No. 642,222. Patented Jan. 30, 1900.

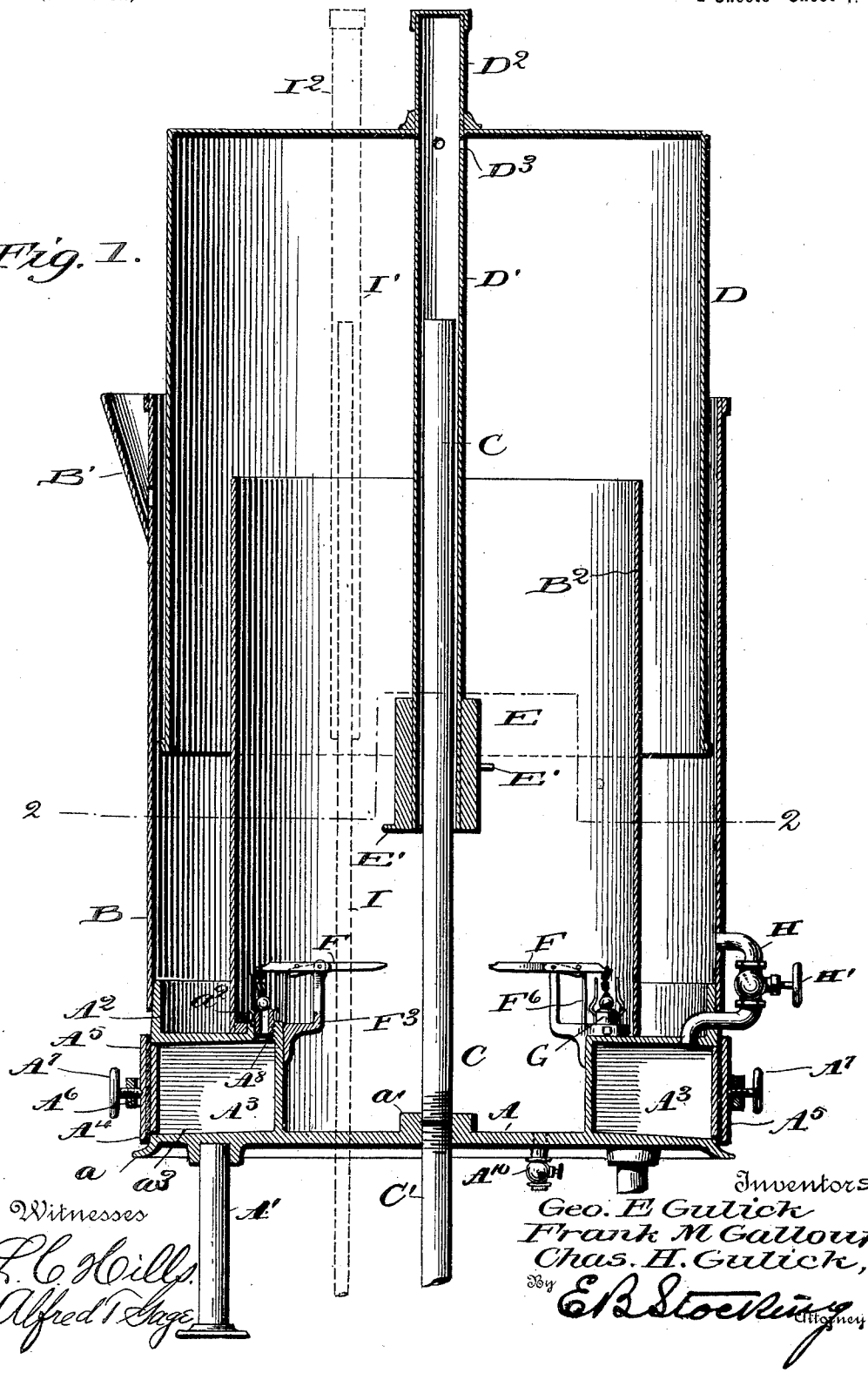
G. E. GULICK, F. M. GALLOUP & C. H. GULICK.

ACETYLENE GAS GENERATOR.

(Application filed Jan. 16, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses

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Fig. 2.

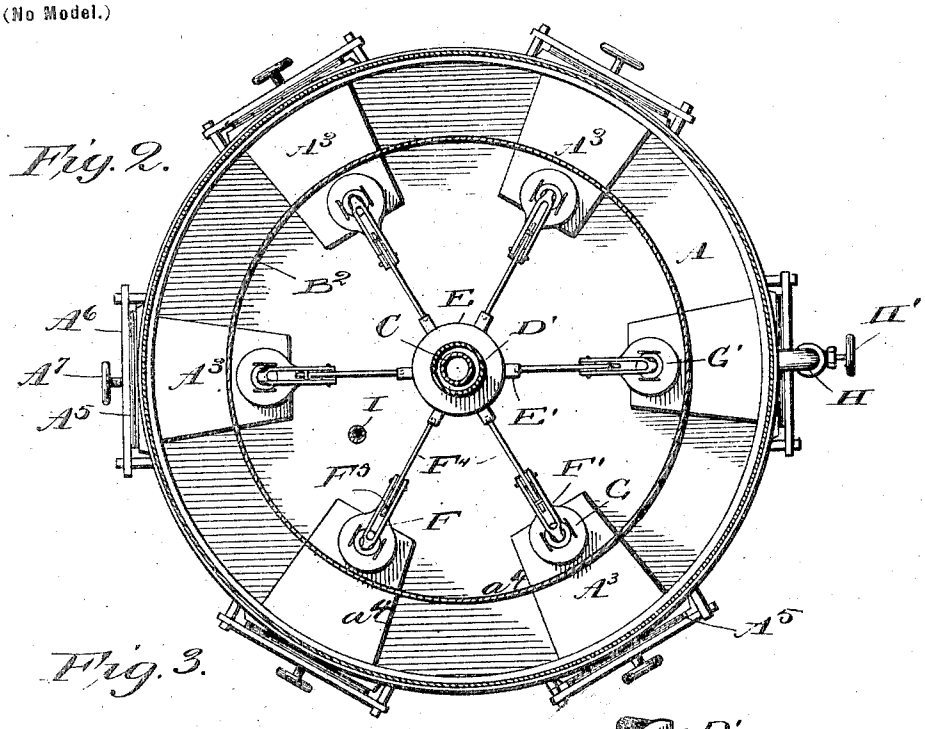
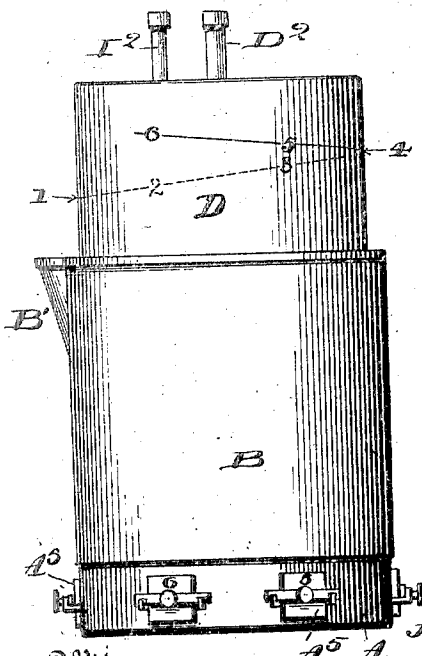


Fig. 3.



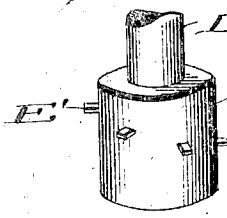
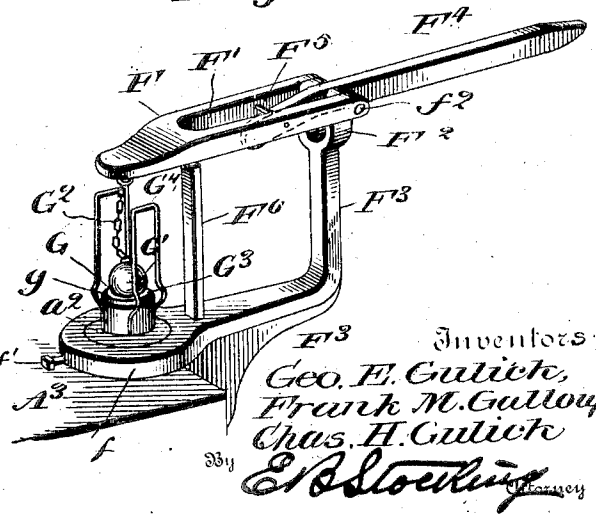


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE E. GULICK, FRANK M. GALLOUP AND CHARLES H. GULICK, OF LODI, NEW YORK.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 642,222, dated January 30, 1900.

Application filed January 16, 1899. Serial No. 702,311. (No model.)

To all whom it may concern:

Be it known that we, GEORGE E. GULICK, FRANK M. GALLOUP, and CHARLES H. GULICK, citizens of the United States, residing at Lodi, in the county of Seneca, State of New York, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to gas-generators, and particularly to an apparatus adapted for the generation of acetylene or similar gases from chemical substances decomposed by the presence of moisture.

The invention has for its object to provide a construction by which the chemical or carbid of calcium to be acted upon may be stored in a series of cells or apartments which are independently and successively brought into operation for the purpose of maintaining in the gasometer a uniform and standard pressure of gas.

A further object of the invention is to provide a carbid chamber or cell which can be conveniently charged and cleaned from the exterior of the apparatus.

The invention also provides a novel and improved apparatus for successively feeding the moisture to a series of carbid-cells, together with means carried by the movable dome for automatically and successively operating the water-admitting devices in the descent of the dome from an elevated position.

Other objects and advantages of the invention will hereinafter appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a vertical section through the generator. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a side elevation upon a reduced scale. Fig. 4 is a detail perspective of the valve-tripping device, and Fig. 5 is a similar view of the water-admitting valve and its operating-levers.

Like letters of reference indicate like parts throughout the several figures of the drawings.

The letter A designates the base of the generator, which may be supported in any suitable manner—for instance, upon legs A'. Said base may be formed of a single casting or in any other desired manner, and at the upper portion thereof a beveled flange A^2 is provided, over which the lower portion of the tank B is adapted to fit to make a tight joint. It is obvious that these parts may be secured together in any desired manner and that the bevel A^2 may be upon the inner face of the flange when the tank B rests within the same. The base is provided with a series of carbid cells or compartments A^3, arranged at intervals circumferentially of the base and provided with openings A^4 upon the exterior or outer faces thereof. These openings may be upon the bottom or upon the outer side, as illustrated in the present instance, and are suitably closed by means of covers A^5, secured in position by a locking-bar A^6 and hand-screw A^7, which forces the cover into close and air-tight contact with the front of the box, at which point a packing of any suitable character may be interposed. The lower portion of the casting is provided with a suitable drip-flange *a*, extending circumferentially thereof and with a central boss *a'*, adapted to receive the threaded end of a guide and delivery pipe C, extending upward through the holder and also to receive the end of a similar discharge-pipe C' for conducting the gas to a point of storage or use. Each of the cells or compartments A is provided with an aperture A^8 in its upper portion for the admittance of water thereinto, which aperture may be surrounded, if desired, by a nipple or collar a^2, as shown in Fig. 1.

Within the tank B a movable dome D is located, provided with a central depending sleeve D', adapted to fit over and surround the upper portion of the guide and discharge-pipe C, said tube being extended above the top of the dome and capped, as at D^2, to allow the descent of the dome and provided adjacent to the top surface of the dome with suitable apertures D^3 to permit the discharge of gas from the upper portion of the dome into the discharge-pipes C and C'.

The lower portion of the depending sleeve D' is provided with a tripping device E, of any suitable construction, adapted to coöperate with a series of valve-lifting levers F

located relative to the circumferentially-arranged carbid-cells A^3. The preferred form of this tripping device is shown in detail in Fig. 4, and consists of a sleeve or collar having spirally arranged upon its vertical periphery a series of contact-lugs E', each being of sufficient length to retain the valve in an open position for a predetermined length of time in order to insure the positive flooding of the carbid-cell upon which it operates.

The tripping device E is adapted to engage any desired form of lever F, adapted to raise or open a valve G, of any preferred form of construction, for the purpose of admitting water into the carbid-chamber. We have illustrated in this application, however, a preferred construction of this lever and of a valve to coöperate therewith, which construction permits a return movement of the dome and tripping device without affecting the position of the valve-controlling end of the lever. This particular construction of lever consists of the forked or bifurcated arm F', pivotally mounted upon the forked upper end F^2 of a supporting-bracket F^3, which bracket is provided with a socket *f*, adapted to fit around the collar a^2 of the carbid-cell A^3 and to be secured thereto by means of a set-screw *f'* or other suitable device. Between the members F^2 of the bracket F^3 the actuating-lever F^4 is pivoted by means of a pivot f^2, which passes through said lever and through the arm F'. Between the members of the arm F' a cross bar or pin F^5 is located, below which the shorter arm of the lever F extends, whereby a depression of the extending end of the lever by the tripping device will raise the arm F', while an elevation of such end of the lever will permit a depression of the inner end of the lever without affecting the arm F'. A suitable stop F^6 is provided to limit the downward movement of the arm F', and upon which said arm rests when not influenced by its lifting-lever.

The preferred and particular construction of valve before mentioned consists of a ball G', flexibly connected to the free end of the arm F'—for instance, by means of the chain G^2. The ball-valve rests upon a seat G^3, having a beveled outer edge *g*, which provides a valve-seat having the minimum of contact-surface, and thus prevents the accumulation or deposit of any matter thereon which would prevent the valve from seating closely to make a water-tight joint. At opposite sides of the valve-seat G^3 suitable guard-wings G^4 are provided to prevent the ball when lifted from swinging out of line with the seat to which it is returned in the further operation of the device.

For the purpose of flooding one of the carbid-cells when the machine is first placed in operation there is provided a by-pass pipe H, having a suitable valve H', by which means water may be admitted into one of the carbid-cells from the lower portion of the tank. The tank B is also provided with a suitable filling-spout B' at its upper portion to facilitate the introduction of water thereinto, and adjacent to the valves a cylindrical skirt B^2 is provided to prevent any possible escape of gas through the water at the point between the edges of the dome and those of the tank B. It may be also found desirable to use in connection with this invention a safety-vent, and such a construction has been illustrated by dotted lines in Fig. 1, wherein a vent or escape pipe I extends upward through the base of the holder and is surrounded by a downwardly-extending pipe or sleeve I', carried by the dome and extending above the same, as shown at I^2. The escape-pipe I extends above the upper portion of the tank, so that water cannot enter the same, and when an excess of gas has accumulated beneath the dome it will raise the same until the sleeve I' passes above the water-level, and thus permits the entrance of gas accumulated in the dome into the escape or vent pipe I.

There are illustrated six carbid cells or compartments arranged at the base of the holder and adapted to communicate with the water contained in the tank of the gasometer. It will be obvious, however, that the number of cells or compartments may be increased or decreased at pleasure and their size and particular construction varied to accommodate machines of different capacity. The bottom of each cell has been shown as slightly inclined, as at a^3, to facilitate the cleaning thereof and the opposite side walls tapered inward, as at a^4, thus leaving the space between the cells of each series to permit a free circulation of water around the same and maintaining the cells in a cool condition. This construction permits the heat generated in the decomposition of the carbid to be conducted to the water, thus maintaining the same in a slightly-heated condition to prevent freezing of the water by reason of reduced temperature in the apartment where the machine may be located.

In Fig. 3 the several compartments have been shown as numbered consecutively and the dome also provided with a spirally arranged series of numerals from 1 to 6, corresponding in position and order to the cells of like numbers. By this arrangement of indicating characters, such as numerals, the user of the machine can at once ascertain which of the series of cells have been used and how soon the apparatus will have to be recharged in order to obtain the desired pressure of gas for the service-line.

In the operation of the generator the tank B is first filled with water approximately to its top, the air beneath the dome having been permitted to escape by a suitable outlet-cock upon the service or discharge pipe C'. Prior to this time the several carbid-cells A^3 have been suitably charged and closed, all of the valves being closed to prevent the entrance of water into the cells. At this time one of the cells is flooded by means of the by-pass

H, which generates sufficient gas to raise the dome and carry the tripping device above all of the levers F. As the gas is used the same is maintained under pressure by any suitable weight—for instance, the tripping device E, which may be formed of sufficient metal to properly weight the dome, and it has been found particularly desirable to weight this dome at its lower portion to render the movement steady as it reaches the upper portion of the tank. When sufficient gas has escaped to permit the descent of the dome and tripping device, one of the lugs E′ will engage the corresponding lever F and retain the same open for a predetermined time, and the gas generated from the cell thus flushed passes upward through the water to maintain the dome and the pressure of gas beneath the same at a substantially uniform point. It will be obvious that the gradual consumption of gas from the dome will permit the successive lugs E′ to engage and actuate the several levers of the series until the compartments have all been flushed. The indicating characters upon the dome, however, will show how many chambers remain filled with carbid, and thus indicate to the attendant when it is necessary to recharge the chambers which have been exhausted. If the lugs E′ upon the tripping device have passed the levers, the weight of the arm F′ returns the same to its position upon the stop F^6 and permits the ball-valve to recede and prevent the escape of any further water into the carbid-cell, which at this time can be opened, cleaned, and recharged for the further operation of the generator. The lower portion of the tank may be provided with a suitable draw-off cock A^{10} for the purpose of removing the water therein when found desirable for any purpose.

With the construction hereinbefore described we are enabled to generate sufficient gas to meet the requirements upon a machine of a predetermined capacity—for instance, if but a single light is burning the amount of gas consumed would be very small and the descent of the tripping device consequently very slow, so that the valve is at first gradually lifted, permitting only a small amount of water to enter the carbid-chamber, and finally increasing this amount until all of the carbid is saturated with water. If a larger amount of gas be used from the generator, the descent of the dome will be correspondingly more rapid and the valves open quickly to rapidly generate the gas to replace that withdrawn from the dome. The automatic character of the generation in this machine obviates the necessity for carrying any large amount or pressure of gas that is required to effect a satisfactory operation.

It is obvious that numerous changes in the details of construction and configuration of the several parts may be made without departing from the spirit of this invention as defined by the appended claims.

The location of the carbid-cells upon or in the base of the generator-tank and below the water-level thereof performs a very important function in this art. It permits the formation of the cells and base as a single casting, thereby insuring the maximum of strength and great convenience and economy in the construction of the apparatus, as all of these parts may be assembled in position for use and the cylindrical body of the tank afterward applied. Furthermore, the admission of the gas generated beneath the body of water within the tank purifies the gas by removing therefrom the particles of dust and other impurities incident to the decomposition of the carbid, while the slow and gradual generation causes the gas-bubbles to rise slowly through the water and be thoroughly purified, cooled, and condensed, which is not the case when a large body of carbid is acted upon at a single time.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a gas-generator comprising a tank and movable dome, a carbid-cell located within and upon the base of the tank beneath the water-level thereof and provided with an aperture in its upper wall, a valve and operating connections for said aperture, and means carried by said dome for actuating said valve for admitting water and discharging the gas from said cell beneath the level of water in said tank; substantially as specified.

2. In a gas-generator comprising a tank and movable dome, a carbid-cell arranged within and upon the base of said tank beneath the water-level of the tank, and having an aperture communicating with said tank, a valve for said aperture, a pivoted arm connected with said valve, an independent operating-lever adapted to engage said arm when moved in one direction, and means carried by the dome for engaging said lever; substantially as specified.

3. The combination with a tank-wall and movable dome within the same, of a base for said wall having a series of independent cells circumferentially arranged upon the upper face within said wall and provided with openings at their outer faces adapted to receive suitable closures; substantially as specified.

4. The combination with a tank-wall and movable dome within the same, of a base-plate for said tank having a series of independent cells arranged upon its upper surface within said wall and provided with ports in their upper faces disposed radially and adjacent to the center of said base; substantially as specified.

5. The combination of a base for a gas-generator having a series of cells circumferentially arranged upon said base-plate, said cells being open at their outer faces, and an annular flange above said cells with a tank-wall fitting said flange, and a movable dome within said wall; substantially as specified.

6. In a gas-generator comprising a tank and movable dome, a series of carbid-cells carried within and upon the face of the base of said tank each having a port radially disposed adjacent to the center of said tank, valves for said ports, and means disposed centrally of said tank for operating said valves to admit water into the separate cells of the series; substantially as specified.

7. In a gas-generator comprising a tank and movable dome, a series of carbid-cells carried within and upon the face of the base of said tank each having a port radially disposed adjacent to the center of said base, valves for said cells, and valve-actuating devices disposed centrally of said tank positioned opposite the several valves to automatically and successively actuate the same; substantially as specified.

8. In a gas-generator comprising a tank and movable dome, a series of carbid-cells carried within and upon the face of the base of said tank each having a port radially disposed adjacent to the center of the tank, valves for said cells each having an operating-lever projecting toward the center of said tank, and a series of tripping devices centrally suspended from said dome and positioned opposite said valve-levers to successively and automatically operate the same; substantially as specified.

9. In a gas-generator comprising a tank and movable dome, a series of valved cells circularly disposed, and a tripping device within said tank centrally carried by said dome and provided with a series of independent spirally-disposed contacts to successively and automatically open said valves; substantially as specified.

10. In a gas-generator, comprising a tank and movable dome, a series of cells, means within the dome for automatically and successively admitting water to said cells, and a series of indicating characters extending around the periphery of the dome and corresponding in position to the cell or compartment designated thereby; substantially as specified.

11. In a gas-generator comprising a tank and movable dome, a carbid-cell having an inlet-aperture, a valve controlling the same, located within and below the water-level of said tank, a pivoted arm for lifting said valve, an independently-pivoted lever for raising said arm, and a tripping device carried centrally within and by the dome and adapted to engage said lever; substantially as specified.

12. A gas-generator comprising a tank and movable dome, a carbid-cell located within and upon the base of said tank and having an inlet-aperture, a valve for said aperture, a pivoted arm flexibly connected with said valve, an independently-pivoted operating-lever adapted to engage said arm in its movement in one direction, and a tripping device carried by the dome to engage and actuate said lever; substantially as specified.

13. A gas-generator comprising a tank and movable dome, a carbid-cell having an inlet-aperture, a valve-seat provided with a beveled edge, a ball-valve and operating-lever, flexible connection between said lever and valve, a tripping device to actuate said lever; an arm lifted by said lever and to which said flexible connection extends, and guard-wings supported by said valve-seat; substantially as specified.

14. In a gas-generator comprising a tank and dome, a series of carbid-cells arranged within the tank, valves and operating-levers carried by said cells, a tripping device carried by the dome, and a series of contact-lugs spirally arranged around said tripping device to engage the lever successively in the descent of the dome; substantially as specified.

15. In a gas-generator comprising a tank and movable dome, a series of radially-arranged cells or compartments, valves thereon communicating with the tank, operating-levers for said valves extending inward toward a common center, and a tripping device carried by a central depending extension upon said dome and provided with a series of laterally-projecting contacting lugs; substantially as specified.

16. In a gas-generator, a tank composed of a base carrying carbid-cells or compartments having apertures communicating with said tank, a cylindrical skirt surrounding said apertures, and a movable dome covering the upper end of said skirt; substantially as specified.

17. In a gas-generator comprising a tank and movable dome, a carbid-cell carried by the base of said tank and provided with a gas-outlet below the water-level within said tank and a by-pass connection communicating with said tank and cell; substantially as specified.

18. In a gas-generator, a base carrying valved carbid-cells circumferentially arranged upon the upper face thereof and having a flange at its upper portion, a cylindrical tank-body secured to said flange, an upwardly-extending gas-pipe located in said base, a dome carrying tripping devices for said valved cells and provided with a sleeve surrounding said pipe, a vent or escape pipe extending upward from said base and above the top of said tank-cylinder, and a telescoping pipe carried by the dome and extending over the upper end of said vent-pipe; substantially as specified.

19. A gas-generator comprising a base having a series of radially-arranged carbid-cells having openings at an outer face, a tank located above said cells, valved connections between said tank and cell, operating-levers for said valves, a by-pass communicating with the tank and one of said cells, a gas-outlet pipe extending upward from said base, a movable dome provided with a downwardly-ex-

tending sleeve surrounding said pipe, and a tripping device at the lower end of said sleeve provided with spirally-arranged contact-lugs to successively operate said levers; substantially as specified.

20. A gas-generator comprising a base having a series of radially-arranged carbid-cells having openings at an outer face, a tank located above said cells, valved connections between said tank and cell, operating-levers for said valves, a by-pass communicating with the tank and one of said cells, a gas-outlet pipe extending upward from said base, a movable dome provided with a downwardly-extending sleeve, surrounding said pipe, a tripping device at the lower portion of said sleeve provided with contact-lugs to successively operate said levers, a series of movable covers for said cells, a cylindrical skirt surrounding said valves and extending upward therefrom, and indicating characters carried by said dome and located to correspond in position with the several cells or compartments; substantially as specified.

21. In a gas-generator, the combination with a tank and a series of carbid-chambers having ports disposed radially to the center of said tank, of a vertically-movable dome, a weight depended centrally of said dome and provided with valve-actuating devices, and a series of valves on said cells having operating-levers extending radially inward toward the center of said tank; substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE E. GULICK.
FRANK M. GALLOUP.
CHARLES H. GULICK.

Witnesses:
E. S. COX,
G. W. GOLDING.