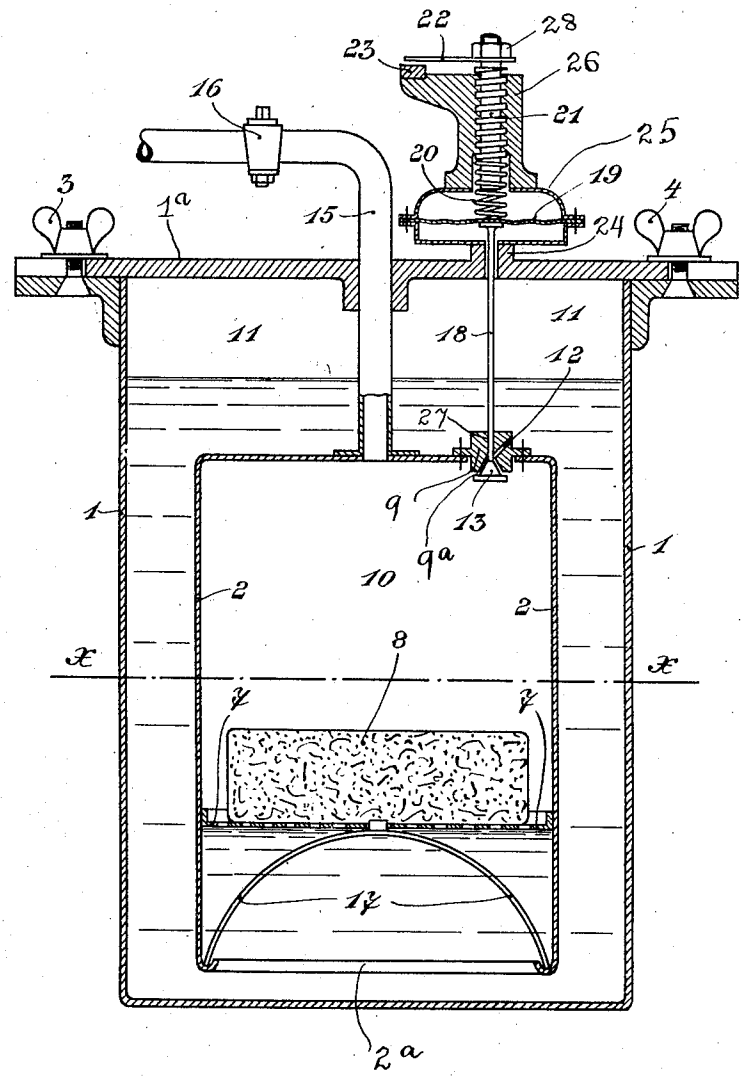
F. KRAUSS.

GAS GENERATOR.

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1,095,217. Patented May 5, 1914.



Witnesses:

Eugene Whiting.

Le Clair Stanley

Inventor

Friedrich Krauss

by Attorney

his Attorney

UNITED STATES PATENT OFFICE.

FRIEDRICH KRAUSS, OF MUNICH, GERMANY.

GAS-GENERATOR.

1,095,217. Specification of Letters Patent. Patented May 5, 1914.

Application filed March 27, 1913. Serial No. 757,060.

To all whom it may concern:

Be it known that I, FRIEDRICH KRAUSS, a subject of the Emperor of Austria-Hungary, residing at Landwehrstrasse 39, Munich, Germany, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification.

My invention relates to gas generators of the ebb and flow type, wherein a gas evolving solid such as calcium-carbid, held suspended in a foraminous pan, is adapted to be decomposed by a suitable liquid, whereby gas such as acetylene gas is evolved.

The principal object of the invention is to provide in a gas generator, automatically operating means whereby the pressure of gas evolved in the generating chamber is maintained substantially constant with respect to a predetermined pressure normal or standard.

A further object of the invention is to provide a structure wherein the gas in the generating chamber itself coöperates in the maintenance of the predetermined pressure standard.

A further object of the invention is to so arrange the device that the rate of gas evolution and the pressure thereof, will be automatically accommodated to the gas consumption.

A structure embodying my invention, includes a gas generating chamber, a pressure regulating chamber, and means whereby communication between the two chambers is established or closed.

I have illustratively exemplified the preferred form of the invention in the accompanying drawing, wherein the figure is a vertical sectional view of a gas generator embodying the several features of my invention.

Referring to the accompanying drawing by characters of reference, 1 designates a container or vessel of any suitable construction; designed to be tightly closed by the cover 1^a through the medium of the winged nuts 3 and 4. Suspended within the vessel 1 is a bell 2, the latter being firmly secured to the cover 1^a by means of the service pipe 15 provided with the controlling valve 16.

The interior of the bell constitutes the gas generating chamber 10 and the interior of the casing 1 surrounding the bell constitutes the pressure regulating chamber 11 all as more fully hereinafter described. The lower edge 2^a of the bell is upturned to support one or more ribs 17 upon which a foraminous pan 7 rests, the pan 7 serving to contain a suitable gas evolving solid 8. Provided in the upper wall of the bell 2 is a block 9 formed with a diagonal passage or duct 12 adapted, under certain conditions, to afford communication between the chamber 10 and the chamber 11, which latter in addition to serving as a pressure regulating chamber, is also designed to receive the liquid which decomposes the solid 8 for the purpose of gas generation.

The cover 1^a of the receptacle 1 is provided with a centrally bored boss 24 to which is attached a housing 25 in which a flexible diaphragm 19 is centrally clamped. Superimposed on the housing 25 is a centrally bored block 26, the upper face of which carries a scale 23, graduated to any standard which may be determined empirically. Extending through the central bore of the block 26 is a screw 21 carrying near its upper end an index or pointer 22 adapted to be moved over the scale 23, said index being secured to the screw by the nut 28. The block 26 is internally threaded to correspond with the threads of the screw 21.

The lower end of the screw 21 is smooth and reduced in diameter, and is encircled by one end of a helical spring 20, the other end of said spring contacting with the diaphagm 19 at approximately its central part. Contacting with the diaphragm 19 opposite the spring 20, is the enlarged end of a rod 18 which passes through the boss 24, and through a vertical bore 27 in the block 9, and carries at its lower end a preferably conical valve 13 adapted to engage the seat 9^a formed in the lower face of the block 9. As clearly shown in the drawing, the lower end of the duct 12 is substantially in line with the lower end of the bore 27, so that the valve 13 serves to control both passages.

The operation of the invention will be understood from the following description thereof: A suitable liquid is introduced into the container 1, to approximately the level of the line X—X. The bell 2 is then inserted whereby the liquid will be displaced and caused to rise to approximately the height illustrated in the drawing. The cover 1^a carrying the bell 2 is then tightly clamped on the receptacle 1 by the nuts 3 and 4, it being assumed

of course, that the valve rod 18 and its appurtenant parts have been installed in position. The index 22 is then moved over the scale to indicate the desired predetermined pressure. By turning the index 22, the screw 21 is revolved, more or less compressing the spring 20 and flexing the diaphragm to a corresponding degree. The flexure of the diaphragm also results in unseating the valve 13 to a degree corresponding with the desired predetermined pressure. The interior of the chamber 11 being open to the diaphragm 19 through the bored boss, 24, the air in chamber 11 will be free to act against the diaphragm.

As the liquid in chamber 11 passes up through the bottom of the bell 2, it contacts with the solid 8 and the evolution of gas commences. Assuming, now that the pressure in the chamber 11 is less than the predetermined pressure indicated by the index 22, the pressure in chamber 11 will be insufficient to cause the diaphragm 19 to overcome the action of the spring 20, whereby this spring will depress rod 18 and unseat the valve 13. When valve 13 is unseated gas will flow from chamber 10, through duct 12, into chamber 11. The diameter of duct 12 is so small that gas, but not water, may flow therethrough, and consequently the emission opening of this duct may be under water without any detrimental effect on the action of the apparatus. The gas flowing into 11 increases the pressure therein forcing a greater quantity of water into contact with the solid 8 and thus enhancing the rate of gas evolution. When the pressure in the chamber 11 has been raised to the desired degree the diaphragm 19 overcomes the tension of spring 20, seating the valve 13 and closing the lower end of duct 12, whereby communication between the upper parts of chambers 10 and 11 is discontinued. As long as the pressure in chamber 11 does not fall below the predetermined pressure for this chamber, the valve 13 remains seated.

If the valve 16 of the service pipe 15 be opened, so that gas flows out of the chamber 10, an increased quantity of fluid will flow from chamber 11 against and through the bottom of the bell, whereby the pressure in 11 will decrease, the diaphragm 19 will drop a corresponding extent allowing the spring 20 to unflex and automatically unseat the valve 13. Gas will then again flow into the chamber 11, until the pressure therein is raised to the predetermined degree, thus again restoring normal conditions and causing the valve 13 to be seated. Should the pressure in chamber 10 be too great, the level of liquid in the bell 2 will be caused to lower. thus automatically diminishing the rate of gas generation.

From the foregoing description, it will be noted that the principle upon which the apparatus operates is that of the difference in pressures in chambers 10 and 11. The generation of gas is dependent upon this difference in pressures, the standard pressure being determined independently of the consumption and generation of gas, by the screw 21 and the parts coacting therewith, and it will be noted that irrespective of the quantity of gas consumed the predetermined standard pressure will always be automatically restored.

What I claim is:—

1. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber and adapted to contain a liquid, and means governed by the pressure in said pressure regulating chamber whereby communication between said chambers may be established or closed to regulate the pressures in said chambers.

2. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber and adapted to contain a liquid, and means carried partly by said gas generating chamber and governed by the pressure in said pressure regulating chamber whereby communication between said chambers may be established or closed to regulate the pressures in said chambers.

3. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber and adapted to contain a liquid, and automatically operating means governed by the pressure in said pressure regulating chamber whereby communication between said chambers may be automatically established or closed to regulate the pressures in said chambers.

4. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber and adapted to contain a liquid, means whereby communication between said chambers may be established or closed, and means controlled by the pressure in said pressure regulating chamber for actuating said first named means.

5. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber and adapted to contain a liquid, means carried by the generating chamber whereby communication between said chambers may be established or closed, and means controlled by the pressure in said pressure regulating chamber for actuating said first named means.

6. A gas generator, embodying therein a gas generating chamber and a surrounding pressure regulating chamber with means whereby said chambers may communicate with each other, and means governed by the

pressure in said pressure regulating chamber for establishing and automatically maintaining a predetermined pressure in each of said chambers.

7. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber, means for predetermining the pressure to prevail in the latter, and means governed by the pressure in said pressure regulating chamber whereby gas is conducted from the gas generating chamber into the pressure regulating chamber when the pressure therein descends below the predetermined amount.

8. A gas generator, embodying therein a gas generating chamber, a pressure regulating chamber completely inclosing said gas generating chamber, means whereby communication may be established or closed between said chambers, means controlled by the pressure in said pressure regulating chamber for actuating said first named means, and means for setting said actuating means to operate at a predetermined pressure in said pressure regulating chamber.

9. A gas generator, embodying therein a casing having its interior formed as a pressure regulating chamber, a bell within said casing and having its interior formed as a gas generating chamber, there being a constricted passage affording communication between said chambers, and means governed by the pressure in the pressure regulating chamber for automatically opening or closing said passage.

10. A gas generator, embodying therein a casing having its interior formed as a pressure regulating chamber adapted to contain a liquid, a bell within said chamber and having its interior formed as a gas generating chamber adapted to contain a solid designed to be decomposed by the action of the liquid from said first named chamber, there being a constricted passage affording communication between said chamber, means for opening or closing said passage, and means controlled by the pressure in said pressure regulating chamber for automatically actuating said first named means.

11. A gas generator embodying therein a casing having its interior formed as a pressure regulating chamber, a bell within said chamber and having its interior formed as a gas generating chamber, there being a passage in said bell affording communication between the upper parts of said chambers, a valve adapted to open or close said passage, and means controlled by the pressure in said pressure regulating chamber for automatically actuating said valve.

12. A gas generator embodying therein a pressure regulating chamber, a gas generating chamber completely inclosed by said pressure regulating chamber, there being a passage affording communication between said chambers, a valve adapted to open or close said passage, and valve actuating means in communication with said pressure regulating chamber whereby pressure variation in the latter causes actuation of said valve.

13. A gas generator, embodying therein a casing containing a pressure regulating chamber, a gas generating chamber within and completely inclosed by said pressure regulating chamber, there being a passage affording communication between said chambers, a flexible diaphragm exteriorly of said pressure regulating chamber movable by pressure variations in said pressure regulating chambers, and means operatively associated with said diaphragm for alternately opening or closing said passage.

14. A gas generator, embodying therein a casing containing a pressure regulating chamber, a gas generating chamber within said pressure regulating chamber, there being a passage affording communication between said chambers, a flexible diaphragm exteriorly of said pressure regulating chamber and movable by pressure variations in said pressure regulating chamber, means for initially flexing said diaphragm a predetermined degree, and means actuated by said diaphragm for alternately opening or closing said passage.

15. A gas generator, embodying therein a casing containing a pressure regulating chamber adapted to contain a liquid, a bell within said chamber forming a gas generating chamber adapted to contain a solid evolving gas by the decomposing action of said liquid, there being a passage in said bell affording communication between the upper parts of said chambers, a flexible diaphragm arranged exteriorly of said pressure regulating chamber and in open communication therewith, means for initially flexing said diaphragm a predetermined degree, and means governed by the movements of said diaphragm to open or close said passage and regulate the quantity of liquid passing from the pressure regulating chamber into contact with the gas evolving solid in the gas generating chamber.

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

FRIEDRICH KRAUSS.

Witnesses:

RICHARD LEMP,

JOHANNA STERN.