C. T. TARPENNING.

ACETYLENE GAS GENERATOR.

APPLICATION FILED DEC. 21, 1912.

1,097,268.

Patented May 19, 1914.

2 SHEETS—SHEET 1.

Fig. 1

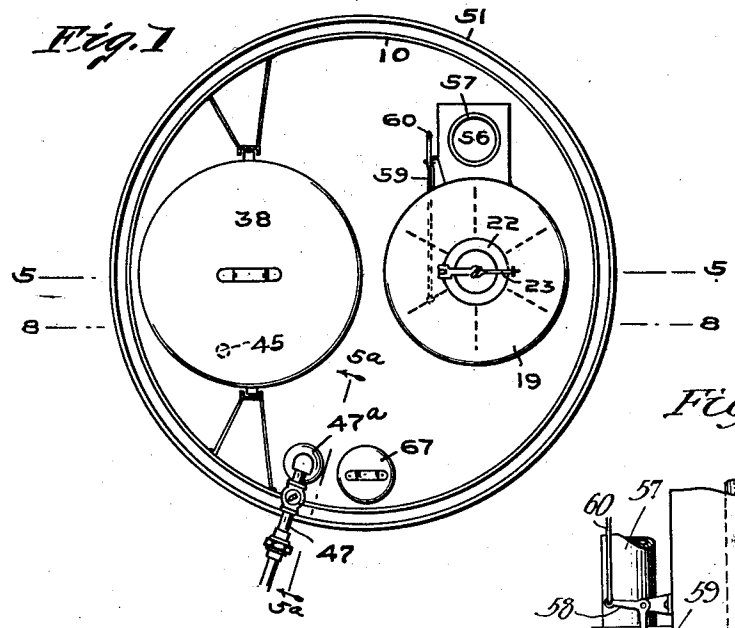


Fig. 4.

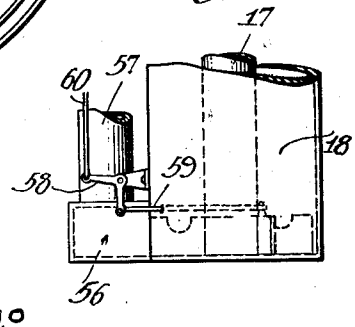


Fig. 2

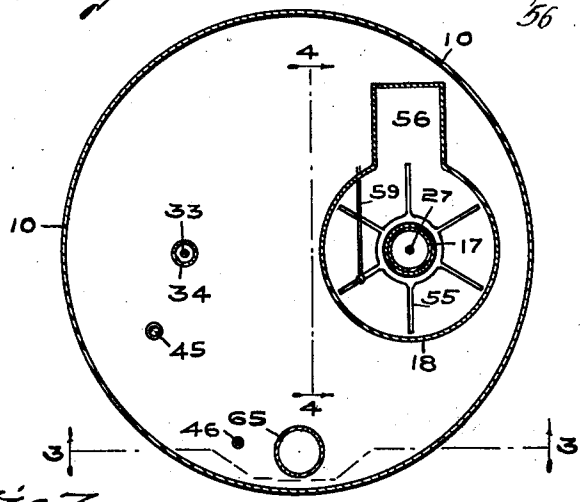
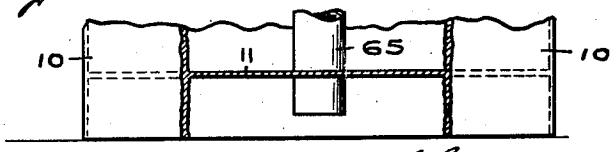


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 5.

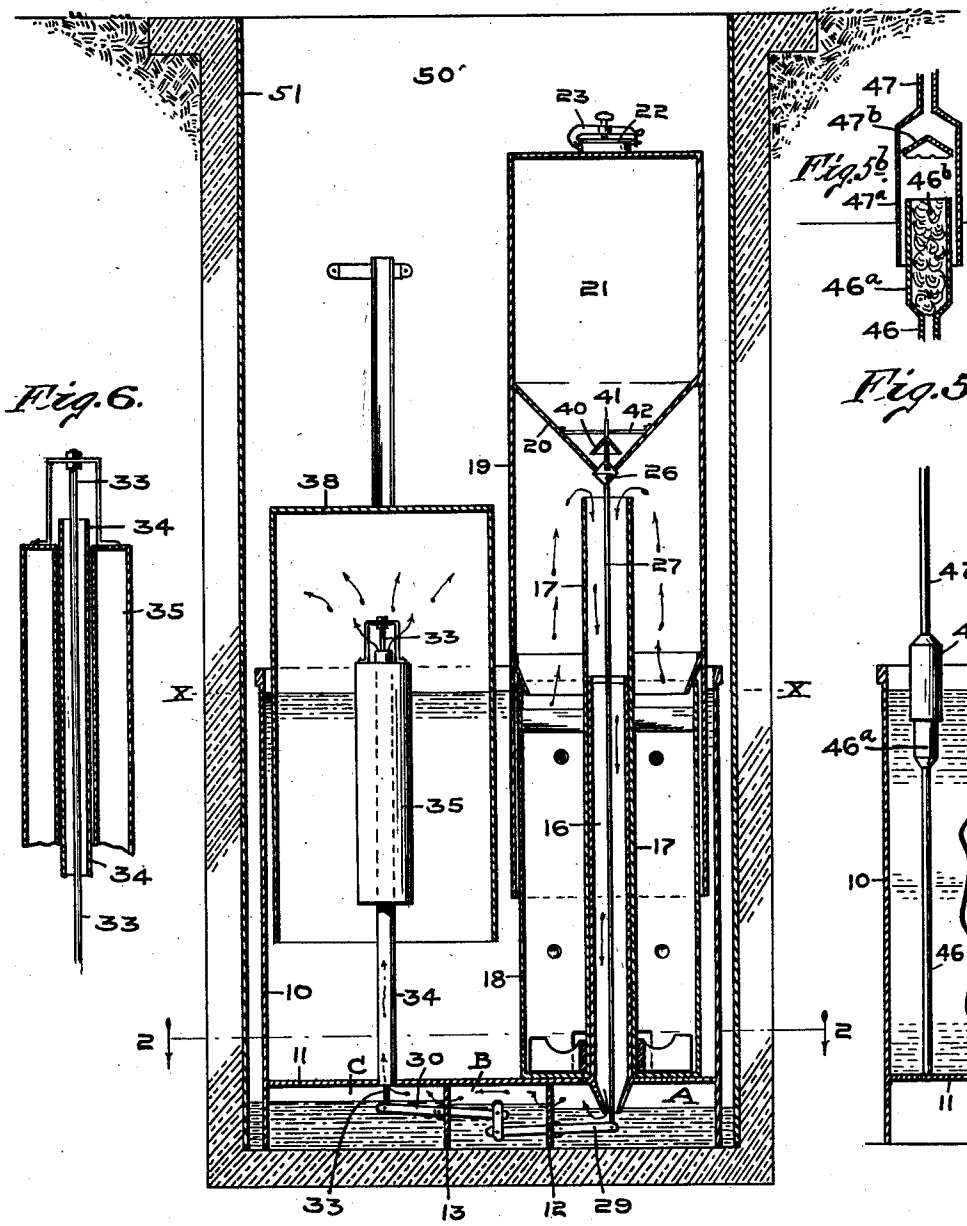


Fig. 5b.

Fig. 5a.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

1,097,268. Specification of Letters Patent. **Patented May 19, 1914.**

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To all whom it may concern:

Be it known that I, CHARLES T. TARPENNING, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

This invention relates to acetylene gas generators for generating acetylene gas for domestic purposes, consisting of a type of generators in which the gas is manufactured from time to time when the consumption has reduced the supply of gas in the bell to a prescribed limit.

The object of the invention is to provide an acetylene gas generator which will be first of all as nearly safe against premature explosion as it is possible to render same.

A further object of the invention is to provide a generator which will be simple in construction and efficient in operation.

A further object of the invention is to provide means whereby water within the generator for sealing the joints provides means for holding the valve to normally close the discharge opening leading into the carbid holding receptacle.

There are other features that will be hereinafter more particularly described and pointed out in the claims.

Referring to the drawings, which form a part of this application, in which similar numerals of reference indicate similar parts—Figure 1 is a top or plan view of my improved acetylene gas generator showing the coöperating parts in active relation. Fig. 2 is a horizontal section on the line 2—2 in Fig. 5. Fig. 3 is a view partly in section and partly in elevation on the line 3—3 in Fig. 2. Fig. 4 is a fragmentary detail view in side elevation of the generating chamber, the surrounding parts being omitted. Fig. 5 is a central vertical section through the apparatus on the line 5—5 in Fig. 1. Fig. 5^a is a fragmentary detail sectional view on the dotted line 5^a—5^a in Fig. 1. Fig. 5^b is a central sectional view of the dry filter on an enlarged scale. Fig. 6 is a fragmentary detail sectional view, on an enlarged scale, of the float.

The acetylene gas generator consists of a primary shell or casing 10, open at the top and provided with a floor 11 which is removed somewhat above the lower end of said shell and forms a water holding reservoir. As shown particularly in Fig. 5 of the drawings, the space below the floor 11 is divided into gas washing compartments A, B, C and D by the walls 12, 13 and 14, and, as will later appear, these compartments perform a very important function in the production of a desirable acetylene gas. Communication is established with the compartment A through a vertically disposed tube 16 which also forms a guide for the tube 17, the latter being mounted centrally within the generator 18. This generator 18 comprises a hollow cylinder, open at the top and closed at the bottom. The top of the generator 18 is sealed by a tube 19 that telescopes down over the upper end of said generator, the upper portion of the tube 19 being divided by means of a cone shaped division wall 20 whereby a carbid retaining receptacle 21 is formed above said wall 20 in the upper end of said tube. The receptacle 21 is provided with an inlet opening at the top through which the carbid is passed and this opening is normally sealed by means of a cover 22 and a cover retaining device 23. The discharge opening of the carbid receptacle 21 is in the point of the cone shaped floor or wall 20, and this opening is controlled by means of a primary valve 26 which is mounted on a vertically disposed valve-stem 27 which extends down through the tubes 16 and 17 and pivotally engages one end of a lever 29. The lever 29 is centrally pivoted in the division wall 12 and is suitably connected to a corresponding lever 30 centrally pivoted in the wall 13, the two levers 29 and 30 being suitably connected at their opposing ends by the links 31. The free end of the lever 30 engages a vertically disposed float-rod 33 which passes upwardly through a pipe 34, through which the gas passes in reaching the bell, and the upper end of the rod 33 carries the float 35. The float 35 is an inclosed cylinder which is air tight and is guided in its vertical movement by the pipe 34 secured to the bottom 11. Surrounding this float and floating in the water within the shell 10 is a gasometer or bell 38.

When the water raises the float 35 to the limit of its upward travel the valve 26 will have closed the discharge opening leading into the carbid receptacle 21, and when sufficient gas has been removed from the bell 38 to allow it to descend until it rests upon the upper end of the float-rod 33, forcing said float 35 downward, the valve 26 will be re-

moved from said discharge opening in the carbid receptacle, thus allowing a new charge of carbid to be discharged into the water within the generator 18. When sufficient gas has been generated to remove the weight of the bell 38 from the top of the rod 33 the buoyancy of the float 35 will cause it and the rod 33 to move upwardly, and by means of the connection between the latter and the valve-stem 27, the valve 26 is reseated to close the discharge opening of the carbid receptacle, thereby shutting off further flow of carbid. I have also provided means to regulate and control the amount of carbid to be discharged from the carbid receptacle in the generating chamber, in order that the charges of carbid may be maintained as nearly uniform as possible. This will not only insure economy in operation, but will reduce the liability of the danger that may result from an excessive amount of gas being generated at one time. This uniformity in the charges of carbid that is allowed to be discharged into the generating chamber is effected by means of a secondary valve 40, located within the carbid receptacle 21. The secondary valve 40 is cone shaped and is placed in an inverted position above the primary valve 26 and is elevated by the projecting end of the valve-stem 27. The valve 40 is guided and held in operative position by means of a vertically disposed pin 41 passing through the bar 42. It will be noted that when the valve 26 occupies a position to seal the discharge opening of the carbid receptacle the valve 40 will be elevated a sufficient distance above the cone shaped floor 20 to allow a certain amount of carbid to move under the valve 40 and on top of the valve 26. As soon as the valve 26 is lowered to open the discharge opening of the carbid receptacle the valve 40 descends until it rests upon the conically shaped floor 20 and prevents carbid other than that beneath the valve 40 from being discharged. When the valve 26 is reseated to close the opening in the carbid receptacle the valve 40 is again elevated above the floor 20, allowing another charge of carbid to move between the two valves 26 and 40. It will be observed that allowing a uniform charge of carbid to be discharged into the generating chamber at a time will insure the production of a uniform amount of gas which may be taken care of when constructing the apparatus, thereby avoiding the danger arising from excessive pressures produced by the production of a too large amount of gas at one time. When the gas is generated within the generator 18 it passes upwardly from the surface of the water, indicated by the line X—X, within the tube 19 (see Fig. 5) and then downwardly through the tubes 17 and 16, and is discharged from the end of the tube 16 beneath the water within compartment A below the floor 11 of the shell 10. The passage of the gas after leaving the tube 16 is best illustrated by the arrows in Fig. 5 of the drawings. It will be noted that when the gas is discharged from the lower end of the tube 16 beneath the water, it passes through the water in reaching the space above the surface of the water within said compartment A. As the gas pressure increases within the compartment A the level of the water therein will be slightly lowered until a horizontal row of perforations 12^a in the division wall 12 is exposed. The tendency of the reduced water level within the compartment A is to raise the water level in the adjacent compartment B, so that the water level therein will stand above the perforations 12^a on the compartment side B of the division wall 12, but will leave the perforations 13^a in the division wall 13 exposed. The different surface levels of the water between the compartments A and B forces the gas to pass through the water in reaching compartment B. As the gas pressure increases within the compartment B the water level in compartment C is raised so that the water therein will stand above the perforations 13^a on the compartment side C of the division wall 13, thus forcing the gas to again pass or filter through the water in reaching compartment C. Thus it will be noted that the gas is forced to pass through water at three different points in its transit from the inlet tube 16, in the compartment A, to the outlet pipe 34 in compartment C, so that the gas is washed and all impurity is removed therefrom. The gas after reaching compartment C passes up through the pipe 34 and is discharged at the upper end within the gasometer or bell 38. As the surface elevation of the water inside the shell 10 is along the line X—X it will be seen that all of the lower ends of the different pipes and tubes therein will be sealed to prevent escape of gas, thereby reducing the liability of danger. The gas is removed from the bell 38 for consumption through a vertically disposed pipe 45 which extends downwardly and communicates with the compartment D which is independent of the compartments A, B and C. The gas after passing into compartment D passes out through the pipe 46 and into the service pipe 47, but before reaching said pipe 47 the gas passes through a dry filter which removes the excessive moisture from the gas.

To add greatly to the security of the apparatus against premature explosion, I provide a dry filter which is water sealed and provides an elastic joint between the service pipe and gas chamber. Acetylene gas needs but little air to support combustion, and with a mixture of from three to twenty-five per cent. of acetylene gas and air, a flame

carelessly applied to an open pipe or jet, during the installation of an apparatus, has been known to follow back an indefinite distance through a pipe to the generator, resulting in the loss of both life and property. To guard against such injury I provide a dry filter, as illustrated in Fig. 5[b] of the drawings. The upper end of the pipe 46 is enlarged to form a cup 46[a] adapted to hold a suitable filtering medium 46[b]. The adjacent end of the service pipe 47 is enlarged to provide a cup 47[a] which telescopes down over the cup 46[a], the diameter of the former being sufficiently greater than the latter to provide an intervening space between the two when they are telescoped together. This intervening space provides a vent in case of a premature explosion within the chamber in the dry filter. The force of such a combustion of the gas within the dry filter would drive the filtering medium 46[b] down in the cup 46[a] and seal the end of the pipe 46, the force of the combustion being exhausted through the intervening space between the cups and into the water which seals the lower end of the cup 47[a]. This elastic coupling renders the apparatus safe against unauthorized persons placing a flame to an open pipe or jet while an apparatus is being installed and after being cleaned and recharged, after which the air must be exhausted before the apparatus is in working order.

As this style of acetylene gas generators is most commonly used around private residences and the like, it is important that the same should be located so as to render it as safe as possible, as it is well understood that acetylene gas is highly explosive. With this end in view it is desirable to place the generator in the ground. This is accomplished by providing a dry well which is lined or walled up with cement so as to provide a water holding reservoir 50 and an additional wall or lining of galvanized iron 51 may be employed, if desired. In placing the generator in the ground, to render it more safe and to save space in and about the premises, provision must be made for removing the sludge from the apparatus at frequent intervals which is necessary in apparatus of this character, and to provide means whereby the removal of the sludge may be speedily and effectively accomplished. To this end I mount within the lower end of the generator 18 an agitator 55 having radial wings, the said agitator being slipped down over the tube 17 which forms a spindle therefor. The generator 18 is provided at one side with a connecting chamber 56 and by means of a vertically disposed pipe 57 an outlet may be had to the outer air. As shown in Fig. 4 of the drawings, I mount a bell-crank 58 on the periphery of the generator 18, one end of said crank connecting with the agitator 55 through a connecting rod 59 and the other end of said crank engaging an operating rod 60, which extends upwardly and may be reached by the operator from the top of the ground. When it is desired to remove the sludge from the generator 18 water is introduced through the pipe 57 and by elevating and lowering the rod 60 the agitator 55 is oscillated back and forth whereby a portion of the sludge is moved into the exterior chamber 56 from whence it is pumped by a suitable pump. A fresh supply of water is introduced occasionally to dissolve the sludge and permit freer removal thereof. This operation is repeated until the sludge has been entirely removed from the machine. By means of this construction it will be seen that the sludge may be easily brought to the surface of the ground without removing the apparatus or any of its parts from the dry well.

It is desirable to maintain a certain water level within the dry well. In case there is too much or an insufficient amount of water the same may be added or removed through a pipe 65 (see Figs. 2 and 3). The lower end of the pipe 65 extends sufficiently below the floor 11 and into the water within the compartment B to insure said end of the pipe being sealed at all times. The upper end of the pipe 65 is normally closed by means of a cap 67. (See Fig. 1.)

Having thus fully described my said invention, what I desire to secure by Letters Patent, is—

1. In an acetylene gas generator, the combination with a hollow casing, a floor dividing said casing into an upper water holding reservoir and a lower gas washing chamber, a gas generator arranged within said reservoir, a floating bell arranged alongside said gas generator within said reservoir, a gas inlet tube extending from within said gas generator and communicating with said gas washing chamber, a gas outlet tube communicating with said gas washing chamber and extending into said bell, a carbid receptacle arranged in the upper end of said generating chamber and having a discharge opening in its lower end, a valve-stem extending downwardly through the outlet tube and into the gas washing chamber, a float-rod extending downwardly through the inlet tube into said gas washing chamber, means connecting the valve-stem and float-rod to cause said stem and rod to travel downwardly when said float-rod is actuated by the bell, and a float attached to the upper end of said float-rod to cause said rod and stem to move upwardly when the weight of the bell is removed from said float-rod.

2. In an acetylene gas generator, the combination with a hollow casing, a floor divid-

ing said casing into an upper water holding reservoir and a lower gas washing chamber, a gas generator arranged within said reservoir, a floating bell arranged alongside said gas generator within said reservoir, a gas inlet tube extending from within said gas generator and communicating with said gas washing chamber, a gas outlet tube communicating with said gas washing chamber and extending into said bell, a sludge-box arranged at one side of the generator and communicating with said generator, a clean-out pipe communicating with said sludge-box, an agitator arranged within said generator for moving the sludge into the sludge-box, and means extending from the top of the generator for actuating said agitator.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this 12th day of December, A. D. one thousand nine hundred and twelve.

CHARLES T. TARPENNING. [L. S.]

Witnesses:
F. W. WOERNER,
I. L. LARSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."