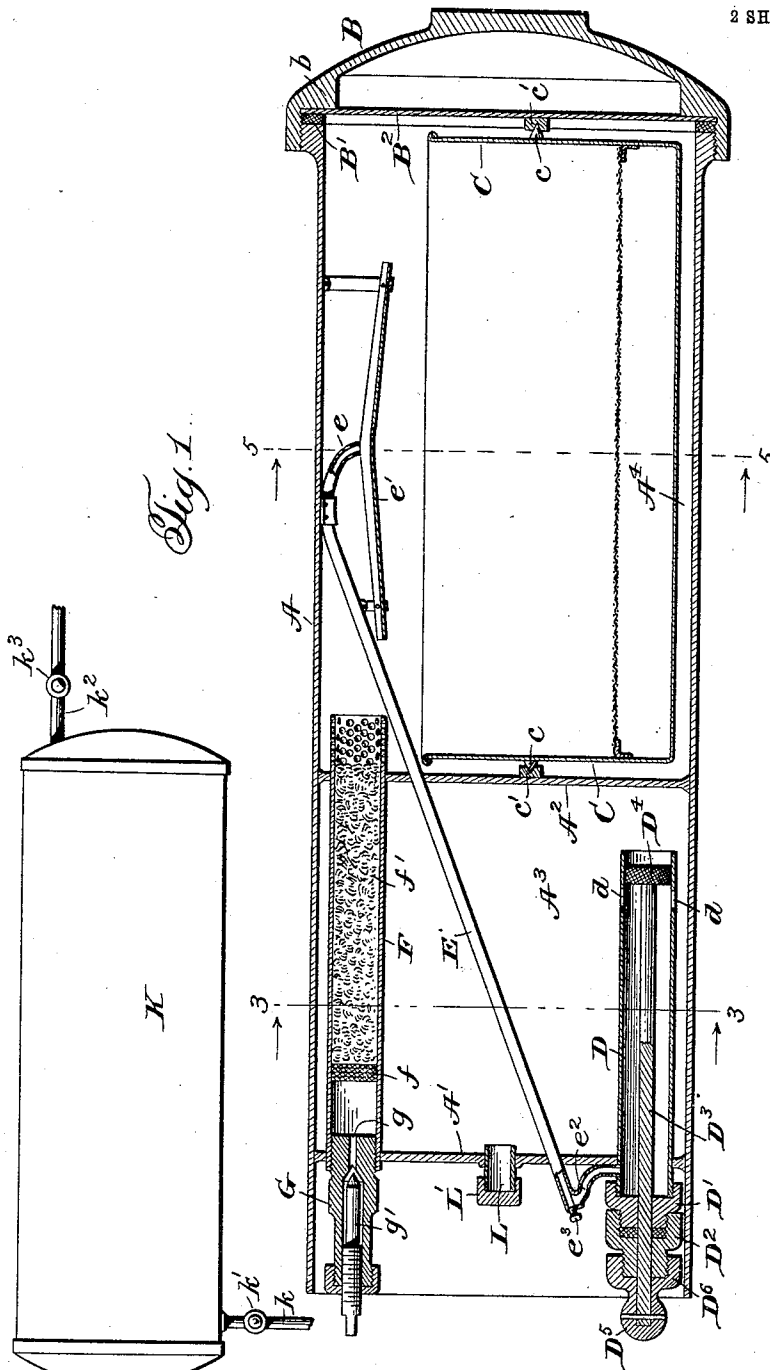


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 ACETYLENE GAS GENERATOR.
 APPLICATION FILED FEB. 20, 1912. RENEWED APR. 5, 1913.

1,061,052.

Patented May 6, 1913.

2 SHEETS—SHEET 1.



Witnesses:

James Hutchinson:
 E. A. Martin.

Inventor:

George H. Davis,

By Waconmilans Attorneys:

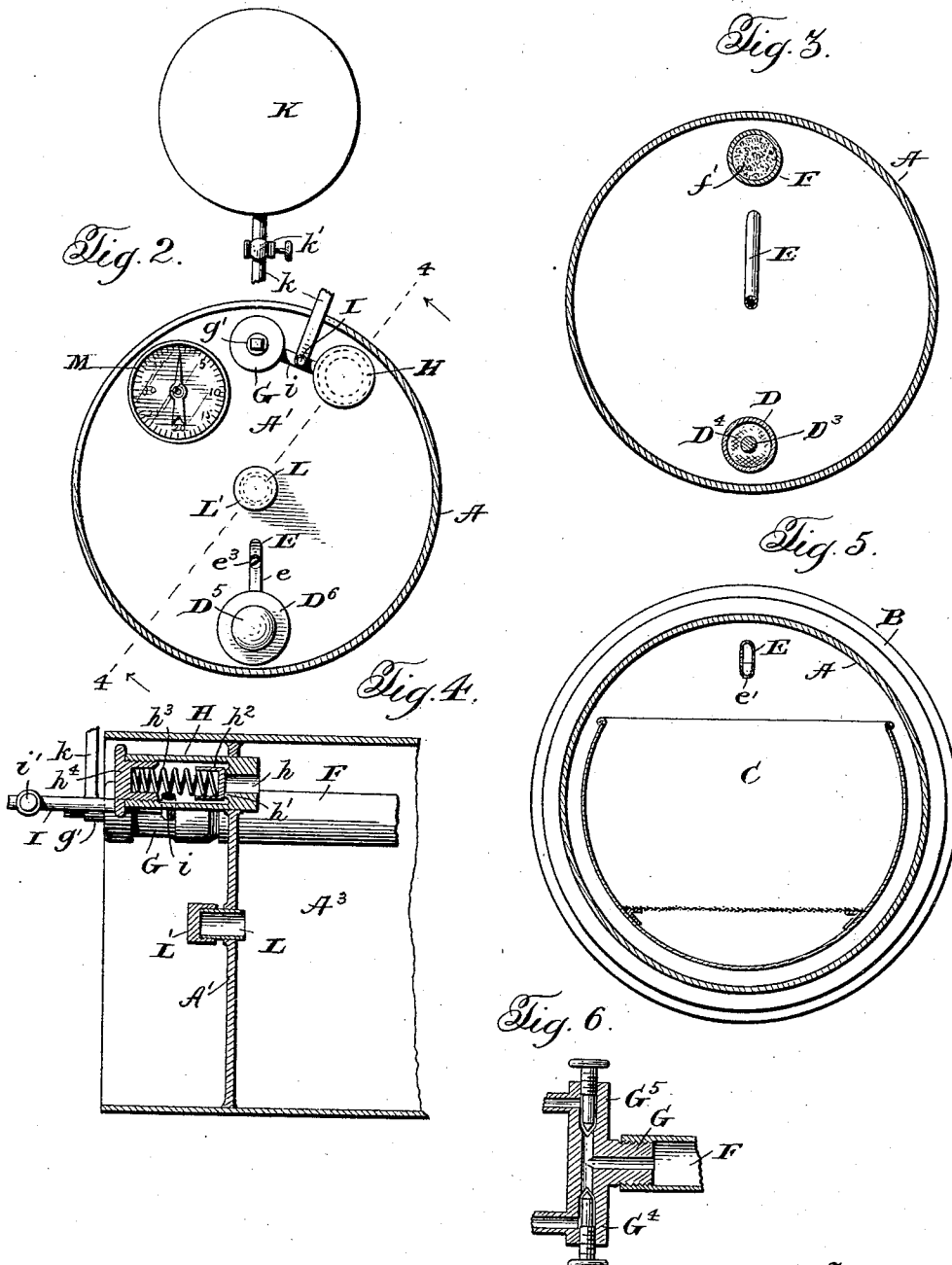
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UNITED STATES PATENT OFFICE.

GEORGE H. DAVIS, OF PORTLAND, MAINE.

ACETYLENE-GAS GENERATOR.

1,061,052.

Specification of Letters Patent.

Patented May 6, 1913.

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To all whom it may concern:

Be it known that I, GEORGE H. DAVIS, citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to an improvement in acetylene gas generators and more particularly to a portable generator of this character which is particularly adapted for use on automobiles, launches and the like.

15 One of the objects of the present invention is the provision of a generator of this character which will furnish the burners with gas at a uniform predetermined pressure.

20 A further object of the invention is the provision of a device of this character which is provided with means for starting the generation of the gas and which is of such a construction that it will, when once started automatically, generate gas proportionately to its consumption at the burners.

25 A further object of the invention is the provision of a device of this character which is compact, and which is of such a form that it may be readily secured to the running board of a vehicle in the manner ordinarily adopted for presto-light or other gas storage tanks.

30 Other objects of the invention will be apparent from the detailed description hereinafter when read in connection with the accompanying drawings forming a part hereof, wherein a convenient embodiment of the invention is illustrated, and wherein like characters of reference refer to similar parts in the several views.

35 In the drawings: Figure 1 is a longitudinal section of the improved generator; Fig. 2 is a front elevation thereof; Fig. 3 is a sectional view on line 3—3 of Fig. 1; Fig. 4 is a sectional view on line 4—4 of Fig. 2; Fig. 5 is a sectional view on line 5—5 of Fig. 1 and Fig. 6 is a sectional view showing a modified form of valve which may be used.

40 Referring now more particularly to the drawings, A designates the casing of the generator, which in the form of the invention illustrated is in the form of an elongated metal cylinder, the forward end of which is closed by a head A' and the rear end of which is open. Positioned within the

casing A intermediate the ends thereof is a partition A² which serves to divide the casing into a water chamber A³ at the front end thereof and a carbid chamber A⁴ at the rear end thereof. The open end of the casing A is normally closed by a cap B which may be removed when it is desired to charge the carbid chamber A⁴. Any suitable form of closure may be used for this purpose, but I have found that the particular form shown in the drawings is very efficient for this purpose and forms an absolutely gas tight joint between the cap and the casing. In the form of the invention illustrated in the drawings, the casing is provided with a threaded portion onto which is screwed the cap B, which cap is provided with a portion b which is adapted to directly overlie the rear edge of the wall of the casing A.

Interposed between the rear edge of the wall of the casing A and the portion b of the cap B, is a gasket B' of rubber or any suitable flexible material and a disk B² of metal which has a smooth surface. Interposed between the surface of the metal disk B² and the portion b of the cap B is a lubricant of any suitable character. With this construction, when the cap B is threaded onto the casing A, the gasket B' will, as soon as it contacts with the edge of the rear end of the wall of the casing A, be held against further rotation, and the metal disk B² will also be held against further rotation by reason of the frictional engagement between the same and the flexible gasket B'. As the cap B is further screwed to position, it will readily rotate over the surface of the metal disk B² owing to the lubricant which is interposed therebetween. As the flexible gasket B' is held from rotation instantly it contacts with the rear edge of the wall of the casing, it will be seen that it will not become torn or distorted and that a perfect gas tight joint will be formed between the cap B and the interior of the carbid chamber.

Positioned within the carbid chamber A⁴ is a carbid receptacle C which is so supported that it may shift axially relative to the casing A so that regardless of the position in which said casing is placed, the carbid receptacle will occupy such a position as will cause the proper retention of the carbid therein. The carbid receptacle may be supported in any convenient manner for obtaining this result. In the embodiment of the invention illustrated, I have

shown the carbid receptacle in the form of an open topped box or basket having a removable screen therein for the support of the carbid and the end walls of which are provided with trunnions c which loosely engage sockets c' formed respectively in the partition A^2 in the case A and in the metal disk B^2 . From this construction it will be seen that the carbid receptacle C is held in its suspended position by means of the closure B and that when the closure B is removed, said receptacle may be readily withdrawn from the casing A .

Secured within the lower portions of the front wall A' of the casing A , and projecting within the water chamber A^3 , is a pump barrel, D , the front end of which projects outwardly beyond the front wall A' of the casing and has connected thereto in any suitable manner, a cap D' . Threaded on the cap D' is a stuffing box D^2 and working within the stuffing box D^2 and the cap D' is a plunger rod D^3 , the inner end of which carries a piston D^4 which is adapted to slide within the pump cylinder D . Secured to the outer end of the piston rod D^3 is a suitable operating handle D^5 by means of which the piston rod may be reciprocated. The operating handle D^5 is provided with an interiorly threaded collar D^6 which may, when desired, be caused to engage a thread formed on the outer surface of the stuffing box D^2 , so that the piston rod D^3 will be held against movement. The pump cylinder or barrel D is provided with a plurality of openings d therein which are positioned in advance of the piston D^4 when the same is locked against movement, and which serves to establish a communication between the water chamber A^3 and the interior of the pump barrel or cylinder. Communicating with the front portion of the pump barrel D which projects beyond the front wall A' of the casing is one end of a pipe or tube E , which pipe extends upwardly from its connection with the pump barrel through the front wall of the casing, the partition A^2 in the casing, and to the upper portion of the carbid chamber A^4 . The portion of the pipe E extending within the carbid chamber A^4 is provided with a downwardly turned end e and positioned directly below said downwardly turned end portion is a trough e' which is provided with downwardly inclined end portions and is adapted to receive water from the downwardly turned end portion of the pipe E and direct the same into the carbid chamber in a manner to be hereinafter more particularly set forth. The trough e' may be supported in the carbid chamber A^4 in any suitable manner. The end of the pipe E which is connected to the pump barrel or casing D is extended forward for a slight distance before the pipe is extended through the

front wall A of the casing, thus forming a loop or yoke e^2 in the pipe E which projects forwardly from the connection of said pipe with the pump barrel. If desired, the yoke or loop portion of the pipe E may be provided with a suitable removable cap e^3 so as to permit access to be had to the portions of the pipe E located in the water and carbid chambers, thus enabling these portions of the pipe to be cleaned should they become clogged.

Secured in the upper portion of the front wall A' of the casing A and extending rearwardly therefrom through the partition A^2 in the casing and into the carbid chamber A^4 is an open ended tube F . The portion of the tube F which is positioned within the water chamber is imperforate so that the interior of said tube is not in communication with the water chamber. The portion of the tube F which projects into the carbid chamber A^4 is, however, perforated so that gas generated in the carbid chamber may pass freely into the tube. The tube F is provided adjacent the front end thereof with a plurality of disks f of chamois or other water resisting material which serves to dry the gas as it passes therethrough.

Any suitable filtering material f' is positioned within the tube F in rear of the chamois disks f . Threaded into or otherwise connected to the front end of the tube F is a valve casing G the interior of which communicates through the port g with the interior of the tube F , the passage of gas through the port G being controlled by a needle valve g' which is threaded in the valve casing G and is adapted to cooperate with a seat formed adjacent the front end of said port.

Secured in the front wall A' of the casing A is a safety valve chamber H , the inner end of which is provided with a port h which establishes communication between the interior of the safety valve chamber H and the water chamber A^3 of the generator. The safety valve chamber H is provided adjacent the front end of the port h therefor with a valve seat h' against which the valve h^2 is normally held seated by a spring h^3 , thus closing the communication between the safety valve chamber and the water chamber. One end of the spring h^3 is preferably seated against the cap h^4 which is adjustably mounted in the valve chamber H so that by adjusting said cap the tension of the spring can be varied to cause the valve h^2 to open when any desired pressure is reached in the water chamber. Connecting the needle valve chamber G and the safety valve chamber H is a pipe i and communicating with said pipe intermediate the needle and safety valve chamber is a gas feed pipe I which leads to the burners and in which is inter-

posed a suitable valve i' for controlling the flow of gas to the burners.

K designates a gas storage tank which is connected to the pipe I between the valve i' and the pipe i by a pipe k in which is interposed a valve k' of any suitable construction. A suitable outlet pipe k^2 extends from the tank K and there is interposed in such outlet pipe, a valve k^3 of any suitable construction for controlling the flow of gas therethrough. Secured in the central portion of the front wall A' of the casing A is a filling tube L, the outer end of which is normally closed by a suitable cap L' of any desired construction.

Having described the construction of the improved generator, I will now set forth the manner of using the same and the operation thereof. The desired amount of carbide is first placed in the carbide receptacle C and the same is secured in the carbide chamber A^4 of the casing by means of the cap B in the manner heretofore described. The generator is now placed end to end with the water chamber uppermost and the water chamber is filled with water through the filling tube L. During this operation, it will be impossible for any of the water in the water chamber to pass through the tube E into the carbide chamber because of the yoke or bend e^2 in the tube which is positioned above the water level. The generator is then secured in a horizontal position to the running board or other part of the vehicle. With the generator in this position, to start the same the handle D^5 of the pump is rotated a sufficient amount to disengage the threaded collar D^6 thereof from the stuffing box D^2 . The handle may then be manipulated to reciprocate the piston D^4 in the pump cylinder D which serves to force a portion of the water from the water chamber A^3 through the pipe E and into the trough e' from whence it drips onto the carbide in the carbide receptacle C. During this operation, the needle valve g' is kept closed so that as soon as the gas is generated in the carbide chamber A^4 some of the gas will pass into the downwardly extending portion e of the pipe E, through said pipe into the pump barrel or cylinder D, out through the openings d in said pump barrel or cylinder, and into the upper portion of the water chamber A^3 , thus equalizing the pressure in the water and carbide chambers. One or two reciprocations of the pump will suffice to generate enough gas to obtain the desired pressure in the water and carbide chambers, a pressure gage M of any suitable construction being secured in the front wall A' of the casing A to indicate when the desired degree of pressure has been reached. As soon as the desired pressure is obtained in the water and carbide chambers, the piston is locked to hold the same against any acci-

dental movement by engaging the threaded collar D^6 of the handle D^5 with the stuffing box D^2 . As the pressure in the water and carbide chambers is equalized, any desired degree of pressure may be utilized, so that if the generator is used on cars employing acetylene under pressure as a starting agent, the operator can, by means of the pump, bring the pressure in the generator up to the desired amount, which pressure will be automatically maintained during the subsequent operations of the generator. The generator is now ready for use and by opening the needle valve g' and the valve i' in the gas supply pipe I, gas will pass from the carbide chamber to the burners. The generator will now act automatically to supply gas to the burners at substantially a constant pressure regardless of the fact whether the burners are adjusted to burn with a high or low flame. This result is obtained by reason of the fact that as soon as the pressure in the carbide chamber is diminished by the passage of some of the gas therein to the burners, the pressure of the gas in the water chamber will serve to force some of the water from the water chamber through the pipe E into the carbide chamber, thus generating a fresh supply of gas and immediately equalizing the pressure in the chambers. During this action, there is temporarily created in the generating chamber, a pressure slightly in excess of that in the water chamber which causes a slight amount of gas to pass from the generating chamber through the pipe E and into the water chamber, thus increasing the pressure therein to a slight extent. Immediately this occurs, however, the safety valve h^2 is opened, and gas is allowed to escape from the water chamber into the gas supply pipe I until the pressure again reaches normal.

When the burners are not being used, the valve i' in the pipe I is closed and the valve k' in the pipe K leading to the storage chamber is open. By this construction it will be seen that any gas due to after-generation or due to any excessive pressure which might be developed in the generator from any source whatever, would pass to the storage chamber. The gas in this chamber can be utilized for any desired purpose, such as starting the engine of an automobile or the like or it may, if desired, be used in an emergency at the burners. When it is desired to again connect the generator to the burners, the valve i' in the gas supply pipe is opened and the valve k' controlling the flow of gas to the storage chamber K is closed.

In Fig. 6 of the drawings, I have illustrated a slightly modified form of valve casing which is coupled to the outlet end of the tube F, this form being particularly useful where the generator is adapted to be used

not only for supplying gas for the lamps but also for supplying gas under pressure to an acetylene starting device. In the form of the invention the valve casing which communicates with the pipe F is provided with two branches G⁴ and G⁵, one of which is adapted for connection to the burners and the other of which is adapted for connection to the gas supply pipe of a suitable acetylene starter, the passage of gas through said passages being controlled by suitable needle or other valves. In this form of the invention, one of said valves is conveniently set to cause the reduction of the gas which passes through the branch controlled thereby to the desired degree of pressure for use at the burners, while the other valve is of such a construction that by proper adjustment thereof the gas which passes through the branch controlled thereby can be caused to pass therethrough either at the pressure maintained in the generator or at a lesser pressure.

From the construction above described it will be noted that the generator may be termed a high pressure generator as distinguished from the ordinary generators of this type which are generally so designed as to prevent the accumulation of any high pressure. With the present device, by means of the pump which is used to prime the generator and of the safety valve, the gas in the generator can be brought to any desired degree of pressure and that degree maintained at all times. This construction renders the generator particularly useful in connection with automobiles, as it is equally as efficient as the ordinary low pressure generators for supplying the burners and as it may be used in connection with acetylene starting devices, most of which require the acetylene to be under considerable pressure.

While a convenient embodiment of the invention is illustrated in the accompanying drawings, it will be understood that many changes may be made to the form and construction therein shown without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:—

1. In an acetylene gas generator, a horizontally disposed casing divided by a partition intermediate its ends into a water chamber and a gas generating chamber adapted to contain carbid, the front end wall of said casing being provided with a fill opening therein for the water chamber, a constantly open pipe extending from fill opening therein for the water chamber to the upper portion of the carbid chamber and constituting the sole connection between the water and generating chambers during the normal operation of the generator, said pipe having a loop formed therein intermediate its ends and extending without

front end of the water chamber, and means for initially supplying water to said generating chamber to prime the generator.

2. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, a constantly open pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, said pipe constituting the sole connection between the water and generating chamber during the normal operation of the generator, and means directly connected to said pipe for initially forcing water therethrough from the water chamber through the pipe to the generating chamber to prime the generator.

3. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, a constantly open pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, said pipe constituting the sole connection between the water and generating chambers during the normal operation of the generator, and a manually operable pump directly connected to said pipe for initially forcing water from the water chamber through said pipe to the generating chamber to prime the generator.

4. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, a pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, a pump cylinder in direct communication with said pipe and the water chamber, a piston for said pump cylinder, and an operating handle for said piston located without the water chamber.

5. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, a pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, a pump cylinder in direct communication with said pipe and the water chamber, a piston for said cylinder, means for actuating said piston to force water from the water chamber through said pipe into the generating chamber, and means for locking said piston against movement.

6. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, a pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, a pump cylinder positioned within the water chamber below the water level thereof and in communication with the lower end of said pipe, said pump cylinder being provided with a port in the wall thereof, a piston in said pump cylinder, and an operating rod extending from said piston through the wall of the water chamber.

7. In an acetylene gas generator, a water

chamber, a gas generating chamber adapted to contain carbid, a pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, a pump cylinder in communication with said pipe and the water chamber, a piston for said pump cylinder, a piston rod extending from said piston through the wall of the water chamber, and means for normally holding the piston against movement, said means comprising interengaging members carried by the piston rod and the wall of the water chamber.

8. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, a pipe extending from below the water level of the water chamber to the upper portion of the carbid chamber, a pump cylinder in communication with said pipe and the water chamber, a piston for said pump cylinder, an operating rod extending from said piston through the wall of the water chamber, and means for normally holding the piston against movement, said means comprising threaded members carried by the piston rod and the wall of the water chamber and adapted to be brought into engagement upon a rotation of the piston rod.

9. A portable acetylene gas generator of the character described, comprising a casing divided into a water chamber and a carbid chamber, a manually operable pump carried by said casing and having its inlet port in communication with the lower portion of said water chamber and its outlet portion in direct communication with said carbid chamber, whereby the pump may be used to transfer water from the water chamber to the carbid chamber to prime the generator.

10. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, means connecting the water and generating chambers for automatically equalizing the pressure therein, a gas outlet pipe leading from the generating chamber, a valve chamber communicating with the water chamber, a safety valve controlling the flow of gas from the water chamber into said valve chamber, and a connection between said valve chamber and the gas outlet pipe.

11. In an acetylene gas generator, a water chamber, a gas generating chamber adapted to contain carbid, means connecting the water and generating chambers for automatically equalizing the pressure therein, a gas outlet pipe leading from a generating chamber, a valve in said gas outlet pipe, a valve chamber communicating with the water chamber, a safety valve controlling the flow of gas

from the water chamber into said valve chamber, a connection between said valve chamber and the gas outlet pipe, in rear of the valve therein, a gas storage tank, and a valved connection between said gas storage tank and the gas outlet pipe in rear of the valve therein.

12. An acetylene gas generator comprising a cylindrical casing provided with a head closing the front thereof and having its rear end open, an upright partition intermediate the ends of the cylindrical casing dividing the casing into a front water chamber and a rear gas generating chamber, a carbid receptacle positioned within the generating chamber, a closure removably secured upon the open rear end of the casing, a continuously open pipe extending from below the water level of the water chamber to the upper portion of the generating chamber above the carbid receptacle therein, said pipe being provided with a loop therein intermediate its ends extending through the front wall of the casing, and a gas outlet leading from the upper portion of the generating chamber.

13. In an acetylene gas generator, a generating chamber open at one end, the end wall of said generating chamber being provided with a socket therein, a plate overlying the open end of the generating chamber, said plate being provided with a socket in its inner face, a cap having a threaded engagement with the open end of the generating chamber for securing said plate in position, a carbid holder positioned within the generating chamber and provided with projections extending from the end walls thereof and loosely engaging the sockets in the rear wall of the generating chamber and in the plate across the open end thereof.

14. In an acetylene gas generator, a water chamber, and a gas generating chamber, said chambers being closed for the maintenance of a normally high pressure therein, a communication between the water chamber and the gas generating chamber adapted to alternately feed water from the water chamber to the generating chamber and gas from the generating chamber to the water chamber, upon a diminution of the normal pressure in either of said chambers, and means directly connected to said communication for initially forcing water from the water chamber through said communication into the generator chamber to prime the generator.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE H. DAVIS.

Witnesses:

THOS. R. STROTH,

JAS. E. HUTCHINSON.