P. F. WILLIS.

ACETYLENE GAS GENERATOR.

APPLICATION FILED FEB. 10, 1912.

1,039,239.

Patented Sept. 24, 1912.

2 SHEETS—SHEET 1.

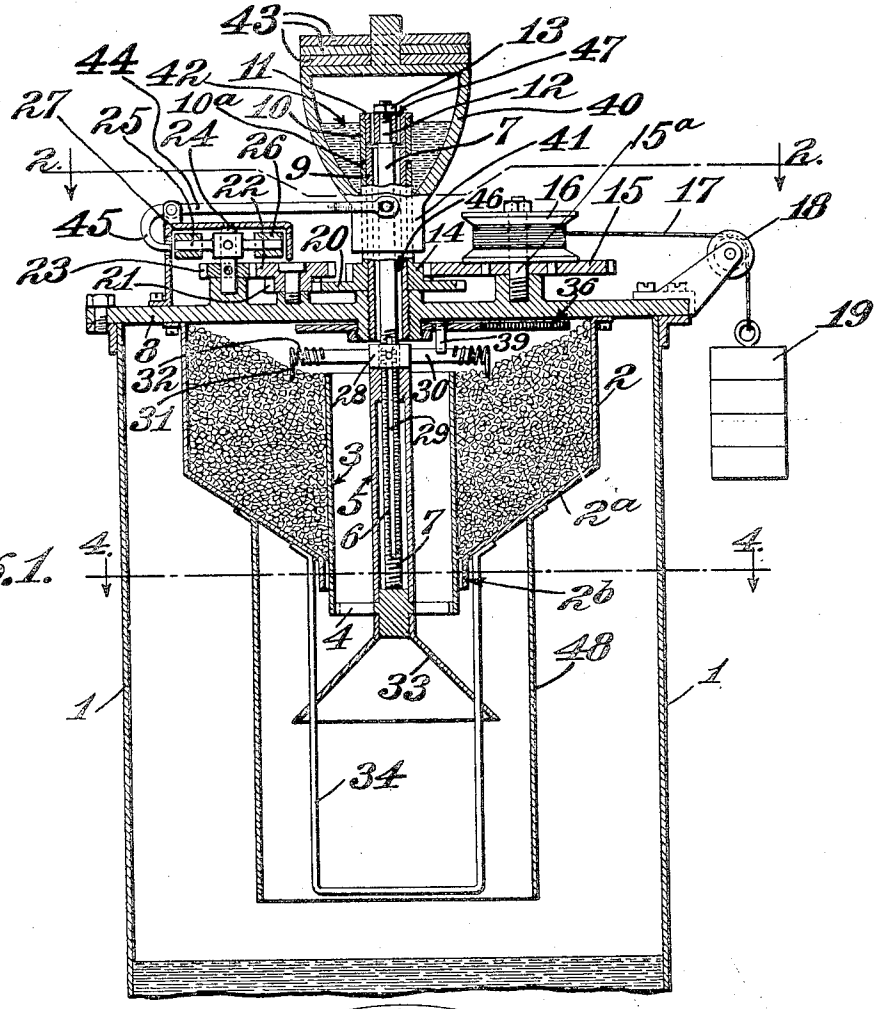

Fig. 1.

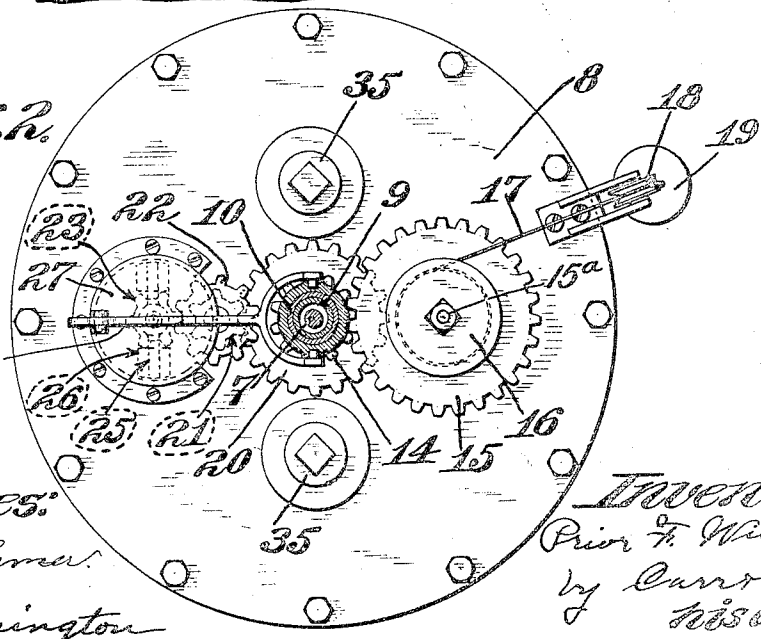

Fig. 2.

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Fig. 3.

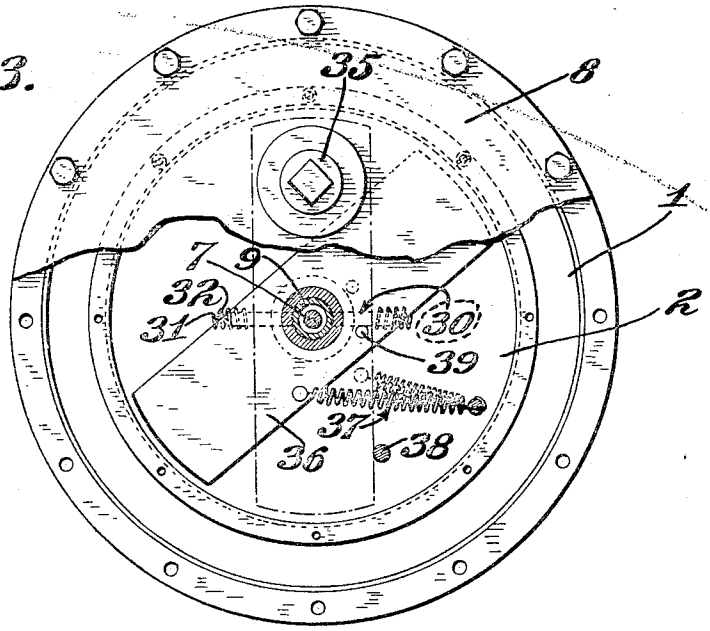
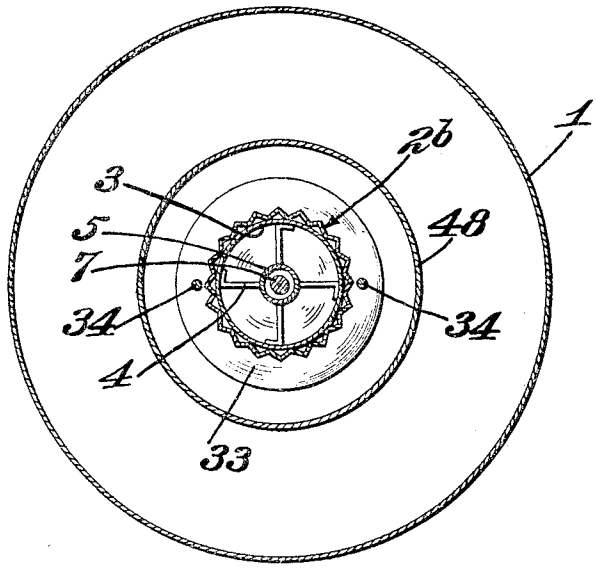


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

1,039,239. Specification of Letters Patent. Patented Sept. 24, 1912.

Application filed February 10, 1912. Serial No. 676,741.

To all whom it may concern:

Be it known that I, PRIOR F. WILLIS, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Acetylene-Gas Generators, of which the following is a specification.

This invention relates to acetylene-gas generators in which the carbid is delivered from a carbid-receptacle into a body of water within a closed tank or water-receptacle.

It has for its principal objects to provide improved means for delivering the carbid automatically to the water only as needed and in such a manner that the carbid will be completely decomposed in the water; to provide for maintaining a uniform pressure within the generator, to minimize resistance of the working parts of the mechanism for feeding the carbid; and to attain certain other advantages as will hereinafter more fully appear.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings which form part of this specification and wherein like symbols refer to like parts wherever they occur,—Figure 1 is a view partly in vertical section and partly in side elevation showing an acetylene-gas generator embodying my invention; Fig. 2 is a top plan view and a horizontal section on the line 2—2 of Fig. 1; Fig. 3 is a top plan view, a portion of the cover being removed to show the device for automatically covering the filling-openings; and Fig. 4 is a section on the line 4—4 of Fig. 1.

The generator comprises a tank 1 of any desirable construction. In the upper portion of the tank is mounted a carbid-receptacle 2 whose upper walls are cylindrical and lower walls tapered or conical to constitute a hopper 2^a.

Slidably fitted in a central opening in the bottom of the receptacle 2 is a cylinder 3. Preferably, a depending flange 2^b is provided around the opening in the bottom of the receptacle so as to steady the cylinder 3; and said flange is preferably crimped or corrugated to minimize the contact surface to reduce friction and permit powdered particles of carbid to sift through without causing the cylinder to bind.

The cylinder 3 is mounted at its lower end on a spider 4 which is secured at its central portion to a tube 5 extending axially through the cylinder. The upper end portion of the tube 5 is of smaller interior diameter than the lower portion and screw-threaded so as to work upon the screw-threaded lower portion 6 of a vertical shaft 7. The shaft 7 extends up through the cover 8 of the tank where it is supported on a tube 9 fixedly mounted on said cover 8. Rotatably fitted over the tube 9 is a sleeve 10 in whose upper end portion a plug 11 is fixedly secured. The shaft 7 is secured fixedly to this plug 11 by having its upper end portion reduced in diameter, as at 12, and fitted in a central opening in said plug 11 and secured by a nut 13.

On the lower portion of the sleeve 10 is a pinion 14 which meshes with a gear 15 journaled loosely on a stud or spindle 15^a secured to the top of the cover 8. This gear 15 has a drum 16 fixed thereto, about which is wound a cord 17. The cord is carried over a pulley 18 and is provided at its end with a weight 19. By this arrangement the sleeve 10 is rotated on the tube 9 and the shaft 7 is, of course, rotated therewith.

Fixed with respect to the sleeve 10 and pinion 14, so as to rotate therewith, is a gear 20. This gear meshes with a pinion 21 journaled on top of the cover 8. Fixed to the pinion 21 is a gear 22 which meshes with a pinion 23 fixed to a spindle 24 journaled on the cover 8. This spindle 24 has a pair of arms 25 fixed thereto on which are slidably mounted weights 26. The arms 25 rotate within a circular housing 27 and the weights 26 are thrown against the circular wall of said housing 27 by centrifugal force and by friction govern the speed of the motor.

Sleeved loosely on the shaft 7 so as to slide freely lengthwise over the screw-threaded portion 6 thereof, is a hub member 28 which rests on the upper end of the tubular member 5 and is provided with a pin which projects into a longitudinal slot or groove 29 in the screw-threaded portion 6 of the shaft 7, so that the hub rotates with the shaft but is permitted endwise movement thereon at the same time. This hub member 28 is provided with horizontal arms 30 which project over the end portion of the cylinder 3 so as to serve as scrapers or sweepers to move the carbid from the receptacle 2 into said cylinder 3. Preferably, the ends of the arms or sweepers 30 are provided with resilient fingers 31 which

contact with the carbid. As shown, these fingers may comprise downward extensions at the end of helical springs 32 which are secured to the arms 30.

Depending from the spider 4 is a bell or spreader 33 which is provided with a pair of perforations through which the vertical members of a yoke 34 slidably fit. This yoke is fixedly secured to the bottom of the carbid-receptacle 2 and, consequently, when the shaft 7 is rotated the cylinder 3 is moved endwise by the action of the screw-threaded portion 6 of the shaft 7 and the tube 5 which is fixedly connected to the cylinder. The uppermost position of the cylinder 3 is limited by the central portion of the spider 4 coming in contact with the end of the shaft 7; and its lowermost position is limited by the bell or spreader 33 contacting with the horizontal member of the yoke 34.

To raise the cylinder 3 and agitating device 30 to uppermost or initial position the shaft 7 is rotated in a direction reverse to that effected by the motor. This may be accomplished by rotating the drum 16 to rewind the cord 17 thereon, thereby driving the train of gears reversely.

In the uppermost position of the cylinder 3 its upper end is a considerable distance below the under side of the cover 8 so that when the carbid is filled in around the cylinder, the upper surface of the carbid is "dished." That is, the surface slopes from the upper edge of the side wall 2 down to the upper end of the cylinder 3. Consequently, as the shaft 7 is rotated and the cylinder 3 thereby moved downward, and the sweeper arms 30 being rotated with the shaft and following the cylinder downward, the carbid is discharged from the upper portion of the receptacle through the cylinder 3 whereupon it is deflected by the bell or spreader 33 before it falls into the water at the bottom of the tank 1.

In the cover 8 are two filling-openings which are closed by plugs or caps 35 (see Figs. 2 and 3). These openings are directly above the space between the wall of the receptacle 2 and the cylinder 3 so that the carbid will not be accidentally dropped through the cylinder in filling the receptacle. To prevent the receptacle from being filled before the cylinder has been raised to its uppermost position, a safety device is preferably provided to cover the filling-openings during the time the cylinder is at any point below its uppermost position. This device as shown comprises a plate 36 which is swiveled near the under side of the cover 8. A spring 37 is attached to this plate so as to normally hold it against a stop 38 in which position the filling-openings are covered. The plate 36 is provided with a depending pin 39 against which one of the sweeper arms 30 contacts as the cylinder is brought into its uppermost position so that said plate is moved to uncover the filling-openings. The pin 39 is of such length that almost immediately after the cylinder 3 starts downward, the sweeper arm 30 will pass clear of it and the spring 37 thereupon pulls the plate into the position shown in broken lines in Fig. 3, in which position the filling-openings are covered. The uncovering position is shown in full lines in said Fig. 3.

Surrounding the upper portion of the sleeve 10 is a hollow casing 40 whose lower portion 41 has a working fit upon said sleeve. The upper portion of this casing 40 is flared somewhat to give a large surface area to its top wall, and in the lower portion is placed a body of oil 42. This oil constitutes a gas seal and also serves to lubricate the bearings. For this purpose the sleeve 10 is provided with perforations 10^a to allow the oil to come in contact with the tube 9.

Removable weights 43 are placed on top of the casing 40 and added to or taken from, depending upon the desired pressure to be maintained in the generator. Pivoted to the lower portion 41 of the casing, as by slot and pin connection, is a lever 44 which is pivoted on the housing 27 and is hooked as at 45, said hooked portion working through a perforation in the wall of said housing 27. By this arrangement the pressure generated in the tank 1 is likewise communicated to the casing 40 through a space 46 between the tube 9 and shaft 7 and openings 47 provided in the plug 11 which supports the shaft 7. When the pressure is sufficient to raise the weighted casing 40 the lever 44 is raised and its hooked end portion 45 is swung into the housing 27, and being in the path of the arms 25 or the weights thereon, arrests the movement thereof and stops the motor. As soon as the pressure falls below that for which the controlling device is set the brake is automatically released and the motor starts to operate, and the feeding mechanism is brought into action until the pressure has been restored.

To prevent the water from splashing onto the lower end portion of the cylinder 3 when the latter is in its lower position a cylindrical shell 48 is secured to the bottom of the receptacle 2 and is of such length that the cylinder is inclosed at all times. By this arrangement, the cylindrical shell 48 coöperates with the bell 33 to protect the cylinder 3.

An acetylene-gas generator constructed and arranged as herein set forth is automatic in operation and the pressure can be maintained uniformly with but a slight momentary variation. The carbid is fed automatically in uniform quantity as required

and there is no choking of the passageway through the cylinder 3.

Obviously, the device admits of considerable modification without departing from my invention. Therefore, I do not wish to be limited to the specific construction and arrangement shown.

What I claim is:

1. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable open-ended tubular member constituting the carbid-outlet for such receptacle, and pressure-controlled mechanical means coöperating with said tubular member so as to support it with its upper end initially near the top of the receptacle and adapted to effect an intermittently progressive movement of the tubular member downward.

2. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable tubular member therein terminating initially near the top of the receptacle and constituting a carbid-outlet for such receptacle, means including a motor for progressively lowering said tubular member, and a pressure-controlled brake for said motor.

3. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable tubular member constituting a carbid-outlet for such receptacle, and means for moving the carbid in said receptacle to said tubular member.

4. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable tubular member constituting a carbid-outlet for such receptacle, means for progressively moving said tubular member, and means cooperating with said tubular member for moving the carbid thereto.

5. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable tubular member constituting a carbid-outlet for such receptacle, and a rotatory device for moving the carbid to said tubular member.

6. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable tubular member constituting a carbid-outlet for such receptacle, and a rotatory device for feeding the carbid to said tubular member, said rotatory device operating in continuous correlation to the upper end of said tubular member.

7. In an acetylene-gas generator, a carbid-receptacle having a vertically-movable tubular member constituting a carbid-outlet for such receptacle, and a device for moving the carbid to said tubular member comprising a rotatory arm having a resilient finger engaging the carbid adjacent to said tubular member.

8. An acetylene-gas generator comprising a closed tank having a carbid-receptacle therein, said receptacle having an opening in its bottom, a vertically-disposed tubular member mounted to move through the opening in said receptacle, means for holding said tubular member from rotating but permitting endwise movement thereof, means for progressively lowering said tubular member, and means operating in continuous correlation to the upper end of said tubular member for moving the carbid thereto.

9. In an acetylene-gas generator, a carbid-receptacle having a tapered bottom having a central opening, a vertically-disposed tubular member therein terminating initially near the top of the receptacle and movable through said opening and constituting the carbid-outlet for said receptacle, means including a motor for progressively lowering said tubular member, and a pressure-controlled brake for said motor.

10. An acetylene-gas generator comprising a closed tank having a carbid-receptacle therein, said receptacle having an opening in its bottom, a vertically-disposed tubular member mounted to move through the opening in said receptacle, means for holding said tubular member from rotating but permitting endwise movement thereof, means for progressively lowering said tubular member, and means operating adjacent to the top of said tubular member for moving the carbid thereto.

11. An acetylene-gas generator comprising a closed tank, a carbid-receptacle therein, said carbid-receptacle having an opening in its bottom, a vertically-disposed tubular member movable through said opening and constituting the carbid-outlet for said receptacle, and a deflector movable with said tubular member adjacent the lower end thereof.

12. An acetylene-gas generator comprising a closed tank, a carbid-receptacle therein, said carbid-receptacle having an opening in its bottom, a vertically-disposed tubular member movable through said opening and constituting the carbid-outlet for said receptacle, a deflector movable with said tubular member adjacent to the lower end thereof, and a tubular extension on the bottom of said carbid-receptacle surrounding said tubular member and deflector and spaced therefrom.

13. In an acetylene-gas generator, a carbid-receptacle provided with a tapered bottom having a central opening therein, said opening being surrounded by a depending corrugated flange, and a vertically-disposed tubular member movable through said opening in contact with said flange.

14. In an acetylene-gas generator, a closed tank, a carbid-receptacle therein, said carbid-receptacle having an opening in its bottom, a vertically-disposed tubular member movable through said opening and constituting the carbid-outlet for said receptacle, a vertically-disposed shaft having a screw-

threaded engagement with said tubular member, means for holding said tubular member from rotating but permitting endwise movement thereof, whereby such endwise movement is given to it when said shaft is rotated, and a device rotatable with said shaft and movable lengthwise thereof in cooperative relation to the upper end of said tubular member for moving the carbid to the latter.

15. In an acetylene-gas generator, a closed tank, a carbid-receptacle therein, said carbid-receptacle having an opening in its bottom, a vertically-disposed tubular member movable through said opening and constituting the carbid-outlet for said receptacle, a vertically-disposed shaft having a screw-threaded engagement with said tubular member, means for holding said tubular member from rotating but permitting endwise movement thereof, whereby such endwise movement is given to it when said shaft is rotated, a device rotatable with said shaft and movable lengthwise thereof in coöperative relation to the upper end of said tubular member for moving the carbid to the latter, a motor for rotating said shaft, and a pressure-controlled device for stopping said motor.

16. In an acetylene-gas generator, a carbid-receptacle, a device for feeding the carbid from said receptacle, said device comprising as an element a rotatory shaft, a motor operatively connected to said shaft, a tubular extension from said generator surrounding said shaft, and a pressure-controlled device comprising a closed hollow shell slidably fitted on said tubular extension, a brake for the motor, and an actuating lever for said brake operatively connected to said closed shell.

17. In an acetylene-gas generator, a carbid-receptacle having an opening in its bottom and a cover, a vertically-movable tubular member working through the opening in the bottom of said receptacle, the cover for said receptacle having a filling-opening between the side wall and said tubular member, an automatically-operable device for covering said filling-opening, and means for automatically moving said covering device out of covering position as said tubular member reaches its highest position.

18. In an acetylene-gas generator, a carbid-receptacle, a vertically-movable outlet-tube for said receptacle, a cover for said carbid-receptacle having a filling-opening between the side wall of said receptacle and said outlet-tube, a rotatory device mounted adjacent to the cover of the receptacle and adapted to cover the filling-opening therein, resilient means for holding said rotatory device normally in covering position, and means for automatically moving said rotatory device out of covering position as said outlet-tube reaches its highest position.

19. In an acetylene-gas generator, a closed tank, a carbid-receptacle in the upper part of said tank, said carbid-receptacle having an opening in its bottom, a vertically-disposed tubular member mounted to slide through said opening, an axial tubular member secured to said first-mentioned tubular member, a vertical shaft having a screw-threaded engagement with said axial tubular member, means for holding said tubular members from rotating but permitting endwise movement thereof, whereby such endwise movement is effected when said shaft is rotated, and means for rotating said shaft.

20. In an acetylene-gas generator, a closed tank, a carbid-receptacle in the upper part of said tank, said carbid-receptacle having an opening in its bottom, a vertically-disposed tubular member mounted to slide through said opening, an axial tubular member secured to said first-mentioned tubular member, a vertical shaft having a screw-threaded engagement with said axial tubular member, means for holding said tubular member from rotating but permitting endwise movement thereof whereby such movement is effected when said shaft is rotated, means for rotating said shaft, and a device rotatable with said shaft and movable lengthwise thereof in continuous correlation to the upper end of said first-mentioned tubular member for moving the carbid to the latter.

Signed at St. Louis, Missouri, this 2nd day of February, 1912.

PRIOR F. WILLIS.

Witnesses:
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PAULINE AMBERG.