

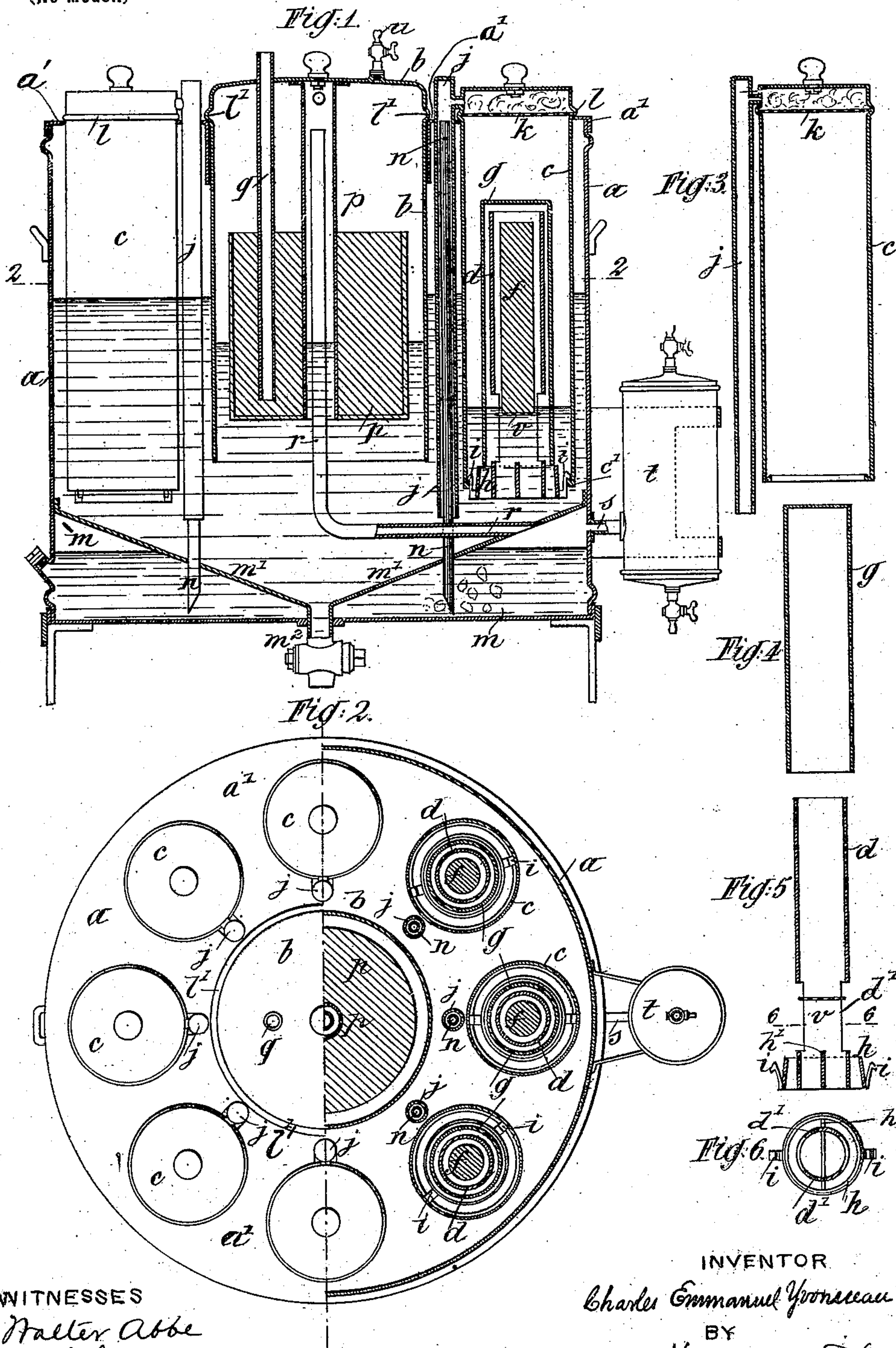
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Patented Mar. 27, 1900.

C. E. YVONNEAU.  
ACETYLENE GAS GENERATOR.

(Application filed Oct. 31, 1899.)

(No Model.)



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES EMMANUEL YVONNEAU, OF PARIS, FRANCE.

## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 646,404, dated March 27, 1900.

Application filed October 31, 1899. Serial No. 735,350. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES EMMANUEL YVONNEAU, engineer, a citizen of the Republic of France, residing at 62 Rue Condorcet, Paris, France, have invented certain new and useful Improvements in Apparatus for Producing Acetylene Gas, of which the following is a full, clear, and correct specification.

This invention relates to an apparatus for producing acetylene gas, especially constructed for the purpose of using candles, molded sticks, or the like made of calcium carbide. This improved apparatus can be recharged while working and without occasioning any escape of gas. I will now describe it with reference to the accompanying drawings, in which—

Figure 1 is a vertical section. Fig. 2 is a view, half plan and half horizontal section, on line 2 2, Fig. 1. Figs. 3, 4, and 5 represent in vertical section the various parts of a carbide box or chamber; and Fig. 6 is a sectional view on the line 6 6, Fig. 5.

My apparatus consists of a tank or vessel *a*, in which are placed the regulating-bell *b* and the various carbide chambers or containers *c c*. The respective positions of these various parts of the apparatus can be varied. Usually the bell is placed at the center and the carbide-chambers around the latter. Each of the carbide-chambers consists of an oblong or tubular bell *c*, in which can be engaged by its lower opening a tube *d*, intended to receive the carbide stick or candle *f*, this latter being supported by a grid *v*. As seen more clearly in Fig. 5, the tube *d* is open at both ends and toward its lower extremity has two opposite slots or notches cut into it, leaving side walls *d'*, supporting between them a grid *v*. At the base of the tube *d* is an outer collar *h*, which is held in place by a transverse reinforcing-strip *h'*, and is in the present instance provided with two spring catches or clips *i* to engage with a supporting-flange *c'* at the bottom of the bell *c*, Fig. 3. The tube *d* may be covered by a small bell *g*, which is free and merely rests upon the lower collar *h* of the tube *d*. This tube *d* can be secured to the bell *c* by means of any suitable device—for instance, by a bayonet-joint or by the hook-catches *z*. (Shown on the drawings.) In its upper portion the bell *c* is divided by a grid

or grating *k*, and above the said grid it communicates with a vertical tube *j*, which is carried by the bell, this tube being closed at the top and open at the bottom. As indicated in Fig. 3, the space above the grid *k* may contain a suitable gas-purifying material. Each of the bells *c*, with all its working parts, as well as the tube *j*, fixed thereto, as explained, can be supported in the vessel *a* by means of a flange or shoulder *l* resting upon the cover *a'* at the upper part of the vessel, the said cover being provided with openings to receive the various carbide-chambers *c c*. These latter can thus be easily inserted and withdrawn. The bottom of the tank *a* is preferably formed by a partition *m'*, which is inclined or funnel-shaped, and has at its lowest part a valved outlet *m''*, through which the residuum may be removed. Beneath the partition *m'* is a closed chamber *m*, toward the lower part of which the vertical tubes *n n* deliver the gas from the chambers *c*. This chamber *m* is supplied with water to a point above the discharge-points of the tubes, so as to constitute a water seal and washing-chamber. These tubes *n* are of a sufficient height when the chambers *c* are in place to enter the tubes *j* up to the upper portion. The different chambers *c* are constructed in this manner, and with the tube *j* of each of them corresponds the tube *n*, opening into the chamber *m*, as previously stated.

In the middle of the vessel *a* is placed a bell *b*, which serves as a governor or regulator, as will be seen presently. This bell passes freely through a suitable opening in the cover *a'*, and when in its lowest position, as shown, will rest upon the cover by means of its shoulder or flange *l'*. This bell *b* carries a casing or receiver *p*, which may be suspended from the top of the bell by a central tube *p'* and constitutes a displacement-body. The weight of this receiver *p* can be regulated as desired by introducing water, granulated lead, &c., into the same through a pipe *q*, whose other end projects through the crown of the bell. Into the upper part of this governor-bell *b* there delivers a tube *r*, which opens from the upper part of the chamber *m*, above the level of the water therein. In the present instance this gas-tube *r* opens into the central tube *p'*, which carries the receiver



*p*, and has suitable outlets for the gas into the upper part of the bell *b*. The upper portion of the chamber *m* communicates, by means of a tube *s* and any suitable drying and purifying apparatus *t*, with the gas-pipes.

The governor-bell *b* is furnished with a cock *u* for the escape of air.

The working of the apparatus is as follows: Each of the chambers *c* is furnished with the gas-generating substance in the form of stick, cartridge, or candle *f*, the various parts of the chamber being in the position shown on the drawings and as above stated. These chambers *c c* are placed in the vessel *a*, this latter being filled with water up to a certain height. The level of this water tends to equalize itself in the vessel *a*, in the bell *b*, and in the carbid-chambers *c c*. Consequently when the water comes in contact with the candles *f* gas is given off. If the loose bell-covers *g* are used over the tubes *d*, the first effects of the generation of the gas will be to depress the water-level in the covers or to raise these covers *g* until the gas can escape around their lower edges and up into the bells *c*. The gas rising in the bells *c* escapes by the tubes *j* and *n* (after having passed, if necessary, in contact with the desiccating material placed above the grids *k*) and is delivered into the midst of the water contained in the chamber *m*, through which water it bubbles. It collects in the upper portion of this chamber *m* and passes through tube *r*, whence it reaches the governor-bell *b*, which it fills and raises. This bell being so raised lifts with it the mass *p*, which, being of a fairly considerable volume and partly standing out of the water, consequently displaces a much less quantity of water. It follows that the level of water in the bell *b* is lowered as well as in the vessel *a* and in the carbid-chambers *c c*. The carbid sticks no longer dipping into the water, the production of gas ceases, and the pressure diminishing by the consumption of the gas the governor-bell *b* redescends. The receiver *p* is thereupon immersed to a greater extent, displacing a greater quantity of water and causing a rise in level in the chambers *c*, the candles again dipping into the water and the production of gas again commencing. This succession of phenomena will be effected in a continuous manner, and the production of gas thus takes place regularly, according to consumption.

It will be remarked that in case of an excessive production of gas the different chambers or bells *c* are raised a certain height, for they are held freely in the openings in the cover *a'*, and thus increase the capacity of the apparatus occupied by the gas. Also in each of the chambers *c* the bell *g* intervenes as a safety device, for in case of an excessive production the water is at first driven back from within the bell *g* to its outside—that is to say, in the chamber *c*—the candle *f* consequently no longer dipping into the water.

It will be observed that with this appara-

tus the recharging of the generator with the gas-producing substance can be effected without any escape of gas. By raising up any one chamber *c* for this purpose the gas-tube *j* is disengaged from the tube *n*, and this latter is then in communication with the atmosphere; but the gas contained in the chamber *m* drives back the water in this tube to a height corresponding with the pressure.

I may obviously modify the construction of this apparatus without departing from the spirit of my invention.

I claim as my invention—

1. An apparatus for producing gas, embodying a casing having a lower chamber and a superposed tank, a combined generator and gas-holder in said tank, the lower chamber constituting a water seal and washing-chamber for the gas, and an automatic regulating-bell in said tank communicating with both compartments and actuated by the gas-pressure to control the production of gas.

2. An apparatus for producing gas embodying a casing having a lower chamber and a superposed tank, combined generators and gas-holders in said tank, the lower chamber constituting a water seal and washing-chamber for the gas, a governor-bell in the tank to effect a variable displacement of the water and removable bells also in said tank, substantially as described.

3. An apparatus for producing gas, comprising a casing to contain water, a governor-bell in said casing having a mass to effect a variable displacement of water, gas-generating bells in said casing and open at their lower portions to the water, the said generator-bells having at their upper ends vertical tubes closed at their upper ends, fixed tubes, with which the bell-tubes telescope, a washing-chamber into which the fixed tubes open, and a gas-tube from the washing-chamber to the governor-bell, substantially as described.

4. In an apparatus for producing gas, in combination a reservoir, a series of bells in said reservoir, a separate generator for each bell, a separate chamber beneath the reservoir, a connection between the said generator-bells and the separate chamber, and a governor-bell or automatic regulating device connected with the separate chamber for causing a column of water to rise in the generators.

5. An apparatus for producing gas, embodying a casing having a lower chamber and a superposed tank, a series of bells, a generator in each bell open at its base portion, said bells being circumferentially arranged and forming a central space, a governor-bell in said central space with a displacement-body, the lower chamber containing water, a telescopic connection extending to near the bottom of said lower water-chamber from each generator-bell and a gas-pipe therefrom to the governor-bell.

6. In an apparatus for producing acetylene gas, in combination an upper tank, a series of bells within the said tank, a gas-generator



for each bell, a lower chamber containing water, pipes connecting the lower chamber with the several bells, and a governor-bell in the upper tank for causing a column of water to rise in the gas-generator bells.

7. In an apparatus for producing gas, in combination, an upper tank, a series of bells, arranged therein, a generator for each bell, a lower chamber, telescopic connections between the lower chamber and said bells, and a governor-bell, a gas-pipe connecting the latter with the lower chamber and means connected with the governor-bell to cause a column of water to rise in the generators simultaneously with the descent of said governor-bell.

8. An apparatus for producing acetylene gas, comprising a casing containing a reservoir and having a governor-bell and a series of removable generator-bells in said reservoir, a generator in each of said bells and water-seal gas connections between the several generator-bells and the governor-bell, whereby any one of the generator-bells may be removed and replaced without escape of gas or interfering with the operation of the others.

9. As an improvement in apparatus for pro-

ducing gas, a combined generator and gas-holder comprising two concentric and interlocking bells and a tube constituting the generator proper arranged within the inner bell, said tube being open at both extremities, and slotted longitudinally near its base portion, with a grid connecting the lateral walls formed by said slots to sustain the gas-producing substance, the outer bell or gas-holder having a grid supported near its top adapted to contain a purifying material.

10. In an apparatus for producing acetylene gas, a carbide-container consisting of a tube open at both extremities and having longitudinal slots substantially near its base portion with a grid supported near said slots adapted to sustain the carbide, a collar at its base and a bell inclosing said tube and supported by said collar.

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

CHARLES EMMANUEL YVONNEAU.

Witnesses.

GUSTAVE DUMONT,  
J. ALLISON BOWEN.