V. E. PETERSON.

ACETYLENE GAS GENERATOR.

APPLICATION FILED MAY 24, 1907.

976,135.

Patented Nov. 15, 1910.

Fig. 2.

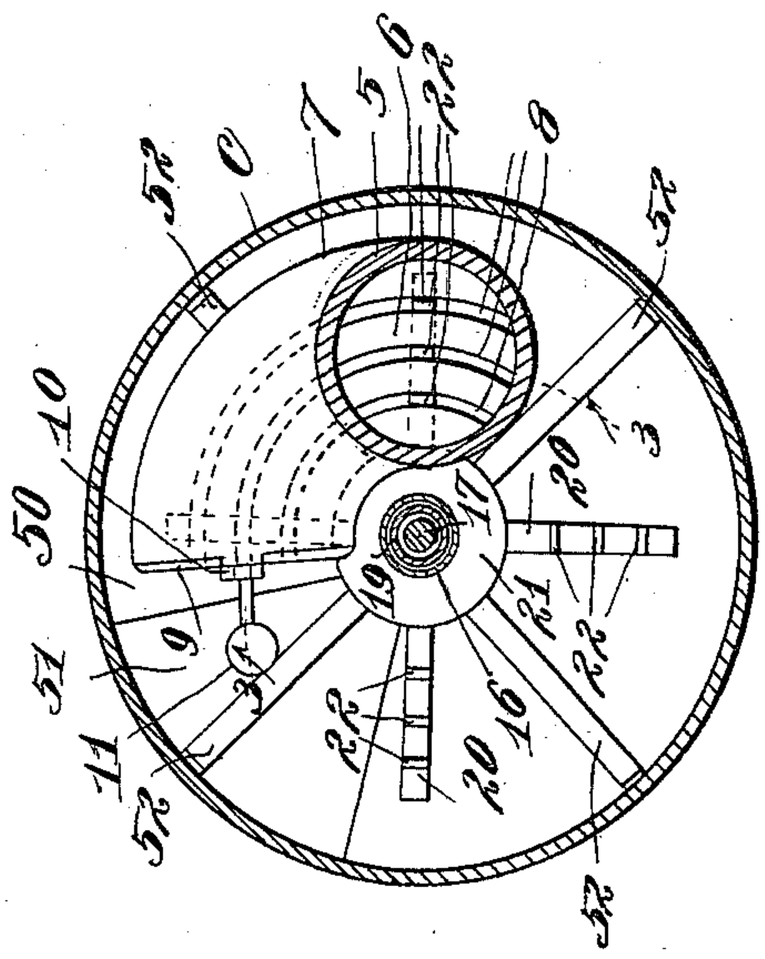


Fig. 3.

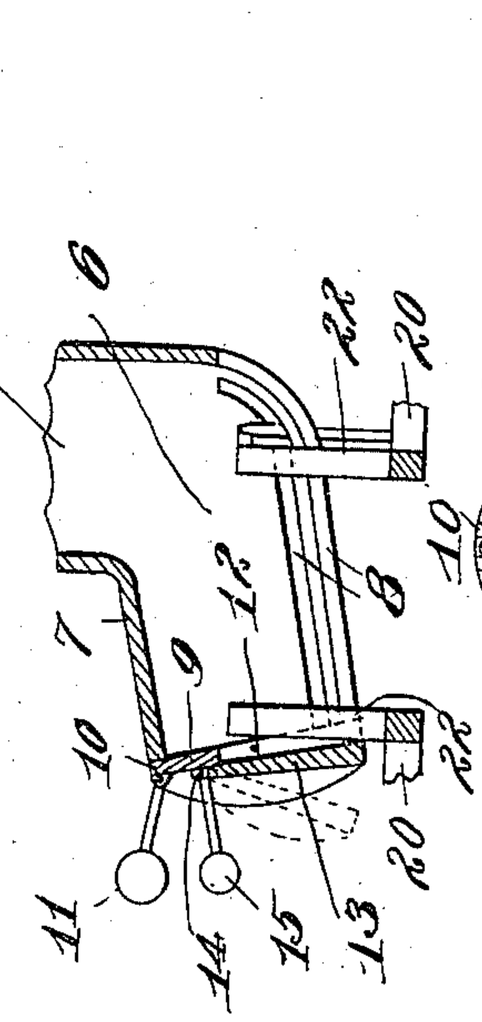
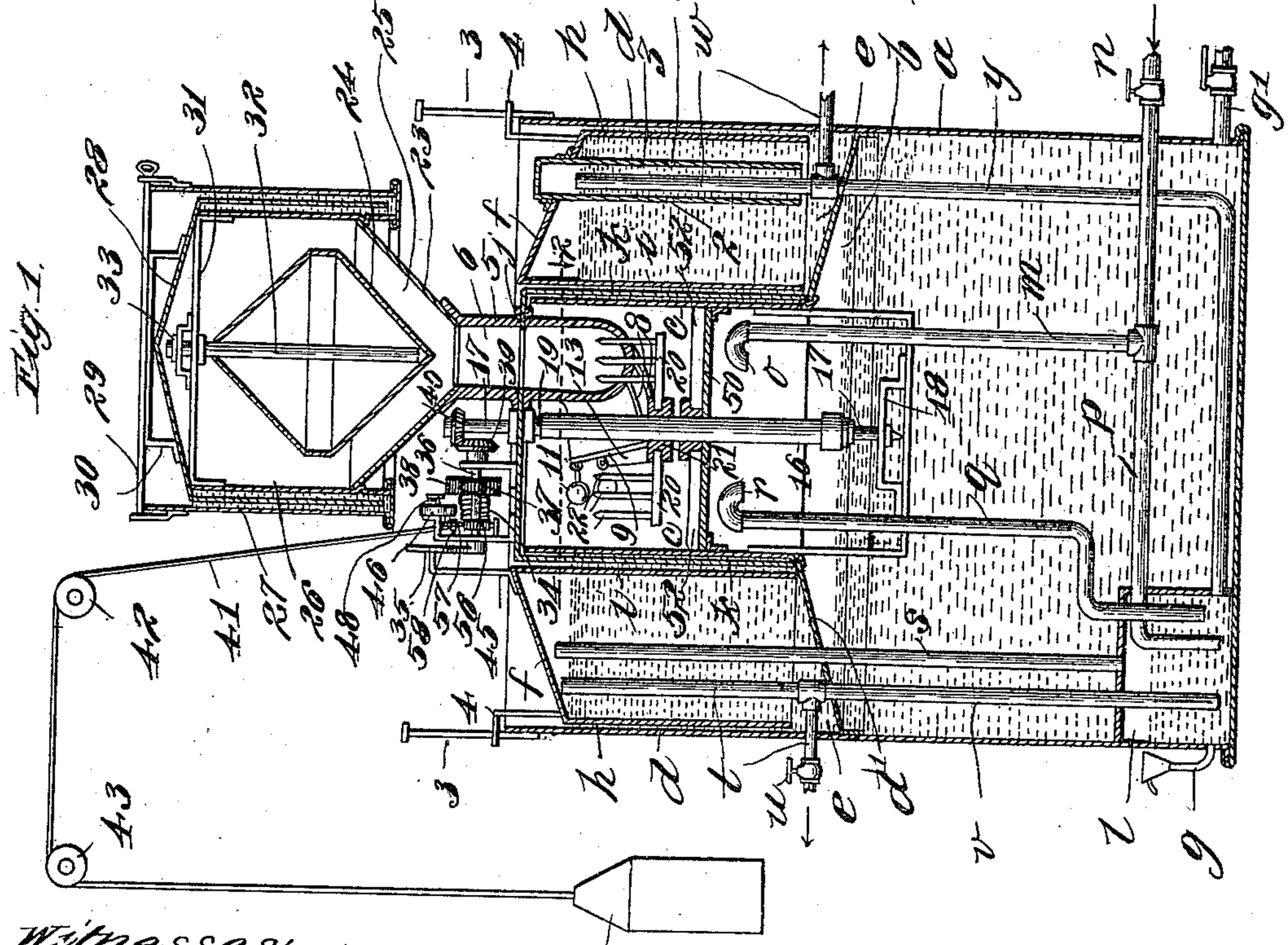


Fig. 4.

Fig. 1.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

976,135. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed May 24, 1907. Serial No. 375,485.

To all whom it may concern:

Be it known that I, VICTOR E. PETERSON, a citizen of the United States, residing in Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

This invention relates to that class of acetylene gas generators having a generating chamber provided with a carbid inlet passage and feeding mechanism mounted in the generating chamber and adapted to control or regulate the supply of carbid introduced into such chamber.

The principal object of the invention is to provide a simple, economical and efficient acetylene gas generator.

Further objects of the invention are to provide an acetylene gas generator with simple and efficient means for feeding carbid, and particularly coarse carbid, to the generating chamber and controlling or regulating the supply of carbid; to prevent clogging, prevent the passage of steam into the carbid containing inlet passage to as great an extent as is practicable while permitting the carbid engaging feeding mechanism to pass into and along the inside of the inlet passage, and provide registering mechanism adapted to enable the operator to ascertain when the carbid is becoming low in the hopper before it is exhausted and without the necessity of opening or obtaining access to the hopper.

Other and further objects of the invention will appear from an examination of the drawings and the following description and claims.

The invention consists in the features, combinations and details of construction and operation hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a central sectional view in elevation of an acetylene gas generator provided with feeding mechanism constructed in accordance with my improvements; Fig. 2, an enlarged sectional plan view in detail, taken on line 2 of Fig. 1; Fig. 3, a sectional view in elevation taken on the curved section line 3 of Fig. 2, looking in the direction of the arrows, showing the slotted curved inlet pipe, the gates therefor, and the feeding fingers or teeth extending into the curved passage formed by the carbid inlet pipe, and Fig. 4, a front view in elevation of the carbid inlet doors.

In constructing an acetylene gas generator provided with feeding mechanism constructed in accordance with my improvements and adapted to accomplish the above objects I provide a tank *a* formed of sheet metal, the lower and inner upper portion of which forms a generating chamber, which in operation is partially filled with water, the upper relatively small portion being adapted to contain gas formed by the intermixture of calcium carbid with the water contained in said chamber. The upper portion of the tank is formed of an inner wall *c* and outer wall *d* which, with the diaphragm or partition wall *d'* form an annular storage chamber *e* which encircles the relatively small upper portion of the generating chamber and is over the lower or relatively large water containing portion of the generating chamber. An annular bell *f* having a depending outer side wall *h* and inner wall *i* both circular and connected at the top forms a cover for the storage chamber. A cap *j* covers the upper end of the generating chamber and has circular side walls *k* which extend inside of and to the bottom of the storage chamber when the cap is in normal position, thus encircling the upper inner side wall portion *c* of the generating chamber.

The storage chamber is partially filled with water, as shown, so as to form a water seal for the top of the generating chamber as well as for the bell and storage chamber, and leave a space in the upper portion of the bell for containing gas. The bell is thus adapted to float upon the gas contained therein while its lower edges are immersed in water, and the gas-containing portions of the generating and storage chambers are both properly sealed. The ordinary form of washing or drip chamber *l* having a water inlet pipe *g*, water sealed as shown, is provided at or near the bottom of the generating chamber, and an outlet pipe *g'* leads from the generating chamber and may be provided with any desired form of mechanism for controlling the liquid outlet passage formed thereby. The generating chamber is provided with an air inlet pipe *m* having a valve *n*, the upper end of said pipe extending above the water level on the inside of the chamber and having a double elbow or curved portion *o* forming a

shield for preventing the admission of particles which might otherwise clog the pipe. A branch drain or drip pipe *p* leads from the upright portion of the air supply pipe into the drip chamber and below the water level therein, so as to be sealed by the water. A gas outlet passage leading from the generating to the storage chamber or bell is formed of a pipe *q* which leads from above the level of the water contained in the generating chamber into and below the water in the drip or washing chamber *l*, and a pipe *s* which leads from the drip chamber above the level of the water therein into the storage chamber and bell, the mouth of said pipe being above the level of the water contained in the bell. A double elbow or curved portion *r* at the upper end of the pipe *q* shields the opening or provides a downwardly facing opening for the pipe.

A gas outlet passage from the storage chamber and bell to the house or burners to be supplied with gas is formed by the pipe *t* having a valve or cock *u* and the upper end of which opens into the bell and storage chamber above the level of the water contained therein. The lower drainage portion *v* of this pipe leads into the drip chamber and into the water contained therein. A safety or blow-off pipe *w* leads from the inside of the bell above the water and out below the lower edge of the bell, and is provided with a drip or drainage portion *y* leading into the drip chamber.

A cap or pipe *z*, closed at its upper end and open at its lower end is secured to the bell and encircles the pipe *w* from a point above the level of the water contained in the bell down to or near the level of the lower edge or bottom of the bell, and perforations 2 in said pipe or cap *z* form outlets for permitting the escape of gas when raised with the bell to a point above the level of the water seal but are normally below the level of and sealed by the water. Upright guides 3 on the tank are slidably engaged by guides 4 on the bell, for guiding the bell and limiting the upward movement thereof.

In order to provide suitable improved means for feeding carbid to the generating tank or chamber, a carbid supply pipe 5 which forms a carbid inlet passage 6 and the bottom side of which forms a carbid supporting element on the inside of the generating chamber adapted to support carbid above the level of the water contained in said chamber, is mounted in the cap *j*. This inlet pipe is provided with a curved elbow portion 7 having preferably a plurality of slots through the bottom side thereof extending longitudinally of the curved portion of the pipe, the slots being so narrow as to prevent the carbid—excepting only very small particles—from passing therethrough. This curved and slotted portion of the pipe extends downward at a slight angle or incline in the direction of its mouth and is provided at its mouth with a door or gate 9 mounted upon a hinge 10 and adapted to close the mouth of the carbid inlet passage when in normal or closed position in which it is held by being suitably weighted. I prefer that the mouth should face downward somewhat so that the carbid will drop freely therefrom and not remain in position to hold the door open longer than is necessary. A weight 11 is therefore provided for holding the door closed. This door is provided with slots 12 which register with the slots 8 in the pipe and extend upward from the lower edge of the door a sufficient distance to permit the passage of the upright feeding fingers hereinafter described. An imperforate supplementary door 13 is mounted by means of a hinge 14 upon the outside of the door 9 and is held in position to close the perforations or slots 12 in the door 9. By this means the feeding fingers hereinafter described are permitted to pass beyond the slotted door from the inside of the passage or pipe without raising or opening said slotted door except as it is raised by actual contact with the carbid. An upright hollow shaft 16 is connected at or near its lower end with an inner shaft 17 which extends through said hollow shaft and is rotatably mounted at its lower end in a support 18 which is secured to the wall of the generating chamber. The upper end of the inner shaft extends above the end of the shaft 16 and is rotatably mounted in the cap *j* already described. A tube 19 extends from the top of the cap *j* downward between the inner and hollow shafts, its upper end being closed by the shaft 17 which extends out through and above the cap *j* and is connected with suitable driving mechanism. The space inside the hollow shaft 16 is sealed by a water seal in the ordinary manner, the water on the inside thereof being sufficient to extend above the bottom of the depending tube 19.

A plurality of laterally extending arms 20 are secured to the hollow shaft 16 in any ordinary and well known manner, as by a collar 21 or other suitable connecting means, and each of these laterally extending arms is provided with a plurality of upwardly extending fingers 22, one for each slot in the curved portion of the pipe. A stationary diaphragm or platform 50 is mounted in the generating chamber or tank to the side walls of which it may be removably secured in any ordinary manner. This platform is above the level of the water contained in the generating chamber and below the mouth of the carbid inlet pipe and feeding arms and fingers above described. It preferably covers the entire upper portion of the generating chamber between the side walls *c* with the

exception of an opening 51 which is provided near the mouth of the carbid inlet passage but preferably a sufficient distance beyond the end of the said passage or pipe so that carbid dropping from the mouth of the passage will alight upon the platform 50 before passing through the opening 51 therein. A plurality of feeding blades or arms 52 are mounted upon the hollow shaft 16 already described, to which they are rigidly secured in any ordinary manner, so that they extend outward laterally from the shaft over and in engagement with the upper face of the platform. These blades are preferably in staggered relation to the arms 20, so that carbid discharged from the mouth of the carbid inlet passage by the fingers 22 will, in so far as it does not at once all fall through the opening 51, be scraped from the platform by the blades 52. The portion of the carbid which falls through the slots 8 will also be scraped from the platform by the blades, and the platform thus constructed and arranged serves to prevent the water from splashing up against and into the carbid inlet pipe, and prevents a large portion of the steam from coming into contact with the carbid in the inlet passage. It confines a large portion of the steam below the platform and causes it to condense as it comes in contact with the underside of the platform. The scraping of the carbid from the platform being alternate with the passing of the respective sets of feeding fingers from the mouth of the carbid inlet passage or mouth it will be readily seen that the feeding is more regular and the variations in the quantity of gas generated is reduced.

The carbid inlet pipe when constructed as above described forms a curved or sinuous inlet passage on the inside of the generating chamber and the slotted bottom side of the pipe forms a support for the carbid on the inside of the generating chamber into which the feeding fingers 22 extend, and these fingers pass along the inside of said passage to the mouth in sets of two three or more abreast so that carbid which is very coarse may be successfully fed and the supply thereof regulated automatically, and the pipe is not permitted to become clogged. The pipe 5 should be of gradually increasing diameter or area from its upper end to its mouth, and is provided at its upper end with a hopper 23 having a cone 24 mounted centrally thereof and having a conical bottom face the pitch of which is less steep than that of the upper face of the hopper, so that the walls of the cone and hopper become farther apart as they approach the bottom of the hopper. The passage 25 thus formed between the cone and the inclined face of the hopper should be of greater area at the bottom of the cone and hopper than at the beginning of said passage. Clogging is thus reduced to a minimum or entirely prevented.

The upper upright portion 26 of the hopper is encircled by a casing 27 and is covered by a cap 28 the side walls of which are circular and extend downward between the upright side-wall portion of the hopper and the inclosing outer casing, and the space between the casing and hopper walls is filled with water thus forming a water seal which is adapted to effectually prevent the escape of gas. The cap is held down or in place by means of a rod 29 which rests upon the handle 30. The cone 24 is supported by a transverse support 31 to which it is secured by means of a bolt 32 and nut 33, the transverse support being secured to the upper portion or wall of the hopper in any ordinary manner.

The driving mechanism for operating the feeding mechanism above described may be of any ordinary and well known type adapted to be released and caused to become locked by the movement of the bell. The mechanism for this purpose here shown consists of a motor or rotatably mounted drum 34 having a stop-arm or brake operating arm 35. This motor or drum is operatively connected with the shaft 17 by means of a shaft 36 having a spur gear 37 thereon in toothed engagement with a similar larger gear-wheel 38 upon the drum—the shafts 36 and 17 being connected by means of bevel pinions or gears 39 and 40. A cable or rope 41 is wound upon the drum and leads over supporting pulleys 42 and 43 to an operating weight 44 which is adapted to supply the motive power for operating the feeding mechanism above described. An arm 45 upon the bell is mounted in position to engage the stop arm 35 of the motor and hold it in releasing position when the bell is in lowered position. When the bell is raised by a sufficient supply of gas so that the arm 45 is disengaged from the arm 35 the latter is permitted to move to locking position so as to lock the feeding mechanism and prevent any more carbid from being fed until a desired portion of the gas has been used or drawn off. By the lowering of the bell the arms may be again automatically brought into engagement and the feeding mechanism set in motion.

It is very desirable that means be provided whereby the operator may be enabled to ascertain what number of revolutions or operations the feeding mechanism has made subsequently to the filling of the hopper with carbid, or in other words to provide means for registering or indicating the number of operations of the feeding mechanism and thereby enabling the quantity of carbid which has been fed to be ascertained and the approximate or actual amount contained in the hopper without opening or in-

specting the interior of the hopper. In order to accomplish this a register or indicator 46 is provided and operatively connected with the carbid feeding mechanism by means of suitable gearing. A gear wheel 56 is mounted on the shaft 36 and in toothed engagement with a gear 58 which is in turn operatively connected with the indicator hand 48 of the register. The register mechanism may be in all other respects of any ordinary and well known type and it is therefore not deemed desirable or necessary to describe it in detail herein.

The carbid feeding mechanism above described is adapted to be used either with a single or double tank apparatus, and I do not limit myself to the specific construction shown except as set forth in the claims.

I claim:—

1. In an acetylene gas generator, the combination of a tank forming a generating chamber and provided with a curved carbid inlet passage leading into such chamber and having a slotted wall portion, carbid feeding mechanism mounted in the generating chamber and provided with carbid engaging members extending into said slotted portion and movable along the inside and longitudinally of such curved inlet passage and a vertical shaft rotatably mounted and forming a support for said carbid engaging members, and adapted to rotate said carbid engaging members in a curved path.

2. In an acetylene gas generator, the combination of a tank forming a generating chamber provided with a curved carbid inlet passage having longitudinally extending slots in the walls of the passage, carbid feeding mechanism mounted in the generating chamber provided with carbid engaging fingers extending into such slots and movable along the inside and longitudinally of the carbid inlet passage in a curved path, and a vertical rotary shaft forming a support for said carbid engaging fingers, and adapted to rotate said carbid-engaging fingers in a curved path.

3. In an acetylene gas generator, the combination of a tank forming a generating chamber, a carbid inlet pipe having a curved portion on the inside of the generating chamber provided with parallel curved slots, and a vertical shaft rotatably mounted and provided with horizontal laterally extending arms having vertical carbid feeding fingers extending into the slots and movable longitudinally thereof in a curved path.

4. In an acetylene gas generator, the combination of a tank forming a generating chamber, a carbid inlet pipe having a curved portion on the inside of the generating chamber provided with parallel slots opening into the passage formed by such pipe, a vertical shaft rotatably mounted in the generating chamber, a plurality of laterally extending arms mounted upon such shaft each provided with a plurality of carbid feeding fingers extending into the parallel slots and into the passage formed by the pipe and rotatable in a curved path, and mechanism connected with the upper end of the shaft on the outside of the generator chamber, for rotating the shaft and thereby rotating the carbid feeding fingers with the shaft and in a curved path.

5. In an acetylene gas generator, the combination of a tank forming a generating chamber, a carbid inlet pipe leading into the generating chamber and having longitudinally extending slots which open into the generating chamber, feeding mechanism mounted in the generating chamber and having movable carbid feeding members extending into the slots and movable along the inside of the carbid inlet pipe, and a gate movable to open and closed position across the mouth of the pipe.

6. In an acetylene gas generator, the combination of a tank forming a generating chamber, a carbid inlet leading into the generating chamber, a hinged door mounted at the mouth of the carbid inlet pipe, and carbid feeding mechanism mounted inside of the generating chamber and movable along the inside of the carbid inlet pipe and outward past the door at the mouth thereof.

7. In an acetylene gas generator, the combination of a tank forming a generating chamber, a carbid inlet pipe leading into the generating chamber and provided with longitudinally extending slots, a door mounted at the mouth of the pipe having slots in line with the slots in the pipe, and feeding mechanism mounted adjacent to the inlet pipe provided with feeding members movable through the slots in the pipe and door.

8. In an acetylene gas generator, the combination of a tank forming a generating chamber and provided with a carbid inlet passage the wall of which is slotted, a door mounted at the mouth of the passage having a slotted edge adjacent to the slotted wall portion of the passage, means for closing the slots in the door, and feeding mechanism mounted in the generating chamber and having feeding members movable through the slots in the door and carbid inlet passage wall.

9. In an acetylene gas generator the combination of a tank provided with a water containing gas generating chamber having a carbid inlet passage, a water-sealed cover for said chamber, a water-sealed hopper having a discharge opening communicating with the carbid inlet passage of the generating chamber, a platform mounted in the generating chamber below the mouth of the carbid inlet passage and above the water contained in the chamber and provided with an opening for permitting the passage of

carbid from the upper side of the platform into the water below the platform, a shaft rotatably mounted in the generating chamber and provided with laterally extending arms or blades adjacent to the upper side of the platform, a set of arms mounted on said shaft and provided with upwardly extending fingers for feeding carbid from the carbid inlet passage, means for admitting air to the generating chamber, and a discharge pipe leading from the inside of the generating chamber and having its inner end above the water contained in the chamber.

10. In an acetylene gas generator, the combination of a tank provided with a water containing gas generating chamber and having inner and outer wall portions forming a storage chamber which encircles the generating chamber, said storage chamber being partly filled with water, a cover extending over the top of the generating chamber and having an annular depending rim or wall extending downward on the inside of the storage chamber into the water contained therein and encircling the upper inner wall of the storage chamber, an annular bell mounted in the storage chamber and encircling the upper portion of the generating chamber, a water-sealed hopper mounted upon the water sealed cover of the generating chamber and provided with a carbid inlet pipe extending through said cover into the generating chamber, and having a curved portion on the inside of the generating chamber provided with slots opening into the passage formed by said pipe, feeding mechanism mounted in the generating chamber having carbid engaging members adapted to extend through the slots and movable along the inside of the curved portion of the carbid inlet pipe, a door mounted at the mouth of the carbid inlet pipe, and a cone mounted in the hopper and having an inclined bottom face gradually diverging from the adjacent inclined face of the hopper toward the bottom thereof.

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