S. T. RUSSELL.

ACETYLENE GAS GENERATOR.

APPLICATION FILED AUG. 1, 1907.

926,292.

Patented June 29, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

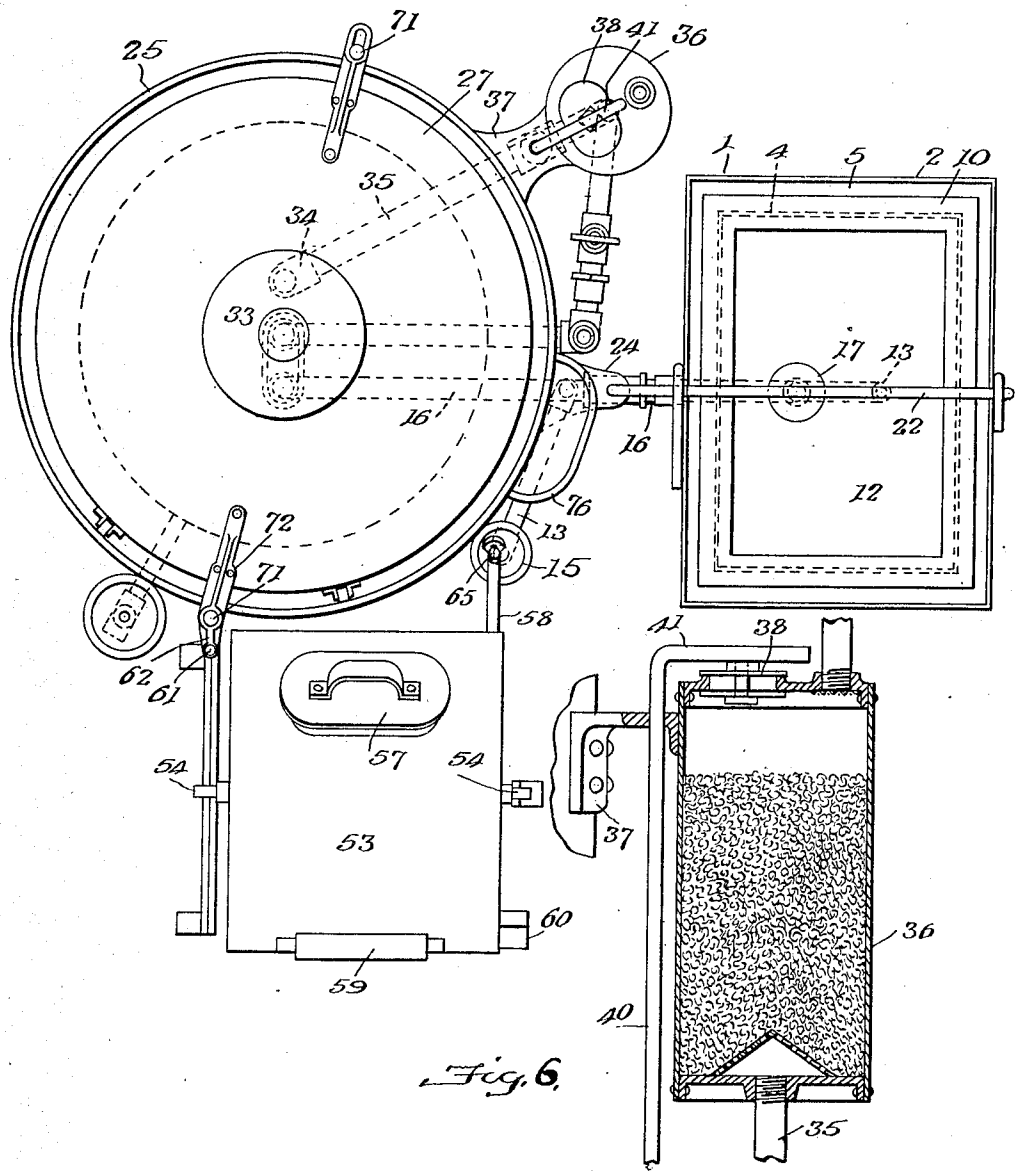

Fig. 6.

Witnesses

G. Howard Walmsley.

Edward F. Reed.

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Samuel T. Russell,

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4 SHEETS—SHEET 2.

Fig. 8.

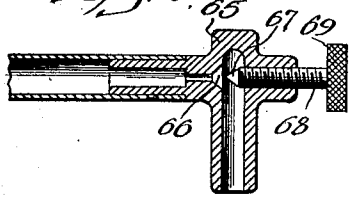

Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 3.

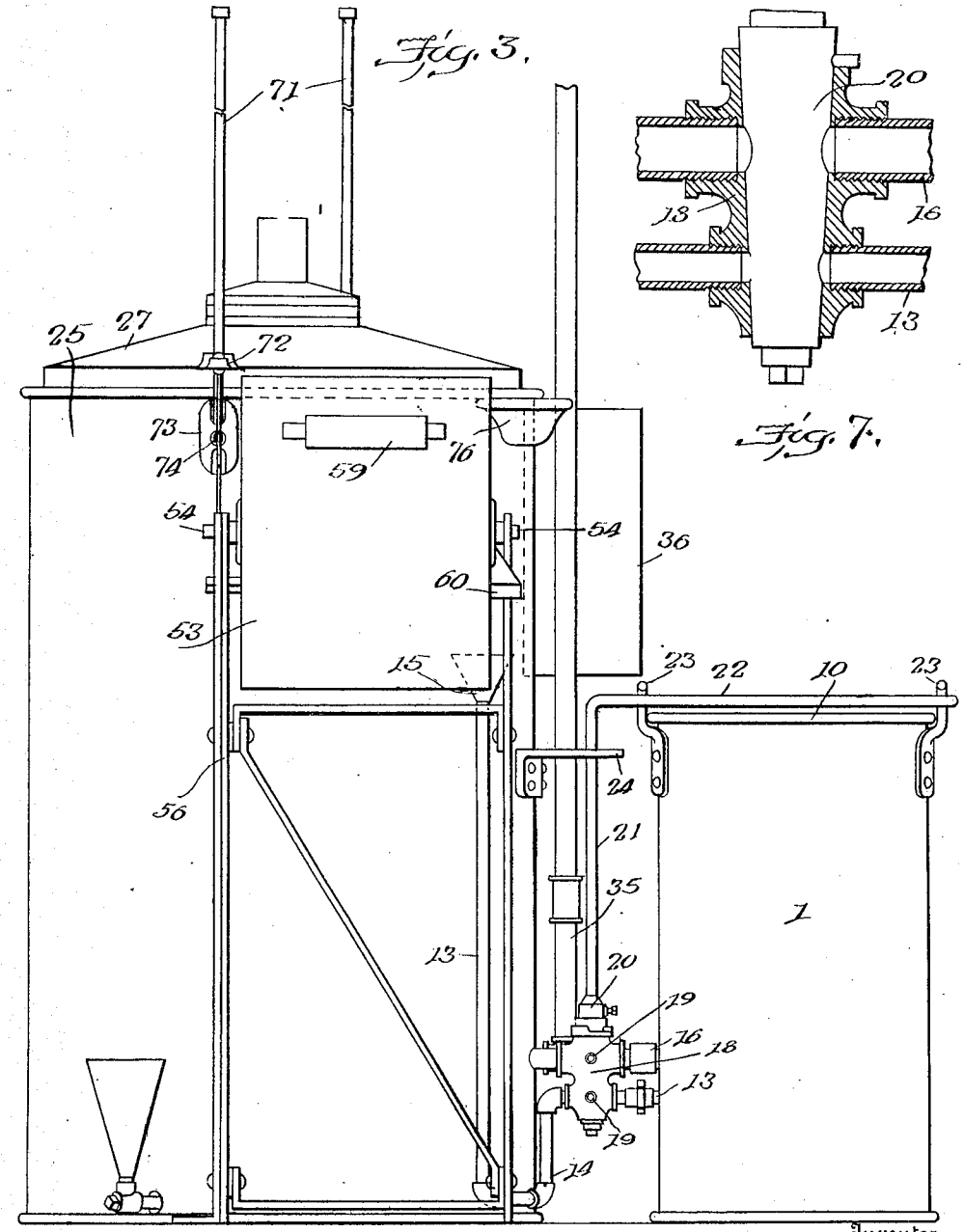

Fig. 7.

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4 SHEETS—SHEET 4.

Fig. 5.

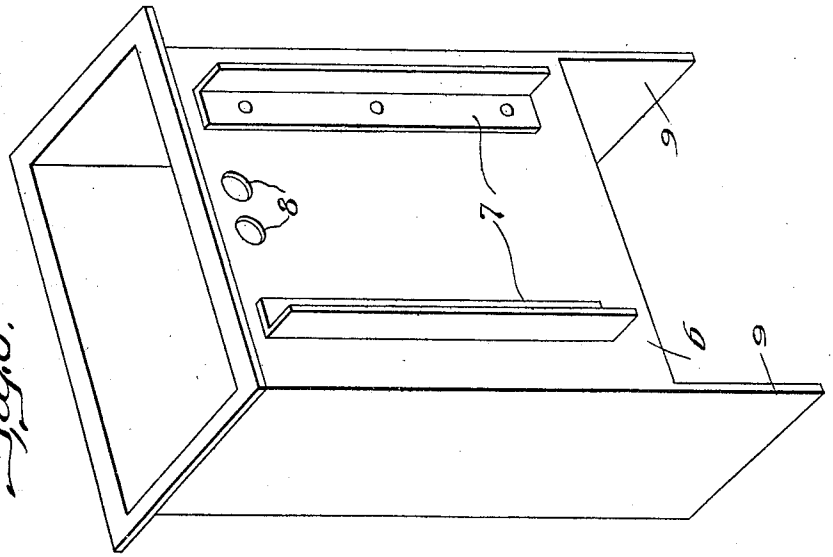
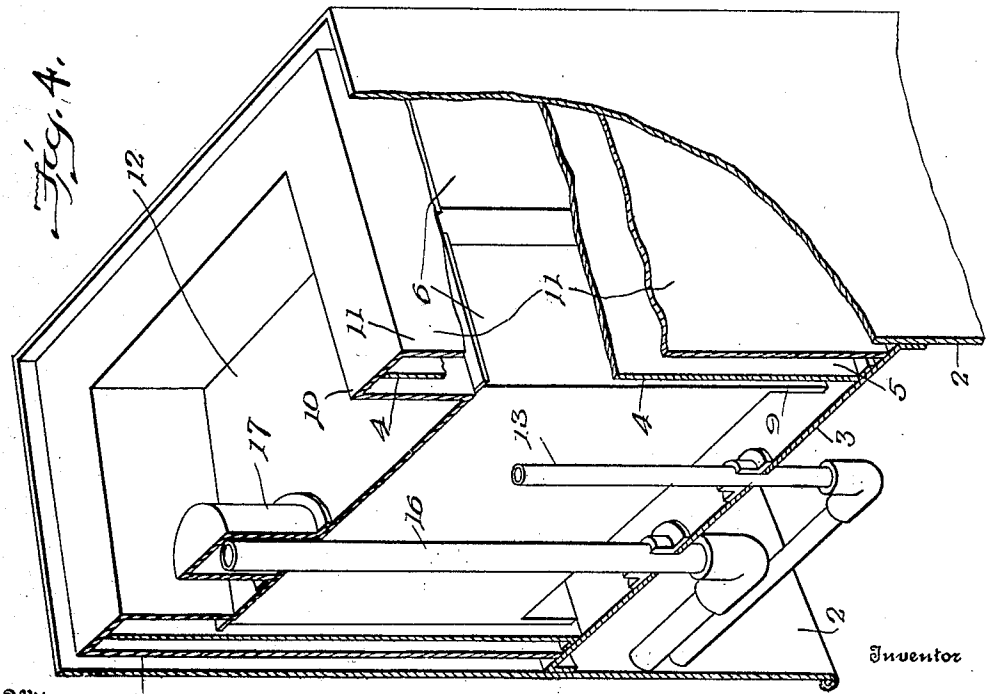


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

No. 926,292. Specification of Letters Patent. Patented June 29, 1909.

Application filed August 1, 1907. Serial No. 386,517.

To all whom it may concern:

Be it known that I, SAMUEL T. RUSSELL, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, 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 drawings.

The present invention relates to acetylene gas generators, and more particularly to that type of generators known as the water feed generator, in which a fixed quantity of carbid is placed and the water fed to the carbid in a sufficient quantity to produce the desired quantity of gas. The object of the invention is to provide a generator of this character which will be of simple and inexpensive construction, easy and safe to operate, and which will have a high per cent. of efficiency.

To this end it is a further object of my invention to provide an improved carbid receptacle in which the water is admitted to a portion only of the carbid at one time; and to provide an improved means for feeding the water to the carbid receptacle, which means is regulated in accordance with the amount of gas contained in the gas holder.

With these objects in view my invention consists in certain novel features of construction and in certain parts and combinations hereinafter to be described, and then more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a top plan view of a complete generator embodying my invention; Fig. 2 is a sectional view, taken vertically through the carbid receptacle, showing the gas holder and water receptacle in elevation; Fig. 3 is a front view of the device showing the several parts in elevation; Fig. 4 is a sectional detail view of the carbid receptacle; Fig. 5 is a perspective view of one of the carbid pans; Fig. 6 is a sectional detail view of the filter; Fig. 7 is a sectional detail view of the double stop and drain cock; and Fig. 8 is a sectional detail view of the adjustable nozzle for the discharge spout of the water receptacle.

In these drawings, I have shown a generator embodying my invention in its preferred form, but obviously, the detail construction and arrangement of the several parts could be altered without departing from the principle of my invention. In the form of generator here shown I employ a carbid receptacle 1, which preferably consists of an outer casing 2 which may be of any suitable shape and size and is provided at a point some distance above the lower edge thereof with a bottom 3. Arranged within the outer casing 2 and above the bottom 3 is an inner casing 4 forming within the same and above the bottom 3 a generating chamber adapted to contain the carbid vessels and forming between the inner casing 4 and the outer casing 2 a water chamber 5. Mounted within the generating chamber formed by the inner casing 4 are a plurality of carbid pans 6 which may be of any suitable construction and which may be arranged in any desired manner, but, in the form here shown, I have provided a generating chamber which is substantially rectangular in shape, and have provided the carbid receptacles or pans 6 of rectangular shape in order that they may fit snugly within the generating chamber, and have provided each pan with suitable flanges 7 adapted to extend between the pans and between the pans and the side wall, thus providing at all times a sufficient space about the sides of the pans for the circulation of water. Each pan is provided with one or more suitable apertures 8, formed in the side wall thereof. These apertures are formed at a different level in each of the pans contained within the generating chamber so that the water, as it rises within the generating chamber, will reach the apertures of each pan successively, and, through these apertures, will reach the interior of the pans and the carbid contained therein. I prefer to employ two apertures 8 in order to lessen the liability of the same becoming stopped or partially clogged and thus interferring with the flow of the water.

As here shown, the carbid pans are supported upon legs 9 which are shown as extensions of the pan and serve to support the pan above the bottom of the generating chamber. This is desirable in that it provides for a free circulation of water about the pans which serves to reduce the heat produced by the generation of the gas. But this construction is not necessary as the pans may be supported in any desirable manner. A suitable closure is provided for closing the upper end of the generating chamber against the escape of gas therefrom, and this

closure preferably consists of a hood 10 having a downwardly extending flange 11 adapted to enter the water chamber 5 surrounding the generating chamber and thus form a liquid seal. This flange may be made of a length sufficient to provide a water seal. The central portion of the hood 10 is depressed in the form of a basin, as shown at 12, the depth of the depression being such as to bring the bottom of the basin 12 into contact with the upper ends of the carbid pans when the hood 10 is at rest upon the upper edge of the outer casing 2. This basin serves two purposes; first, it retains the carbid receptacles or pans in their proper positions in the generating chamber and prevents their floating as the chamber fills with water; and second, by filling the basin 12 with water the heat produced by the generation of the gas is materially reduced. A water supply pipe 13 extends through the bottom 3 and upward into the generating chamber with its upper end slightly beneath the level of the lowest inlet aperture 8 in any of the pans. This pipe extends outwardly through the side walls of the casing 2 where it is provided with a downwardly extending bend 14 to form a water trap and thence extends upwardly and is provided with a suitable funnel 15 adapted to receive water from any suitable source. A suitable outlet pipe 16 extends through the bottom 3 of the generating chamber upward to a point near the top of the generating chamber, and preferably extends through an aperture in the hood into a dome or cap 17, which is secured to the bottom of the basin 12, and surrounds the aperture through which the pipe 16 extends. This cap or dome enables the pipe to be so placed as to draw off the gas without the water from the generating chamber being able to enter the same. This pipe also extends outwardly through the side wall of the casing 2 and thence into the gas holder, as hereinafter described.

The pipes 13 and 16 are preferably provided with suitable stop and drain cocks which are adapted to be actuated by a single operating mechanism. As here shown, a single valve casing 18 is employed for both the stop and drain cocks and is provided with two three-way valve openings, as shown, two of the openings of each series being adapted to receive the ends of the pipes 16 and 13 respectively, while the third opening of each series, as shown at 19, serves as a drain for said generating chamber. A single valve plug 20 is provided with two series of openings for controlling both the pipes 13 and 16, these openings being so arranged that, when the valve plug is in its open position, the opening through the pipes 16 and 13 will be continuous, but when in its closed position, the inner ends of these pipes, that is the ends connected with the generating chamber, will be connected with the atmosphere through the drain openings 19. The valve plug 20 is preferably provided with a suitable valve stem 21 having its upper portion 22 turned at right angles thereto and so positioned relatively to the plug 20 that, when the plug is turned to its open position, to provide a continuous passage through the pipes 16 and 13, the horizontal portion 22 of the rod 21 will lie above the hood 10 of the carbid receptacle 1, which is preferably provided with suitable ears or clips 23 on the opposite sides thereof, beneath which the horizontal portion 22 of the rod extends and which serves to prevent the displacement thereof. A suitable bracket 24 is preferably mounted on the adjacent wall of the water receptacle and engages the rod 21 and serves to support the same in a vertical position. Thus, it will be seen that so long as the pipes 13 and 16 are in open communication with the water supply and gas holder, respectively, that the closure for the carbid receptacle and generating chamber will be locked in position and that the same cannot be removed until the valve controlling the pipes 13 and 16 has been operated to cut off the generating chamber from the water supply and gas holder and connect the same with the drain cock, whereby any surplus gas or water remaining in the generator is withdrawn.

By providing the inlet pipe 13 with a drain cock, I am enabled to utilize that pipe as a combined inlet and outlet pipe, and, inasmuch as the upper end of this pipe lies in a lower level than any of the inlet apertures in the carbid pans, it will be apparent that the water in the generating chamber can be drawn off to a point below these inlet apertures without completely emptying the chamber. Thus, when the refilled carbid pans have been replaced in the generating chamber, the water therein will rise to a point just below the inlet apertures and the amount of water which it will be necessary to feed into the chamber before it reaches the carbid and the device becomes operative will be materially reduced.

The pipe 16 leads from the generating chamber to a suitable expansible gas holder, which is here shown as consisting of an outer casing 25, which is preferably cylindrical in shape, and forms a water chamber within which is mounted an inverted gas bell 27 adapted to rise and fall within said water chamber. The outer receptacle 25 is provided with suitable guide rods 71 extending above the same and adapted to engage guide lugs or apertured brackets 72 carried by the gas bell near the upper end thereof. These brackets may be of any suitable construction, and, as here shown, one of the same is provided with an outwardly extending portion, forming a bracket 62, and is adapted to re-

ceive the rod 61. The rods 71 form a guide for supporting the gas bell in its proper position when the same has been moved upwardly by the gas. These rods may be supported from the outer receptacle 25 in any suitable manner, but I prefer to secure each rod in an apertured bracket 73 which is secured to the side of the receptacle 25 in any suitable manner and is provided with a set screw 74 extending into the aperture and adapted to engage the rod 71 to hold the same in its adjusted position. By the use of the apertured bracket and set screw the guide rods 71 can be moved downwardly until their upper ends are approximately even with the upper end of the receptacle 25, thus greatly facilitating the removal of the gas bell 27 from the water receptacle 25. The water receptacle 25 is preferably provided near its upper end with an inlet aperture 75 surrounded by a filling lip 76, thus providng means for renewing the supply of water within said receptacle.

The outlet pipe 33 extends from a point within the gas holder and is connected by a joint 34 with the service pipe 35 which extends through a suitable filter 36 and thence to the burners or other source of consumption. This filter may be of any suitable construction, but preferably consists of a sheet metal receptacle adapted to be filled with raw cotton or similar filtering material for removing impurities from the gas and is provided with a suitable bracket 37 for securing the same to the side wall of the casing or other suitable supporting surface. It is also provided with a suitable hand-hole in the upper end thereof which is provided with a suitable closure 38. The pipe 35 is provided with a suitable cut-off valve 39 which is preferably located in the horizontal portion thereof and is provided with an upwardly extending valve stem 40, which preferably extends to a point near the upper end of the filter 36, where it is provided with a horizontal handle portion 41 which is so positioned relatively to the valve that, when the valve is open, the horizontal portion 41 will extend above the closure 38 of the hand-hole and prevent the removal of the same until the valve has been operated to cut off the supply of gas from the service pipe.

The water is fed to the funnel 15 of the water supply pipe in any suitable manner, but I prefer to employ the means herein shown which consists of a suitable receptacle 53, pivotally mounted near the carbid receptacle, and preferably consists of a cylindrical tank having at its opposite ends suitable trunnions 54 adapted to engage bearings 55 which are supported in any suitable manner adjacent to the carbid receptacle, and are here shown as formed in the upper end of a suitable supporting frame 56. This tank has a suitable inlet which is provided with a closure 57 and has on one side thereof a discharge spout 58 extending from the lower portion of the cylindrical tank and adapted to discharge into the funnel 15 of the supply pipe. The receptacle 53 is provided on the side opposite that in which the discharge pipe 58 is mounted with a suitable weight 59 which may be of any suitable character and which serves to so increase the weight on that side of the cylinder as to cause the receptacle to rotate about its pivotal support until a suitable stop 60, mounted on the end of the receptacle, comes into engagement with the supporting frame 56, and, with the stop 60 in engagement with the frame, the discharge spout 58 has been elevated to such a position that the water cannot flow therefrom. Suitable means are provided for turning the water receptacle about its pivotal center against the action of the weight 59 and thus permitting the water to flow to the carbid. This means is preferably actuated by the expansible gas holder, and, in the form here shown, consists of a rod 61 secured at its upper end to a bracket 62 which is carried by the gas bell 27. This rod extends downwardly and through an apertured lug 63 carried by that side of the receptacle to which the discharge spout is connected and is provided with a stop 64 adapted to engage the lug 63 and rotate the receptacle as the rod moves downward with the gas bell 27. Thus, it will be seen that as the gas bell rises, the weight 59 will rotate the receptacle and move the discharge spout into inoperative position, and that as the gas is consumed and the bell 27 drops, the stop 64 on the rod 61 will engage the lug 63 and rotate the receptacle in the opposite direction, thus, moving the discharge spout into operative position and permitting the water to feed to the carbid. I preferably provide the discharge spout 58 with an adjustable nozzle 65, by means of which the amount of water discharged therefrom may be regulated. As herein shown, the nozzle 65 is provided with a valve seat 66 and a valve 67 which is provided with a screw-threaded shank 68 mounted in the end of the nozzle 65 and provided with a milled head 69 for operating the same, thus, enabling the size of the discharge opening to be varied. I also prefer to provide the receptacle with a suitable overflow aperture which is preferably located in one end of the cylindrical tank, as shown at 70, and is so located that, when the discharge spout is in its inoperative position, the water will escape through the aperture 70 before it will rise high enough to pass out of the discharge spout.

The operation of my improved generator will be readily apparent from the foregoing descriptions of the several parts thereof. In brief, it is as follows:—In preparing the

machine for use, each of the carbid pans 6 are filled with calcium carbid and are then placed in position within the generating chamber and water is introduced into the same until it reaches a point just beneath the level of the lowermost inlet aperture in any of the pans. The pivotal water tank 53 is filled with water, and, assuming that the gas holder is practically empty and the bell 27 near its lowermost position, the stop 64 on the rod 61 will tilt this tank forward into a position which will permit of the water flowing through the discharge spout 58 into the funnel 15 of the water supply pipe 13. As the water enters the generating chamber through this pipe it gradually rises within the chamber until it enters the lowermost apertures of the carbid pans, thus generating gas which escapes from the carbid pans into the generating chamber, thence through the outlet pipe 16 to the gas holder where it is forced to pass through the water in the water receptacle of said gas holder and thus washed and cleansed from impurities. The gas accumulating in the gas bell above the water in the gas holder causes the gas bell 27 to move upwardy, and, as the gas bell moves upwardly, it carries with it the rod 61 and stop 64, thus releasing the pivoted tank 53 and permitting the weight 59 to rotate the same about its pivotal center and move the discharge spout 58 into its inoperative position, thus stopping the flow of water to the generating chamber and likewise interrupting the generation of gas. The gas which has entered the gas holder passes out through the outlet pipe 33 to the service pipe 35 and through the filter 36 to the burners. As the gas within the gas holder is consumed, the gas bell 27 moves downwardly and again brings the stop 64, on the rod 61, into engagement with the lug 63 of the water tank and again moves the discharge spout 58 into operative position and starts the generation of gas. All moisture and products of condensation accumulating within the inlet and outlet pipes within the gas holder drain downward through the extensions from the lower ends of those pipes into the water receptacle, the water in said receptacle forming a seal and preventing the escape of gas from said pipes. Thus, it will be apparent that I have provided an acetylene gas generator of the character described which is simple in construction and easy of operation and which will have a very high per cent of efficiency. It will be further apparent that this result is accomplished by providing the several parts of such a construction and arrangement that they will coöperate one with the other to provide an automatic feed of the water to the carbid, which feed is under perfect control and is regulated to feed the water to the carbid only in such quantities as is necessary to generate the required amount of gas, thus insuring the complete consumption of the carbid.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a generator of the character described, the combination, with a generating chamber, and a plurality of carbid pans within said chamber, each of said carbid pans having a water inlet, of a supply pipe, a drain, a combined water inlet and outlet for said generating chamber located at a point above the bottom of said chamber and below the inlets of all of said carbid pans, and means for connecting the same to either said supply pipe or said drain.

2. In a generator of the character described, the combination, with a generating chamber, a plurality of carbid pans within said chamber, each of said pans having a water inlet aperture in one of the side walls thereof, the aperture of each pan being located at a different distance from the bottom of said chamber than the apertures in the other pans, a combined water inlet and outlet pipe extending above the bottom of said generating chamber and having its upper end below the level of the lowest aperture in said carbid pans, a water supply pipe, and a water receptacle, of means for feeding water from said receptacle to said supply pipe, an expansible gas holder, means actuated by said expansible gas holder for controlling said water feeding means, a drain, and means for connecting said inlet and outlet pipe with either said supply pipe or said drain.

3. In a generator of the character described, the combination, with a generating chamber, and a plurality of carbid pans within said chamber, each of said pans having a water inlet, of a water receptacle, a supply pipe adapted to receive water from said water receptacle, an inlet pipe extending into said generating chamber and terminating at a point above the bottom thereof and beneath the lowermost of the inlets in said carbid pans, a drain, and a three way cock in said inlet pipe and adapted to connect the same with either said supply pipe or said drain.

4. In a generator of the character described, a carbid receptacle comprising a casing having a generating chamber within the same, a plurality of carbid pans mounted within said chamber and having flanges extending from the sides thereof, each of said pans having an aperture through the side wall thereof at a different distance from the

bottom of said receptacle than the apertures in other pans, a closure adapted to close the upper end of said chamber and having its central portion depressed to engage the upper ends of said carbid pans, and means for feeding water to said generating chamber.

5. In a generator of the character described, a carbid receptacle comprising an outer casing, an inner casing within said outer casing forming a generating chamber within the same, and a water chamber between said inner casing and said outer casing, a plurality of carbid pans within said inner casing, means for feeding water successively to said carbid pans, a hood having a downwardly extending flange adapted to enter said water receptacle, and a downwardly extending central portion adapted to engage the upper ends of said carbid pans and retain the same in position.

6. In a generator of the character described, a carbid receptacle comprising an outer casing, a bottom secured within said casing at a distance from the lower edge thereof, an inner casing within said outer casing and above said bottom forming a generating chamber within the same, a water receptacle between said inner casing and said outer casing, a plurality of carbid pans within said generating chamber, means for feeding water successively to said pans, a hood having a downwardly extending portion adapted to enter said water receptacle, a depressed central portion adapted to engage the upper ends of said pans, said depressed portion having an aperture therein and a cap covering said aperture, and an outlet pipe extending through said aperture into said cap.

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

SAMUEL T. RUSSELL.

Witnesses:

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EDWARD L. REED.