A. S. PHELPS, JR.

ACETYLENE GAS GENERATOR.

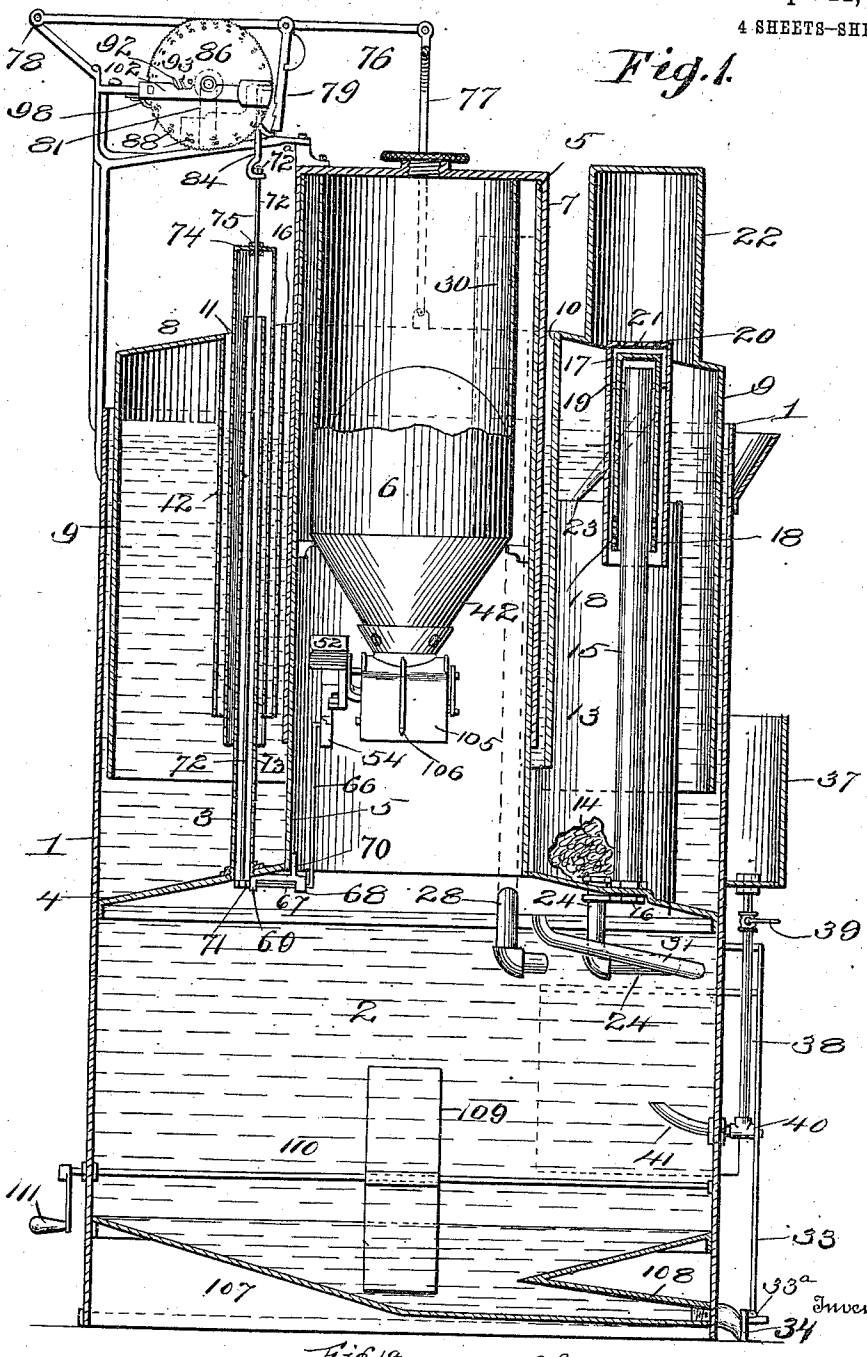
APPLICATION FILED AUG. 31, 1907.

989,411.

Patented Apr. 11, 1911.

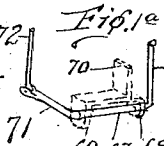
4 SHEETS—SHEET 1.

Fig. 1.



Inventor

Fig. 1a



Witnesses

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4 SHEETS—SHEET 2.

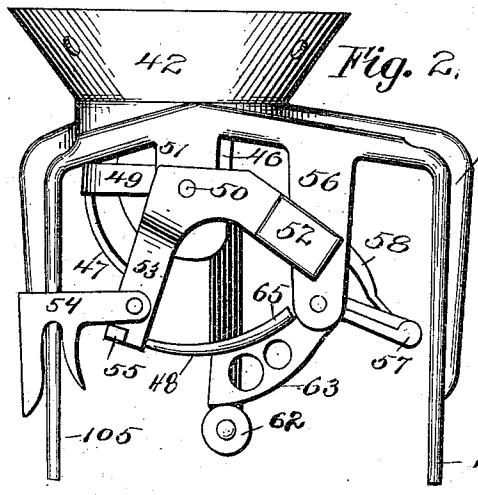

Fig. 2.

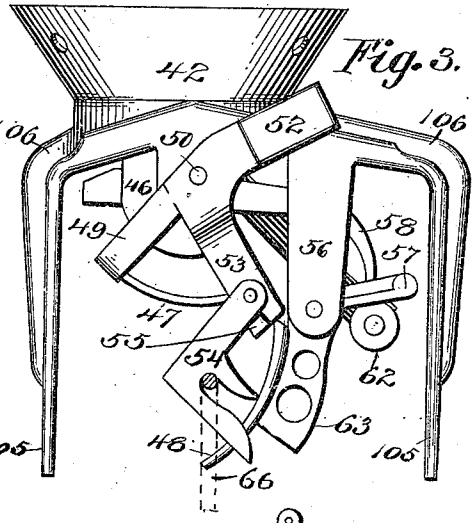

Fig. 3.

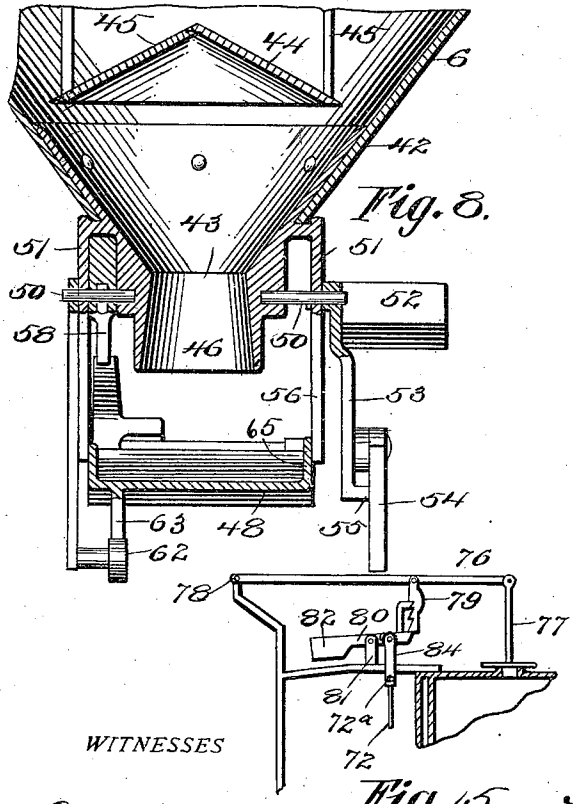

Fig. 8.

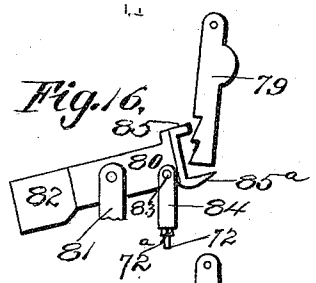

Fig. 16.

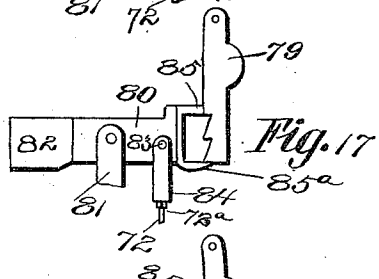

Fig. 17

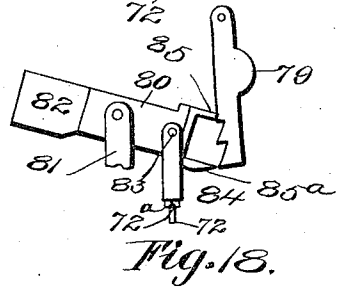

Fig. 18.

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4 SHEETS—SHEET 3.

Fig. 5.

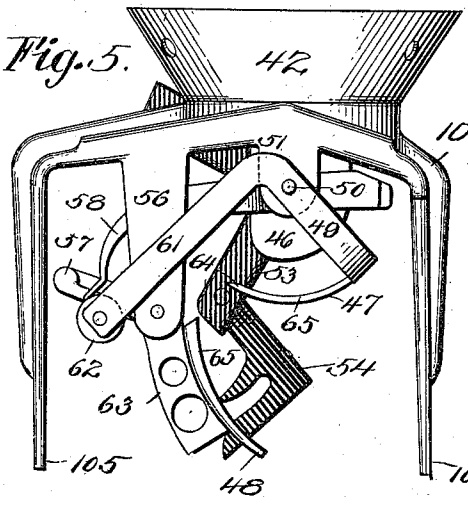
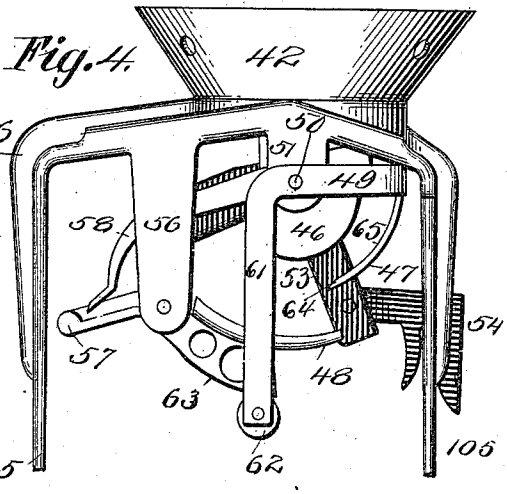


Fig. 4.



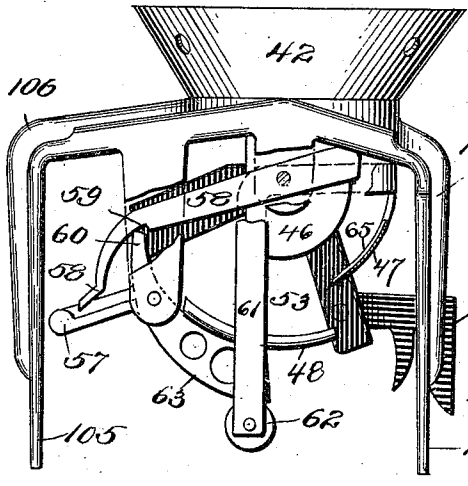


Fig. 6.

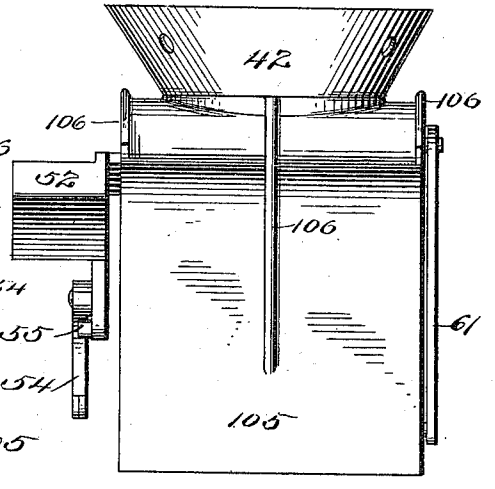


Fig. 7.

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4 SHEETS—SHEET 4.

Fig. 9.

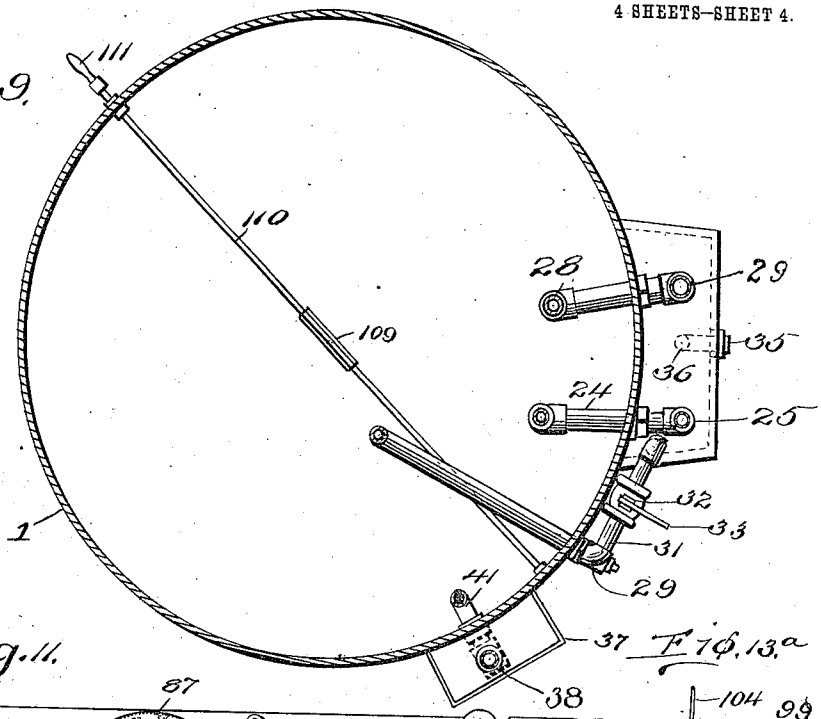

Fig. 11.

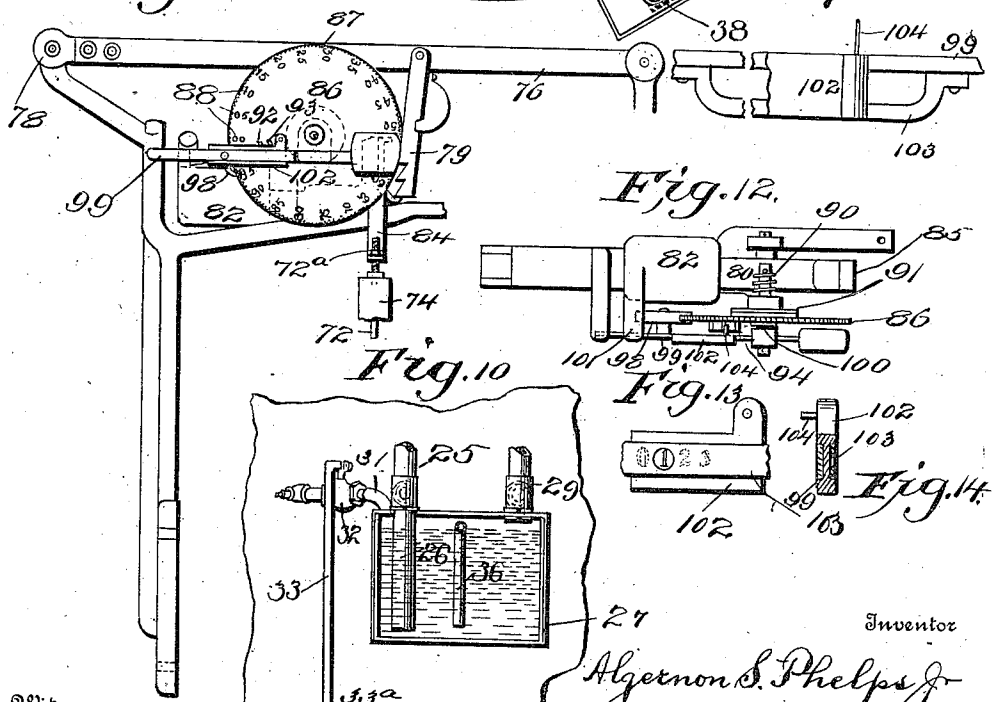

Fig. 13a

Fig. 12.

Fig. 10

Fig. 13

Fig. 14.

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ACETYLENE-GAS GENERATOR.

989,411. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed August 31, 1907. Serial No. 390,928.

To all whom it may concern:

Be it known that I, ALGERNON S. PHELPS, Jr., citizen of the United States, residing at Chicago, in the State of Illinois, have invented certain new and useful Improvements in Acetylene-Gas Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in acetylene gas generators.

The object of my invention is to provide an acetylene gas generator, of a simple, efficient, durable and safe construction, which will automatically operate to feed the carbid from a bulk magazine regularly and uniformly in measured charges as the gas is consumed, and whereby all danger or liability of delivering an excessive quantity of carbid to the generator and producing an excessive or unsafe pressure of gas is avoided, and whereby, in case a single charge of carbid fails to generate a substantial amount of gas, repeated charges will be fed to the generator, and whereby the number of available charges remaining in the magazine may be quickly and accurately ascertained.

The invention, as hereinafter more fully described, and as particularly pointed out in the claims, will be readily understood from an inspection of the accompanying drawings, illustrating a preferred embodiment of the same, and in which—

Figure 1 is a central vertical section of an acetylene gas generator embodying my invention, showing some of the parts in elevation; Fig. 1[a] is a detail view; Fig. 2 is a detail elevation of the carbid feed mechanism in its normal position; Fig. 3 is a similar view in the dumping position; Fig. 4 is a view similar to Fig. 2 from the opposite side; Fig. 5 is a similar view in the dumping position; Fig. 6 is a view similar to Fig. 4 with certain parts broken away; Fig. 7 is an end elevation of the same; Fig. 8 is a vertical section through the magazine throat; Fig. 9 is a horizontal section through the generator tank; Fig. 10 is a vertical section through the by-pass box; Fig. 11 is a detail elevation of the charge registering mechanism; Fig. 12 is a plan view of a portion of Fig. 11; Fig. 13 is a detail side elevation of a portion of the register; Fig. 13[a] is a detail view; Fig. 14 is an end view of Fig. 13; Fig. 15 is a view of the feed tripping mechanism, apart from the register; and Figs. 16, 17 and 18 are details of the feed tripping mechanism in different positions.

In the drawing, 1 represents the main tank of my acetylene gas generator. The tank 1 has at its lower portion a generator chamber 2, and an upper chamber 3 for the gasometer, the two compartments or chambers being separated by an annular dome-shaped partition 4, having a central tubular extension 5 within which fits the carbid holder or magazine 6. A cylindrical hood or seal 7 fits over the central tube 5 and the carbid holder within said tube. The bell or gasometer 8 is of annular form, having an outer wall 9 fitting within and concentric to the cylindrical wall of the tank or casing 1, and an inner wall 10 concentric to the wall 9 and surrounding the central tube 5 and hood or seal 7. An opening or well 11 is provided at one side of the magazine and its tube, said opening having a wall 12 which extends downwardly to a considerable distance below the water level in the gasometer bell, and serving to receive and accommodate the connection rod of the carbid feed mechanism.

The filter 13 consists preferably of a cylindrical closed shell secured to the horizontal annular partition 4 and contains filtering material 14 of any well known kind. The gas pipe 15 extending through an opening in the annular partition 4, is secured thereto by lock nuts 16 and through it the gas from the generator chamber is conducted into the gasometer. The upper end of this tube projects above the water level in the tank 1 and is covered by a closed hood 17, the lower end of which extends below the water level and is provided with fine perforations 18 through which the gas escapes into the water. Over the hood 17, there is provided an outer hood 19, the lower end of which extends below the lower end of the inner hood 17, and the upper head 20 of which is provided with perforations 21 through which the gas escapes into the gasometer. The gasometer is furnished with a dome 22 which telescopes with the hoods 17 and 19. The upper end of a pipe 23 communicates with the gasometer above the water level, and by it the gas is

conducted from the gasometer into the filter 13. The gas conducting pipe 24 leads from the filter to the service pipe 25 on the outside of the machine. The drip pipe 26, communicating with the pipe 24 and service pipe 25, has its lower end extending into the by-pass box 27. A blow-off pipe 28 communicating at its upper end with the gasometer and extending through the annular partition 4 and out through the cylindrical wall of the tank 1 communicates with the by-pass box 27 through one arm of the T 29, the other arm of which connects with the blow-off pipe leading out doors for the escape of the gas. The upper end of the blow-off pipe 28 is covered by a closed hood or tube 30 attached to the gasometer, and prevents the escape of gas through the blow-off pipe except when the gasometer is raised by the gas pressure above the height fixed upon. A pipe 31 extends through the outer wall of the tank, is provided with a stop cock 32, and communicates at its outer end with the by-pass box 27. The inner end of this pipe 31 extends above the water level in the lower or generator chamber and gives vent into the by-pass box when the stop cock is opened. The handle of this stop cock is provided with a bent arm 33 having a foot 33^a which serves as a lock to the gate or faucet 34 by which the water is removed from the generator chamber to flush and recharge the machine. This arrangement prevents opening the gate or faucet 34 before opening the stop cock 32 which gives vent into the by-pass box. The by-pass box is furnished with an overflow pipe 35 having an interior nipple 36 extending nearly to the bottom of the by-pass box, which regulates the water level in the by-pass box, so that an air space is always maintained at the upper part thereof as required.

The water-filling receptacle 37 communicates with the interior of the generator chamber by the pipe 38 provided with a stop cock 39 and with a clearing plug 40 in line with the inner extension 41, the stop cock preventing overflow from the back pressure, and the clearing nipple providing for the ready removal of any obstructions in the pipe.

The carbid holder or magazine 6 is provided at its lower portion with a frusto-conical deflector 42 having a central opening 43, and immediately above said opening a conical shield 44 suspended by the rods 45. The shield is directly over the throat 46 of the magazine and relieves the same of the weight of the carbid in the magazine, thus preventing clogging, being assisted by the downwardly widening passage through the throat as shown in Fig. 8.

The feed mechanism by which the carbid is fed automatically and regularly in measured quantities from the holder or magazine 6 into the generator chamber 2 comprises a rocking shoe 47 and a tilting dump pan 48 arranged below the shoe, the rocking or swinging shoe moving concentric with the curvature of the dump pan when the pan is in its raised position so as to avoid any wedging, clamping, or binding action upon the carbid material between the dump pan and the swinging shoe. The shoe 47 is carried by arms 49 pivoted upon pins 50 to lugs 51 depending from each side of the magazine throat and counterweighted at 52 so as to be easily overbalanced but normally held at rest to one side of the throat as shown in Figs. 2 and 4. An arm 53, formed integral with or attached to the arm 49, at one side of the shoe, has pivoted thereto a downwardly opening hook 54 tending to fall but held in a horizontal position by the lug 55. This hook has a wedge shaped opening to enable it to readily receive the crank arm which operates the feed mechanism, as will be later described. To the rear of the shoe 47 are lugs 56 to which is pivoted the dump pan 48 which is provided with a counterweight 57 which is insufficient to hold the pan in the horizontal position shown in Figs. 2 and 4, but which facilitates the return of the pan to that position, thus contributing to ease of operation. Upon the opposite side from the hook 54, a counterweighted latch 58 is pivoted to the lug 51, said latch being provided with a notch 59 arranged to engage a finger 60 carried by the pan 48 and to hold the pan normally in its horizontal position against its tendency by gravity to drop to the position shown in Figs. 3 and 5.

Upon the same side as the latch, a roller arm 61 is formed as a continuation of or secured to the arm 49 of the shoe 47, said arm forming an angle with the shoe arm and carrying a roller 62 at its extremity. The roller is arranged to travel in an arc concentric to the pivotal point of the shoe 47 and in doing so to ride upon a cam shaped rib 63 formed on the under side of the dump pan 48, which rib, in the horizontal position of the pan, forms a track for the roller, which is eccentric to the pivotal point of the shoe and to the arc traveled by the roller. The roller and the arm upon which it is mounted thus serve as an additional support for the pan while the parts are at rest and during a considerable portion of the lateral movement of the roller arm. In the position of rest shown in Figs. 2 and 4, the roller bears directly against the rib 63 and the arm 61 consequently aids in supporting the pan. As the arm 61 swings to the left in Fig. 4, the roller will gradually be carried out of touch with the rib, thus withdrawing part of the support of the pan and as the movement continues the roller will strike against and raise the latch 58, whereupon the pan

will at once assume the position shown in Figs. 3 and 5 and dump its contents.

The operation of the feed device, thus far described, is as follows: If the hook 54 is moved to the right (Fig. 2) it tilts the arms 49 of the shoe 47 against the counterweight 52 and moves the shoe 47 to the position shown in Figs. 3 and 5 beneath the mouth of the magazine, as it does so, the roller 62 travels along the rib 63 and past the vertical plane of the pivotal point of the pan 48 leaving the pan supported wholly by the engagement of the finger 60 with the notch 59 of the latch 58. Just as the shoe 47 reaches its horizontal position, the roller 62 strikes the end of the latch 58, lifting the same and releasing the pan 48 which immediately dumps by gravity, the parts thereupon occupying the positions shown in Figs. 3 and 5. It will thus be seen that in the normal position of the parts, the dump pan is charged, as the shoe swings into place it removes the upper portion of said charge and the lower portion is dumped by the pan 48 into the water in the generator chamber; whereupon as the dump pan returns again to its horizontal position the shoe recedes and allows a gross charge to again enter the pan, to be again scalped by the shoe, leaving the net measured charge to be dumped into the generator chamber. The shoe is provided with a knife edge 64 to facilitate its passage through the charge of carbid, and both shoe and pan are provided with lateral flanges 65 to prevent wastage.

Motion is transmitted to the hook 54 by a crank arm 66 carried by a rock shaft 67 journaled in bearings 68, 69, formed in a bracket 70 in the upper part of the generator chamber. To this rock shaft is also secured an arm 71 to which is attached the lower end of a connecting rod 72 operated by the gasometer bell as later described. Extending upward from the top of the generator chamber centrally of the well 11 and inclosing the rod 72 is a tube 73 which reaches to a point above the water level in the gasometer bell. A hood 74 is hermetically secured at its upper closed end by lock nuts 75 upon the rod 72 and extends downwardly within the well 11 over the open end of the tube 73 and about the rod 72 to a point below the water level in the bell. Thus is secured a gas-tight, water-sealed operative communication between the gasometer bell and the feed mechanism, obviating the use of any stuffing boxes, and also availing of the gas pressure in the hood 74 to assist in returning the feed mechanism after each charge.

The gasometer bell acts upon the connecting rod 72 to operate the feeding mechanism by means of a lever 76 attached to the gasometer by a pivoted bail 77 and provided between said bail and the fulcrumal point 78 of the lever with a swinging rack 79 weighted upon one side. A holding lever 80 is fulcrumed upon a fixed standard 81 and weighted at one end as shown at 82. The other end of said lever is pivoted at 83 to a bar 84 which in turn is adjustably secured to the rod 72 which connects said bar with the arm 71 of the rock shaft 67. The bar 84 is preferably formed in its lower portion as a hook which is perforated at a point in line with the bar proper and threaded for the reception of the rod 72, suitable lock nuts 72^a being provided so that the distance between the lower end of said rod and the point 83 on the lever 80 may be adjusted as occasion may require.

The function of the mechanism just described is to actuate the rock shaft arm 66 to operate the carbid feeding mechanism under the influence of the falling gasometer bell as is usual.

The operation of the tripping device is as follows: Normally the relation of the lever 80 and the swinging rack 79 is as shown in Fig. 16, the unweighted end of the lever 80 being provided with projections constituting dogs 85 and 85^a, the lower one of which 85^a underlies the freely swinging rack 79 in an inclined position due to the weighted end of the lever 80. As the gasometer bell descends the lever 76 descends therewith and consequently the swinging rack 79 descends until it contacts with the lower dog 85^a, bearing downwardly upon the same and transmitting such motion through the rod 72, rocking the shaft 67 and operating the feed shoes, to deposit a measured charge of carbid in the generating chamber, the relative positions of the rack and lever being as shown in Fig. 17, whereupon the gasometer bell immediately rises and carries with it the rack 79 to its normal position as shown in Fig. 16.

A difficulty hitherto encountered with all generators using a measured charge from a magazine containing carbid in bulk, has been due to the fact that where the generator is out of use for a few days, the measured charge of carbid in the feed shoe becomes hydrated and loses its efficiency. If it is then desired to start up the machine this charge of hydrated carbid when dropped into the water fails to generate any gas and as a result the generator is "dead" and the feeding mechanism will not be automatically operated by the gasometer bell, which fails to rise. To overcome this difficulty provision is herein made whereby the still descending gasometer bell will cause a second charge of carbid to be deposited in the generator chamber, or, in case of emergency, a third charge.

It will be observed that the swinging rack 79 is provided with two notches in addition to its lower operative end. If, upon reaching the position shown in Fig. 17, and by

the dumping of the feed shoes, enough gas is not generated to raise the gasometer bell, it continues to fall, as shown in Fig. 18, whereupon the lower dog of the trip lever 80 clears the lower end of the rack, the latter being pushed forward by the upper dog 85. As soon as such clearance is effected, as shown in Fig. 18, the weighted end of the lever 80 causes it to again assume a horizontal position similar to that shown in Fig. 17 except that the dog 85^a enters the first notch and is engaged by the tooth forming the upper boundary of said notch. The continued downward pressure of this tooth serves to again dump the feed shoes whereupon the generated gas will cause the bell and with it the rack 79 to rise to the position shown in Fig. 16. In case this second dumping, however, should not be effective to produce the desired result, the operation will be again repeated, the dog 85^a of the trip lever dropping into the second notch and being again tripped to dump the feed shoes as before. Obviously other notches may be added, although the number shown would meet any ordinary emergency.

By the feed mechanism hereinbefore described, measured charges of carbid are fed to the generating chamber, the amount of each charge being, under ordinary circumstances, say three ounces. With a carbid magazine having a capacity of, say fifty pounds of carbid in bulk, it becomes convenient and in many cases important to know to what extent the magazine has been depleted, or in other words, how many charges have been fed since it was filled. To accomplish this purpose, I may combine with the trip mechanism hereinbefore described, a register disk 86 provided around its periphery with, appropriately, 100 inclined teeth 87 and with index numerals 88 referring thereto. This register disk is frictionally mounted upon the standard 81 being held against accidental movement by a spring 90 and a leather washer 91, while permitting of the rotation of said disk under the influence of a slight pressure exerted upon its notched periphery. Upon the face of said disk are arranged three diagonal ribs 92, 93 and 94 providing intermediate slots or passages for a purpose to be hereinafter described. A pawl 98, pivoted to a counterweighted lever 99, which lever is isolated from the disk 86 by a pin 100, rides upon the notched periphery of the register disk, the outer end of said pawl underlying an arm 101 extending laterally from the weighted end of the trip lever 80. The result is that whenever the weighted end of the trip lever is raised at the beginning of the feeding movement the weighted end of the lever 99 also raises the pawl 98 into the next notch above and as the lever 80 drops to its normal position after the feeding of the charge the pawl 98 feeds the register disk forward one notch so that the total number of charges fed into the generator chamber may be read off the register disk at any predetermined place as for instance the upper edge of the lever 99. To provide for registering multiples of 100 a saddle 102 is mounted for sliding movement longitudinally of a rail formed on the upper edge of the lever 99, which saddle has upon its lateral face a series of numbers 0 1 2 3, etc. In front of the saddle is arranged a plate 103 provided with a perforation which normally presents to view the underlying numeral 0. Projecting laterally from the saddle is a pin 104 which upon the completion of the first revolution of the register disk 86 is engaged by the inclined face of the rib 92 and passes through the passage between said rib and the adjacent rib, moving the saddle 102 longitudinally of the rail and plate, covering the numeral 0 and disclosing the numeral 1. Upon the next revolution the pin passes through the next slot, moves the saddle again and discloses the numeral 2, and so on, thereby registering the hundreds.

A further important feature of the generator is the projections or flanges 105 extending outwardly and downwardly from the throat of the magazine around and to a point below the lowermost portions of the feeding mechanism and forming a support for the magazine and attached mechanism when removed from the generator. The incline of the flanges is such as to carry any water of condensation away from the carbid in the feed shoes, the side ribs 106 serving also to confine the flow of such water to the flanges.

The generator chamber has its bottom inclined at 107 and is provided with an inclined outlet or flushing channel 108. Within the lower part of the chamber are agitator blades 109 carried by a shaft 110 having a crank handle 111 by means of which the sludge in the bottom may be stirred up preparatory to flushing out through the channel 108 when the gate 34 is opened.

Having thus fully described my invention, what I claim is:—

1. In an acetylene generator, the combination, with a gasometer, a magazine for carbid in bulk, and means to feed the carbid from the magazine in unitary charges, of reciprocating mechanism for actuating said feeding means, and means actuated by the falling of the gasometer and arranged to reciprocate said reciprocatory mechanism a plurality of times during one sustained downward movement of the gasometer.

2. In an acetylene generator, the combination, with a gasometer, a magazine for carbid, and a reciprocatory device to feed the carbid therefrom, of means actuated by the gasometer to operate the feed device re-

peatedly during one sustained movement of the same until gas is generated.

3. In an acetylene generator, the combination, with a gasometer, a magazine for carbid in bulk, and a carbid feeding device arranged to hold only a single charge of carbid and feed it from the magazine, of reciprocatory mechanism for actuating said feeding device, and means actuated by the falling of the gasometer and arranged to reciprocate said reciprocatory mechanism a plurality of times during one sustained downward movement of the gasometer.

4. In an acetylene generator, the combination, with a gasometer, a carbid magazine, and a reciprocatory feed shoe to feed the carbid therefrom, of a rack and dog device operated by the gasometer and arranged to reciprocate the feed shoe repeatedly during one sustained movement of the bell until gas is generated.

5. In an acetylene generator, the combination with a gasometer bell, a magazine for the carbid in bulk, and mechanism to measure and feed a charge of the carbid from the magazine, of a reciprocatory rack and dog device operated by the falling gasometer bell to alternately release and arrest the measuring and feeding mechanism until gas is generated.

6. In an acetylene generator, the combination with a gasometer bell, a magazine containing carbid in bulk, and reciprocatory measured charge carbid feeding mechanism, of a governing device including dogs, a rack provided with a plurality of notches engaged by the dogs alternately and movable by the gasometer bell into contact with the dogs, and a connection between the governing device and the feeding mechanism whereby the feeding operation is repeated in case the first charge is ineffective.

7. In an acetylene generator, the combination with a gasometer bell, and carbid feeding mechanism, of a lever arranged above and connected with the gasometer bell to be actuated thereby, a freely swinging rack depending from said lever, a vibratory holding lever arranged adjacent the rack and provided at its end with dogs adapted to engage the rack, and a connection between the holding lever and the carbid feeding mechanism.

8. In an acetylene generator, the combination with a gasometer bell, a magazine for carbid in bulk, and reciprocatory means actuated by the gasometer bell to measure and feed the carbid from the magazine in charges, of means to control and repeat the feeding operation in one sustained downward movement of the gasometer bell, and means operated by the feed controlling means to register the total number of charges fed whether effective or ineffective.

9. In an acetylene generator, the combination, with a gasometer bell, a magazine for carbid in bulk, and a reciprocatory carbid-feeding device arranged to hold and feed a single charge of carbid, an operating lever connected to the carbid feed, a dog carried by the lever, a laterally swinging rack provided with a plurality of notches and movable by the falling gasometer bell into engagement with the dog to operate the carbid feed, a second dog carried by the lever and bearing laterally against the rack as the bell moves downward, to disengage the rack from the first dog and permit an independent return movement of the reciprocatory carbid feed device and lever, the return of the lever withdrawing the second dog from the rack to permit it again to engage the first dog with another notch to operate the feed device repeatedly during one sustained downward movement of the bell.

10. In an acetylene generator, the combination with a gasometer bell, and measured charge carbid feeding mechanism, of a governing device including dogs, a rack provided with a plurality of notches and movable by the gasometer bell into contact with the dogs, a connection between the governing device and the feeding mechanism whereby the feeding operation is repeated in case the first charge is ineffective, and means actuated by the governing device to register the total number of charges fed.

11. In an acetylene generator, the combination with a carbid magazine, a generator chamber, and means for feeding carbid from the magazine to the generator chamber, of a gasometer bell, a well extending downwardly into the lower portion of the bell, a tube extending upwardly from the generator chamber centrally of the well, a connecting rod within the tube and connecting the bell and the feeding mechanism, and a hood independent of the bell and tightly secured to the rod to move therewith and extending downward through the well and over the tube, the connection between the bell and feeding mechanism being out of contact with water.

12. In an acetylene generator, the combination with a carbid magazine, a generator chamber, means for feeding carbid from the magazine to the generator chamber, and a gasometer bell above the generator chamber, of a rock shaft journaled in the generator chamber above the water therein, a crank arm extending from the rock shaft to the feeding mechanism, a connection between the bell and the rock shaft, and a water seal about said connection outside the generator chamber.

13. In an acetylene generator, the combination with a carbid magazine, a generator chamber, means for feeding carbid from the magazine to the generator chamber, of a rock shaft journaled in the generator chamber above the water therein, a crank arm

extending from the rock shaft to the feeding mechanism, a well extending downwardly into the lower portion of the bell below the water level therein, a tube extending upwardly from the generator chamber centrally of the well to a point above the water level in the bell, a connecting rod within the tube and connecting the bell and rock shaft, and a hood independent of the bell and tightly secured about the rod and extending downward over the tube and within the well.

14. In an acetylene generator, the combination with a generator chamber, and a carbid magazine removably mounted above the generator chamber and having depending arms at its sides, of feeding mechanism arranged below the lower end of the magazine and supported by and between the said depending arms, and projections extending outwardly from the magazine over the feeding mechanism and then downwardly to a point below said mechanism whereby the said mechanism will be inclosed and the carbid therein protected from falling water of condensation.

15. In an acetylene generator, the combination with a carbid magazine, a generator chamber, a rocking feed shoe beneath the discharge mouth of the magazine, a tilting dump pan mounted beneath the shoe, a latch to hold the dump pan closed, and a roller moving with the shoe and bearing upon a rib on the lower face of the pan to close the pan as the shoe opens and clearing the pan and tripping the latch to open the pan as the shoe closes.

16. In an acetylene generator, the combination with a carbid magazine, a generator chamber, a rocking feed shoe swinging beneath the discharge mouth of the magazine, a tilting dump pan mounted beneath the shoe, a latch to hold the dump pan closed, a rib on the lower face of the pan, and a roller moving with the shoe and bearing on the rib to close the pan as the shoe opens and clearing the pan and tripping the latch to open the pan as the shoe closes.

17. In an acetylene generator, the combination with a carbid magazine, a generator chamber, a rocking feed shoe swinging beneath the discharge mouth of the magazine, a curved tilting dump pan mounted beneath the shoe, a latch to hold the dump pan closed, a rib on the lower face of the pan, and a roller moving with the shoe and bearing on the rib to close the pan as the shoe opens and clearing the pan and tripping the latch to open the pan as the shoe closes.

18. In an acetylene generator, the combination with a carbid magazine, a generator chamber, a rocking feed shoe pivoted to swing beneath the discharge mouth of the magazine and in an arc having its center substantially in the vertical plane of the mouth, a tilting dump pan mounted to occupy a position normally below the shoe, a latch to hold the pan in its normal closed position, a rib on the lower face of the pan, and means swinging with the shoe and bearing on the rib to close the pan as the shoe opens and tripping the latch to dump the pan as the shoe closes.

19. In an acetylene generator, the combination with a carbid magazine, a generator chamber, a rocking feed shoe pivoted to swing beneath the discharge mouth of the magazine and in an arc having its center substantially in the vertical plane of the mouth, a tilting dump pan mounted to occupy a position normally below the shoe, a latch to hold the pan in its normal closed position, a rib on the pan, and means bearing on the rib and moving in an arc eccentric thereto to close the pan as the shoe opens and tripping the latch to dump the pan as the shoe closes.

20. In an acetylene generator, the combination, with a carbid magazine, and a feed device arranged to feed a measured charge of carbid therefrom, of a gasometer, and reciprocatory means actuated by the gasometer when but partially exhausted to operate the feed device to feed a complete charge of carbid from the magazine, the gasometer arranged to actuate the feed-operating means repeatedly during a continuous depletion and before final exhaustion of the gasometer.

21. In an acetylene generator, the combination, with a carbid magazine, and a feed device arranged to feed a measured charge of carbid therefrom, of a rising and falling gasometer bell, and reciprocatory means actuated by the falling bell before it reaches its lowermost position to operate the feed device to feed a complete charge of carbid from the magazine, the bell arranged to thereafter reciprocate the feed-operating means repeatedly during a sustained downward movement of the bell in case the first charge is ineffective to generate gas sufficient to raise the bell.

22. In an acetylene generator, the combination, with a carbid magazine, a carbid feed device, and reciprocatory mechanism for operating the same, of a reciprocating gasometer arranged to move independently of the feed-operating mechanism when containing a normal supply of gas and to actuate the feed-operating mechanism when but partially exhausted to feed a complete unitary charge of carbid from the magazine, the gasometer arranged to thereafter reciprocate the feed-operating mechanism repeatedly during a continuous depletion and before final exhaustion of the gasometer.

23. In an acetylene generator, the combination, with a carbid magazine, a carbid feed device and reciprocatory mechanism for

operating the same, of a gasometer bell disconnected from the feed-operating mechanism at the upper position of the bell and arranged to engage and release the same repeatedly during a sustained downward movement of the bell to feed repeated charges of carbid from the magazine in case the first charge is ineffective to generate sufficient gas to reverse the movement of the bell.

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

ALGERNON S. PHELPS, JR.

Witnesses:

J. A. GRAVES,

P. F. KEHOE.