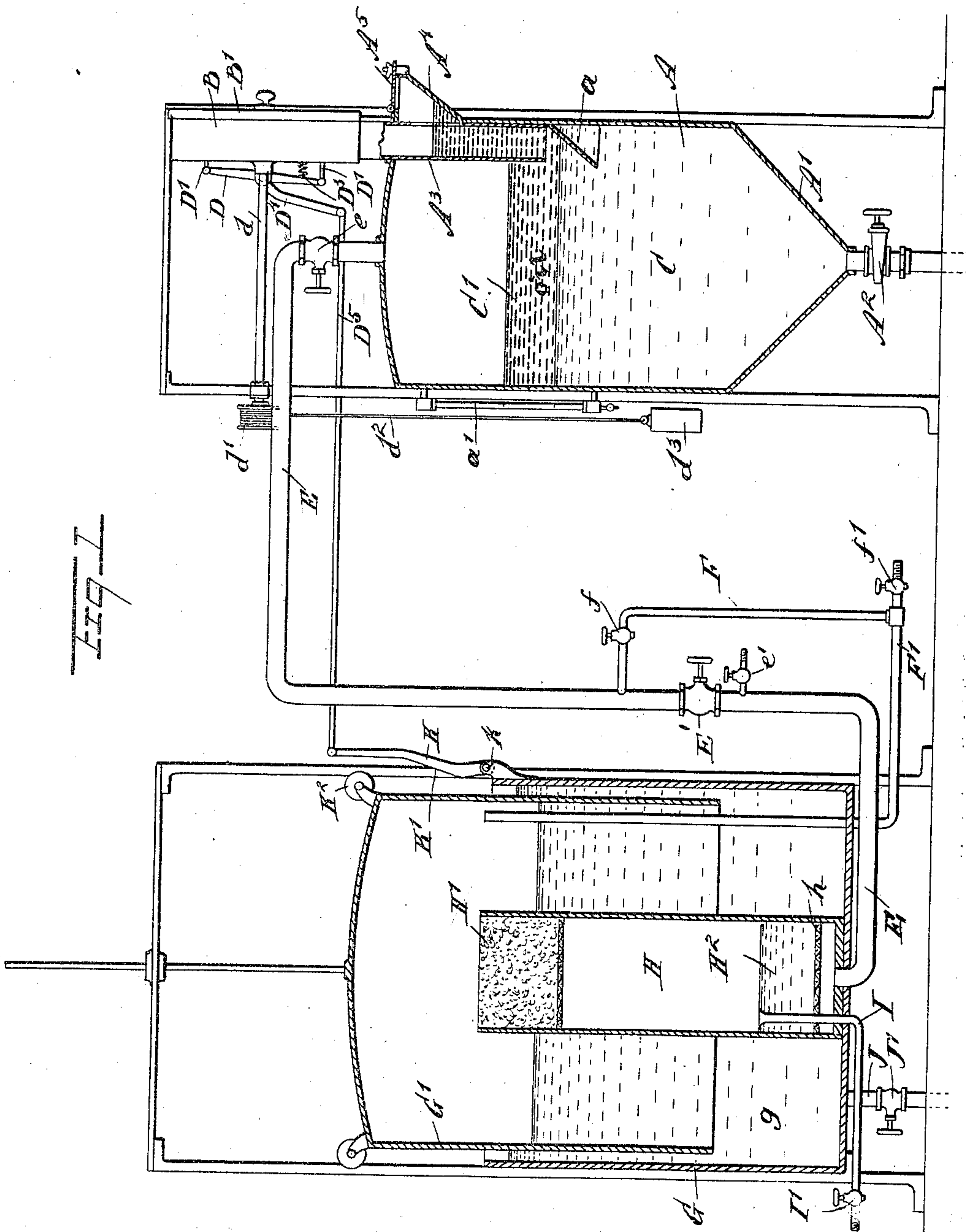
Patented Jan. 10, 1899.

E. BOURNONVILLE.  
ACETYLENE GAS APPARATUS.

(Application filed July 8, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

H. Walker

H. L. Reynolds.

INVENTOR

E. Bournonville

BY

Munn & Co.  
ATTORNEYS.

**No. 617,632.**

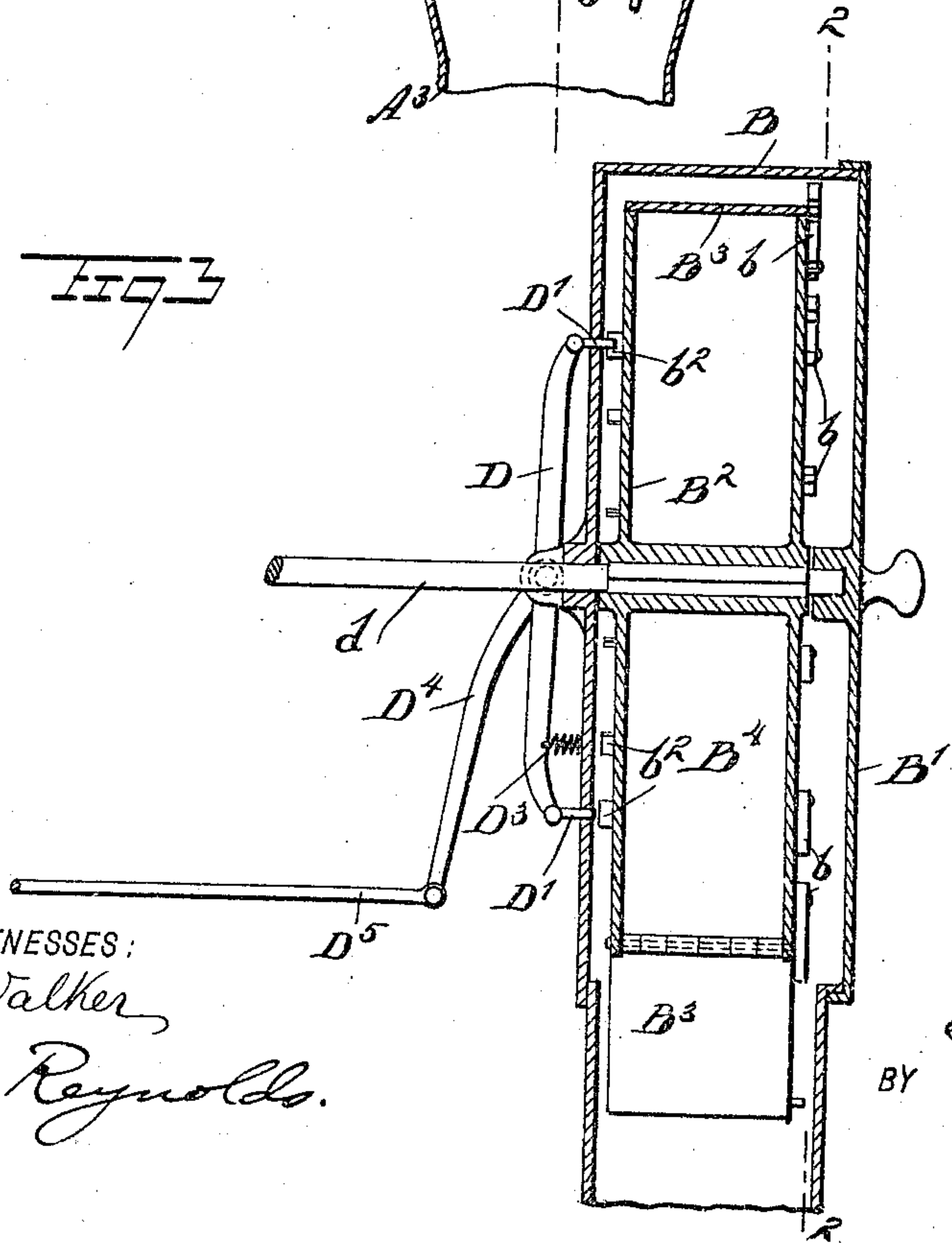
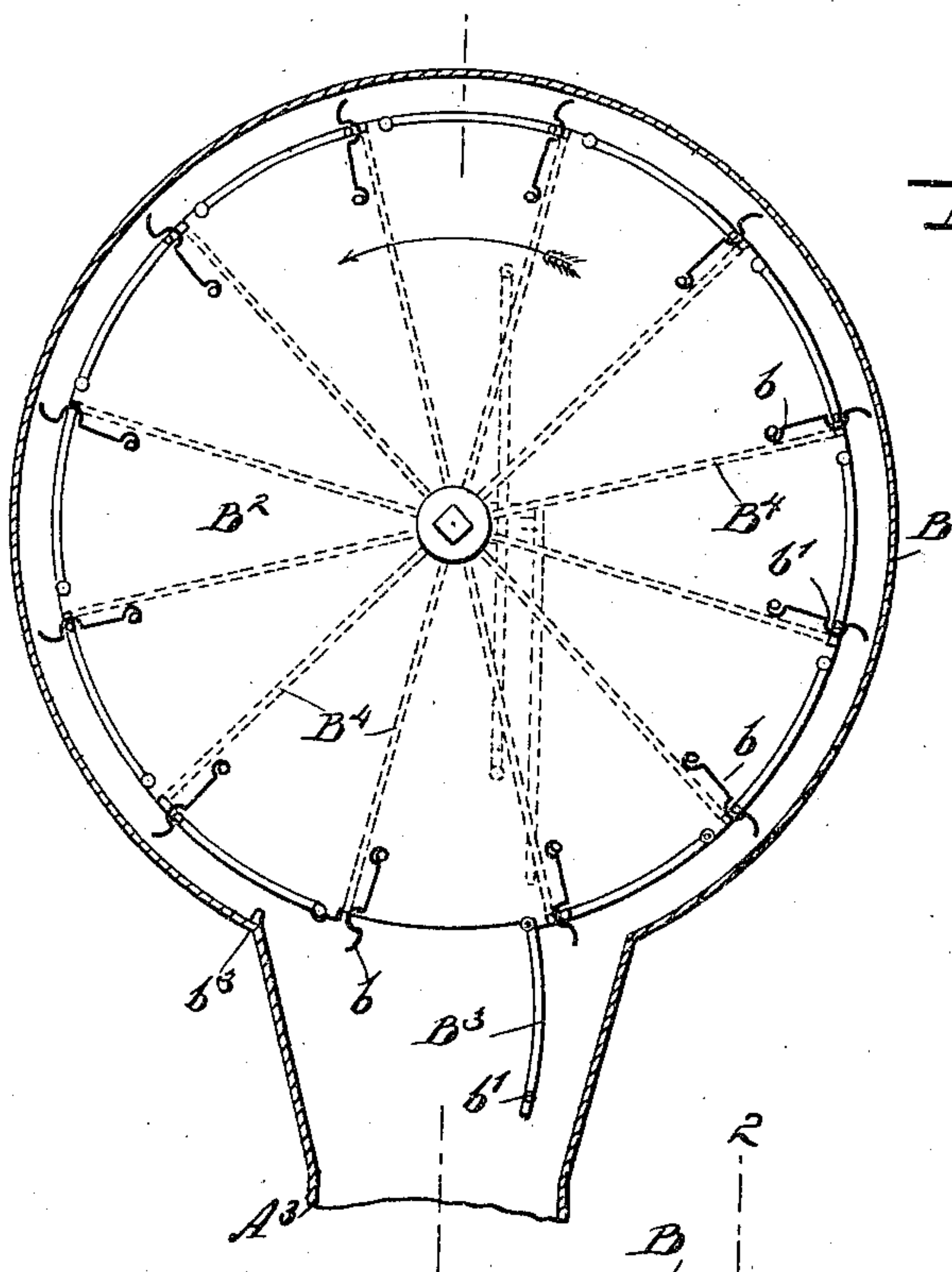
**Patented Jan. 10, 1899.**

**E. BOURNONVILLE.**  
**ACETYLENE GAS APPARATUS.**

(Application filed July 8, 1897.)

(No Model.)

**2 Sheets—Sheet 2.**



WITNESSES:

H. Walker  
H. L. Reynolds.

*INVENTOR*

C. Pournoville

BY

ATTORNEYS



# UNITED STATES PATENT OFFICE.

EUGÈNE BOURNONVILLE, OF JERSEY CITY, NEW JERSEY.

## ACETYLENE-GAS APPARATUS.

SPECIFICATION forming part of Letters Patent No. 617,632, dated January 10, 1899.

Application filed July 8, 1897. Serial No. 643,788. (No model.)

*To all whom it may concern:*

Be it known that I, EUGÈNE BOURNONVILLE, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Acetylene-Gas Apparatus, of which the following is a full, clear, and exact description.

My invention relates to certain improvements in apparatus designed for generating acetylene gas from carbide of calcium; and the invention consists in the particular construction and arrangement of parts, as hereinafter described, and pointed out in the claims.

Figure 1 is a cross-sectional elevation taken through both the generator and the gasometer; and Figs. 2 and 3 are sectional front and side elevations of the casing containing the wheel, within the pockets of which charges of the carbide are placed.

In the drawings the generator-case is represented by A and may be of any suitable form and material. The bottom of this case A should, preferably, be sloping, forming a cone A' for convenience in drawing off the lime, which is deposited as the residue of the carbide. For this purpose a pipe is connected to the bottom of the cone and is provided with a valve A<sup>2</sup>. A feed-pipe A<sup>3</sup> is introduced through the upper portion of the generator. Immediately beneath this feed-pipe is a deflecting-plate a, extending far enough beyond the edge of the feed-pipe to discharge the carbide away from the mouth of the pipe, so that the gas generated thereby cannot pass upward into the pipe. This pipe may be provided at any suitable height with an opening for the introduction of water or other liquid which is to be introduced into the generator. I have shown for this purpose a spout or funnel A<sup>4</sup>, provided with a hinged cover A<sup>5</sup>. Any suitable device may, however, be substituted for that shown.

To the upper end of the feed-pipe A<sup>3</sup> is attached a circular or cylindrical casing B, within which is supported a shaft d, and upon this shaft is a cylinder or wheel B<sup>2</sup>. This cylinder or wheel is divided into a number of segmental pockets or chambers by radial partitions B<sup>4</sup>. The outer ends of these pockets or chambers are closed by a swinging door B<sup>3</sup>, which is provided with a pin b', projecting

from the side thereof at its outer end and adapted to be engaged by a spring b to hold the same closed. This wheel or casing may be removed from the end of the shaft when it is desired to fill it. For this purpose one side of the casing B, within which the wheel is mounted, is made open and provided with a cover B', by which it may be closed when the wheel is in place. This wheel is mounted upon the shaft d, so that it will rotate therewith. In the drawings the portion of the shaft entering the hub of the wheel is shown as being square in section. This or any other suitable method of mounting may be used.

Within the casing B and located near one edge of the connection to the feed-pipe A<sup>3</sup> is a pin or projection b<sup>2</sup>, so placed as to engage the outer ends of the springs b when the wheel is revolved and thus to release the swinging doors B<sup>3</sup>, so as to successively discharge the contents of the chambers or pockets into the upper end of the feed-pipe. To insure revolution of the wheel in the proper direction and with sufficient force to disengage the catches, the shaft d should be provided with some positive means for rotating it, especially through the space necessary for discharging the first two or three chambers. After this has been done the wheel will be enough heavier on one side to supply the force necessary to revolve it. To accomplish the starting of the wheel, I have shown a wheel or pulley d' upon the shaft and a weight d<sup>2</sup>, suspended from the pulley by means of a cord d<sup>3</sup>. It is evident that a spring may be used instead of the weight d<sup>2</sup>. As previously mentioned, it is hardly necessary to use either the weight or spring except at the beginning of the revolution, when the wheel is practically balanced.

To the upper end of the generator-chamber is connected a pipe E, through which the gas as generated passes to the gasometer. This pipe is provided with a valve e close to the generator-chamber, by means of which valve the pipe may be closed when desired.

The gasometer is composed of upper and lower chambers or bells G and G', the latter being the smaller in diameter and telescoping within the former. These bells or chambers are provided with the usual water seal as used in gasometers. The water g within the gasometer extends a little below the top



of the lower bell or chamber. The gasometer is also provided with a small cylinder H, resting upon the bottom of the lower chamber and having its upper end open and extending to such an elevation as to rise above the water in the gasometer. The pipe E, leading from the generator, is connected within the lower section of the cylinder H. Near the bottom of the cylinder H is a perforated diaphragm *h*, designed to break the incoming gas up into a number of fine small streams, so that as it passes up through the water H<sup>2</sup>, which is placed in the lower end of the cylinder H, the gas will be more thoroughly subjected to the purifying influence of the water. Instead of water for this purpose any other liquid which it is desired to use for purifying the gas may be substituted. The cylinder H may also be provided with an overflow-pipe I, the upper end of which extends to the level it is desired that the liquid shall occupy. Said pipe I is provided with a valve I' outside the gasometer, which valve may be opened when the liquid H<sup>2</sup> is poured in the cylinder. This latter feature, however, is thought to be unnecessary in most cases, but may be used, if desired. The upper end of the cylinder H is shown as having a layer H' of porous material, through which the gas passes and by which it is further purified. This, however, forms no feature of my present invention, and is therefore not described.

A pipe F' enters the bottom of the gasometer and extends upward through the water, its upper end projecting above the water, and through this pipe the gas is drawn as used. To the pipe F' is connected a by-pass pipe F, which at its other end is connected to the pipe E, extending between the generator and the gasometer, the pipe F being provided with a valve *f*. The connection of the pipes E and F is preferably made at such an elevation above the bottom of the cylinder H that the liquid in said cylinder will form an efficient seal against back pressure of the gas in the gasometer when the pressure in the generator is relieved. A valve E' is placed between this by-pass connection and the connection to the gasometer, so that it may be closed when desired. A small valve or nipple *e'* is also connected to the pipe E and may be used for attaching a funnel in order to supply water or other liquid for the bottom of the cylinder H.

The rear side of the wheel B<sup>2</sup> is provided with a series of projections *b*<sup>2</sup>, corresponding with the number of chambers or pockets within the wheel. The outer casing B is provided with an escapement mechanism adapted to engage with these projections and thus to regulate the revolutions of the wheel. This escapement mechanism consists of a lever D, which is pivoted at its center and has pins D' at each end projecting through the side of the casing B and engaging the projections *b*<sup>2</sup>. To this lever D is affixed an arm D<sup>4</sup>, and to this arm is connected a rod D<sup>5</sup>, which extends over to the gasometer. At its opposite end this

rod D<sup>5</sup> is connected to the lever K, which is pivoted at *k* to some fixed part of the gasometer. The lever K has a portion K' placed at an angle to the path of travel of some portion of the upper bell G'. As indicated in the drawings, the portion utilized for this purpose is one of the rollers K<sup>2</sup>, by which the upper portion of the gasometer is guided in its ascent and descent. When the gasometer falls to its lower position, this roller K<sup>2</sup> will engage the portion K' of the lever and force the lever outward, and thus will release the upper pin D', which is normally held toward the wheel by the spring D<sup>3</sup>, and will permit the wheel to rotate until it is checked by the engagement of one of the projections *b*<sup>2</sup> with the lower pin D'. During this portion of the movement the spring engages the pin *b*<sup>2</sup> and the carbide is discharged into the upper end of the feed-pipe. As the upper portion of the gasometer rises through the influence of the gas generated by the discharge of the carbide the portion K' will be freed from the roller K<sup>2</sup> and the spring D<sup>3</sup> will be allowed to return the escapement to its normal position. In doing this the lower pin D' will be freed from the projection *b*<sup>2</sup> and the upper pin D' will be brought into the path of the other projection *b*<sup>2</sup>. This latter movement is usually slight. In this way the rotation of the wheel is divided into two portions. It is very evident that any form of escapement may be substituted for that shown and described for this purpose. The essential requirement for such a device is that it will permit the movement of the wheel through the angle occupied by one of the pockets or chambers. The rotation of the wheel is caused by the weight D<sup>3</sup>, a spring, or whatever is substituted for the weight or spring, and the escapement simply controls the extent of the revolution of the wheel.

In using a device of this character it is necessary to frequently draw off the lime which is deposited in the bottom of the generator as the residue resulting from the decomposition of the carbide, and for this purpose the pipe and valve A<sup>2</sup> have been provided. It is desired to be able to accomplish this without permitting the entrance of any air to the generator. In order that this may be accomplished, a layer of oil or similar material which will not mix with the water and which is of less specific gravity than the water is introduced into the generator. This layer is of considerable depth and the amount of water such that the surface thereof will be slightly below the lower end of the feed-pipe A<sup>2</sup>. By reason of this when it is desired to cleanse the generator a considerable amount of water may be drawn off without bringing the top surface of the oil below the bottom of the feed-pipe. In this way a sufficient amount of water may be withdrawn to thoroughly flush the deposit from the bottom of the generator; also, by keeping the lower surface of the oil always below the bottom of the feed-pipe the liquid within the feed-pipe,



and which acts as a seal therefor, is oil which is neutral as respects the carbide—that is, has no effect to generate gas. By reason of this the generation of the gas while the carbide is passing through the feed-pipe is prevented. By opening the valve *f* in the by-pass direct communication may be obtained with the upper portion of the generator-chamber and the upper portion of the gasometer, so that the space occupied by the liquid withdrawn from the generator when cleansing the same may be replaced by gas from the gasometer. In doing this the valve *E'* may be closed, if desired. This, however, is not essential, as the connection of the by-pass in the pipe *E* is at such a height, as previously explained, as to form an efficient water seal to prevent the gas-pressure from forcing the water in the cylinder *II* to such an elevation in the pipe *E* as to interfere with the by-pass.

For convenience in order to regulate the level of the water and oil in the generator the same is provided with a glass gage or indicator *a'* similar to that commonly employed for such purpose. The use of a considerable layer or zone of oil or similar liquid upon the water within the generator permits the cleansing of the same while the apparatus is otherwise at work and without permitting any air to enter again. It also enables the feed-pipe to be sealed by a neutral liquid, and thus to prevent the possibility of any escape of the gas when each charge of the carbide is introduced. These features are of considerable importance, and by this simple means the result is perfectly obtained. It also permits charges of carbide to be placed in a device which is entirely outside of the generator, and makes it unnecessary to open the generator for any purpose so long as it remains in good repair. The prevention of the escape of even a small quantity of gas is a matter of considerable importance, as it is very explosive and also of an offensive odor. The use of the inner cylinder *II* within the gasometer and the small amount of water *H*<sup>2</sup> within the bottom thereof, through which the gas must pass, enables a uniform pressure to be used in the operation of the generator and does not make the pressure depend upon the depth of the water required in the gasometer. In devices in which the gas-pipe is introduced through the water which acts as a seal for the gasometer the pressure required in connection with large gasometers amounts to very considerable. This is objectionable in many ways. By using an inner cylinder, as shown and described herein, the same pressure may be employed for all gasometers.

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

1. An acetylene-gas apparatus comprising a generator, a gasometer having a liquid seal, a cylinder extending from the bottom of the gasometer upward through the sealing liquid, and provided near its bottom with a perforated diaphragm, a supply-pipe connecting the generator with the bottom of the said cylinder below the diaphragm, the said cylinder having a liquid in its bottom of sufficient depth to form a liquid seal in the supply-pipe, and an overflow-pipe leading from the said cylinder, as and for the purpose set forth.

2. An acetylene-gas apparatus comprising a generator, a gasometer having a liquid seal, a cylinder open at the top and extending from the bottom of the gasometer upward through the sealing liquid, said cylinder containing means for purifying the gas, a supply-pipe connecting the bottom of said cylinder with the generator, the said cylinder having a liquid in the bottom thereof sufficient to form a liquid seal within the supply-pipe, and a valved by-pass connection from the interior of the gasometer to the gas-supply pipe at a point between the liquid seal or trap and the generator, substantially as described.

3. An acetylene-gas apparatus comprising a generator, a gasometer, gas connections between the two, a liquid seal or trap in said connections, adapted to act against pressure in either direction, and a valved by-pass connection from the gasometer to the gas connection between this liquid seal or trap and the generator, substantially as described.

4. In an acetylene-gas apparatus, the combination with a generator and a gasometer, of a carbide-feeding mechanism comprising a wheel mounted to turn on a horizontal axis and adapted to supply successive charges of carbide to the generator by its rotation, means for rotating the wheel, and an escapement mechanism consisting of a pivoted lever provided with pins at each end adapted to engage projections on the wheel, a spring for holding said lever in its normal position, an arm attached to said lever, a rod connected at one end with the said arm and extending toward the gasometer, a lever pivoted to a fixed part of the gasometer, and connected with the other end of said rod, the said lever having a portion extending into the path of travel of one of the guide-rollers of the gasometer, substantially as set forth.

5. A carbide-feeding mechanism, comprising a casing connected with the feed-pipe leading to the generator, a wheel mounted to turn on a horizontal axis within said casing and provided with segmental chambers or pockets, projections on one side of said wheel corresponding to the number of chambers or pockets, an escapement mechanism for the said wheel comprising a lever pivoted at or near its center and provided with pins at each end extending through openings in the side of the casing and adapted to engage the projections on the wheel, and means for controlling the said escapement mechanism from the gasometer substantially as described.

EUGENE BOURNONVILLE.

Witnesses:

EVERARD BOLTON MARSHALL,  
H. L. REYNOLDS.