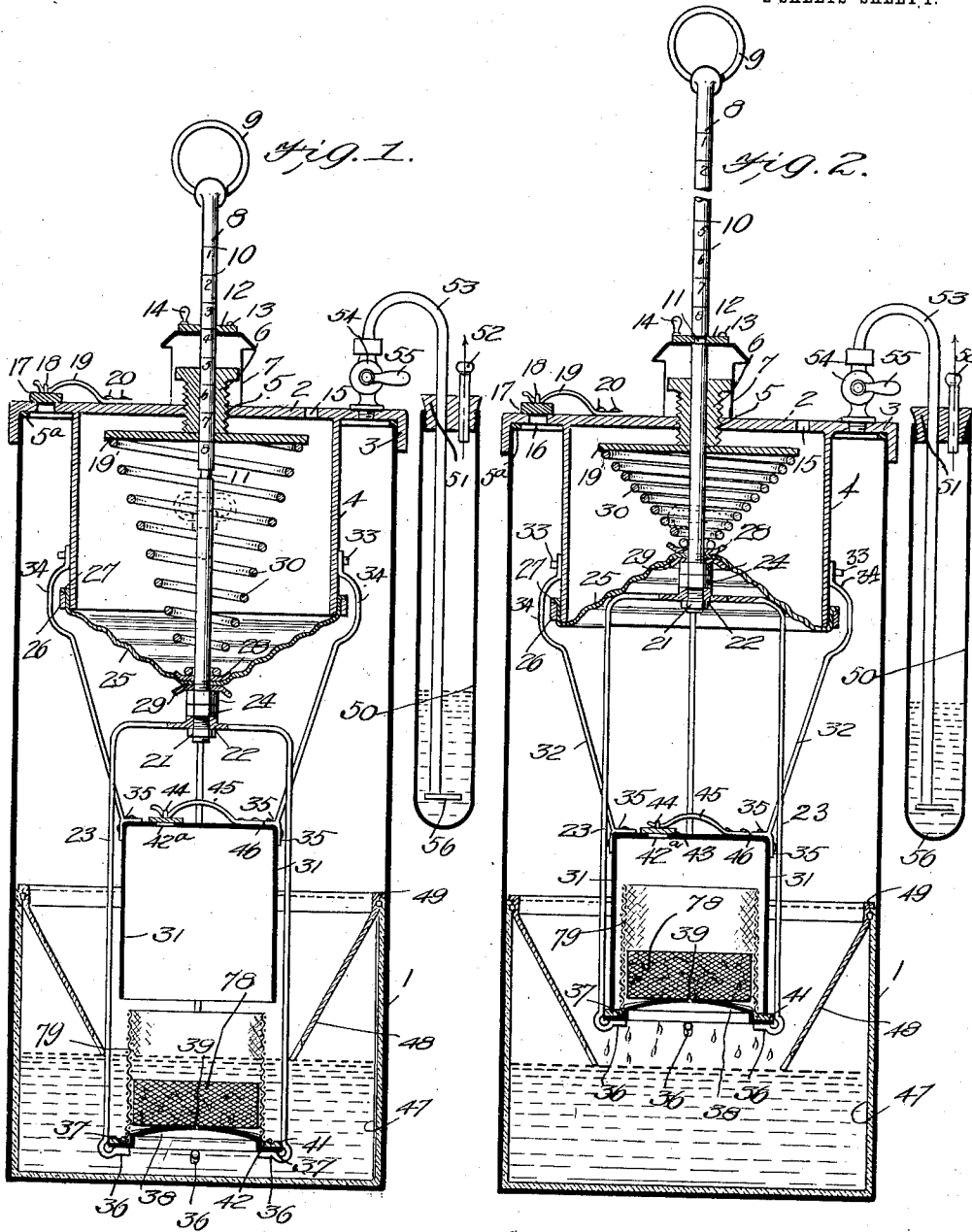


R. C. BRADLEY.
GAS GENERATOR.
APPLICATION FILED FEB. 3, 1912.

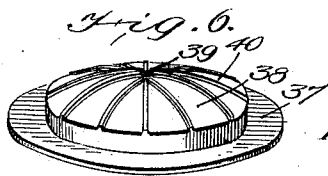
1,042,882.

Patented Oct. 29, 1912.

2 SHEETS-SHEET 1.



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2 SHEETS-SHEET 2.

Fig. 3.

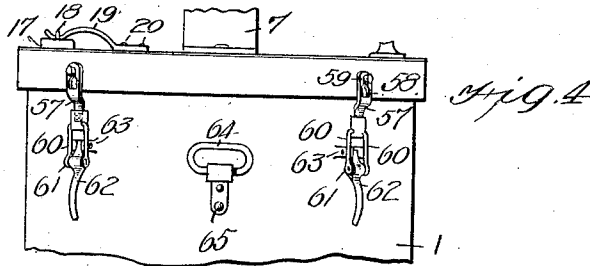
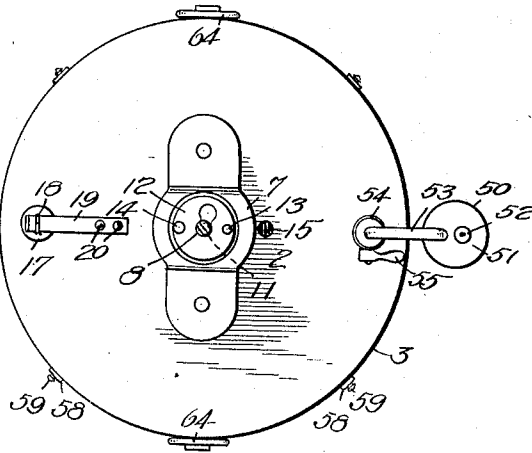


Fig. 4.

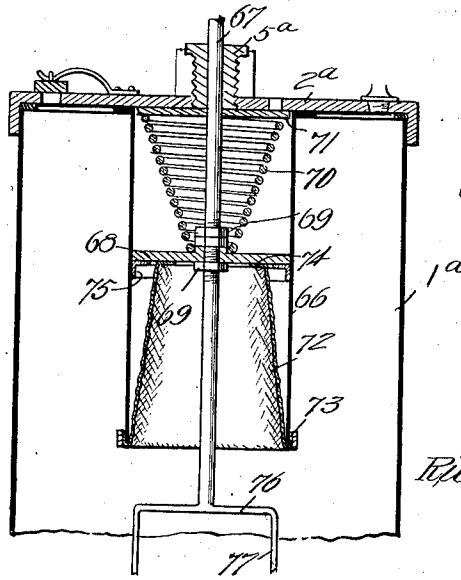


Fig. 5.

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GAS-GENERATOR.

1,042,882.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed February 3, 1912. Serial No. 675,168.

To all whom it may concern:

Be it known that I, RICHARD C. BRADLEY, a citizen of the United States, and a resident of Shreveport, Caddo parish, State of Louisiana, have invented a new and useful Improvement in Gas-Generators, of which the following is a specification.

My invention is an improvement in gas generators, and has for its object the provision of a light, compact, simple, inexpensive and easily transportable device of the character specified, especially designed for use with prepared cartridges, and having means for moving the cartridge into or out of the water, and for sealing the cartridge in a holder when not in action.

A further object is to provide a generator capable of generating gas as fast as it is consumed and in proportion to the rate of consumption, and which will retain the cartridge for an indefinite time without waste or detriment when not in use, and in condition for immediate use when desired.

A further object is to provide a generator where any desired pressure may be obtained and maintained, and which may be transported while the gas is being generated, and which will not be affected in operation by change in the relative position of the parts of the generator.

In the drawings: Figure 1 is a central vertical section of the improvement with the parts in one position; Fig. 2 is a similar view with the parts in another position; Fig. 3 is a plan view; Fig. 4 is a partial side view of the improvement, Fig. 5 is a partial vertical section of a modified form, and Fig. 6 is a perspective view of the cartridge holding plate.

The embodiment of the invention shown in Figs. 1 and 2 comprises a container or receptacle 1 of circular cross section, having a cover 2 provided with an annular lateral flange or rim 3 fitting outside of the receptacle. The cover is provided with a depending annular flange 4 concentric with the flange or rim 3 and with a central opening 5 normally closed by a plug 6 threaded into the opening. A cap 7 is secured to the upper face of the cover over the opening 5 and plug 6, and the said cap is provided with an opening in its top in line with a similar opening in the plug for receiving a rod or stem 8. The rod is provided with a ring 9 for operating the same, and with a longitudinal scale 10, and with an annular groove

11 below the scale. A latch arm 12 is pivoted at 13 to the cap and is provided with a handle 14 for swinging the latch into and out of engagement with the groove. The rod may be moved through the plug by means of the ring and may be held in elevated position by means of the latch engaging the groove. The cover is also provided with an opening 15 inside the flange 4 and with an opening 16 outside the flange 4 and inside the flange or rim 3. The latter opening 16 is normally closed by a plate 17 having an eye 18 on its upper face engaging a transverse recess or groove in a resilient arm 19 secured to the cover at 20. A disk 19 is secured to the lower end of the plug 6, and the lower end of the rod 8 is threaded and is passed through a bearing in the body 22 of a cross having four depending arms 23. A nut 21 is threaded onto the end of the rod below the body of the cross, and nuts 24 are threaded onto the rod above the body. A flexible diaphragm or closure 25 is arranged between the lower end of flange 4 and the rod, the said closure being secured to the flange by a ring 26 fitting over the closure and flange and engaging an annular rib 27 on the edge of the closure. The diaphragm has an opening for the rod, and washers 28 and 29 are arranged on the rod above and below the closure. Each washer is dished or cupped and they are oppositely arranged. A helical conical shaped spring 30 is arranged between the disk 19 and the upper washer 28 and acts normally to force the rod and the cross downward. A cartridge receptacle or holder 31 of cup shape is held in inverted position below the diaphragm and near the bottom of the receptacle 1 by means of arms 32. Each arm 32 is secured to the flange 4 at its upper end by pins or tacks 33 and is then bent outwardly at 34 to avoid the ring 26, and is then bent inwardly, and is forked at its lower end, the arms 35 of the fork being riveted or otherwise secured to the side wall and bottom of the cartridge holder. The arms 32 are four in number and are arranged at angular distances of 90°. A holding or supporting plate 37 for the cartridge is supported by the portions 36 of the arms 23, the central portion 38 of the disk being offset laterally from the margin, and the said central portion is also convex on its upper face, and is provided with grooves 40 extending radially from the center. A gasket or ring 41 is

seated on the margin of the holding or supporting plate, and the ring is provided with an annular groove 42 on its upper face for receiving the lower edge of the holder 31 and for sealing the plate to the holder. The holder 31 has an opening 42^a in its top, which is normally closed by a plate or cover 43, having an eye 44 engaging a hook in the free end of a resilient arm 45 secured at 46 to the said top of the cartridge holder. A cup-shaped water holder 47 is seated in the container 1 on the bottom thereof, and a funnel 48 is seated in the water holder. The lower end of the funnel is of approximately the same diameter as the cartridge container or holder 31, and the upper end has a marginal flange 49 seated on a rubber gasket on the upper edge of the water holder. A washing tube 50 of glass or other transparent material is held at one side of the container 1 and is provided with a plug 51 in its upper end. The tube is designed to contain a washing and purifying liquid for the gas, as, for instance, water. The plug has two openings, through one of which is passed a tube or service pipe 52, and a pipe 53 passes through the other. The upper end of pipe 53 is bent over and is connected to the outer or discharge end of a valve casing 54. The said casing is threaded into an opening in the cover 2, and the valve is operated by a stem or handle 55. The pipe 53 extends to near the bottom of tube 50 and is provided with a spreader or flange 56.

The cover 2 may be secured in place on the holder by means of the devices shown in Fig. 4. Each of the said devices comprises a latch plate 57 having a key hole slot 58 for engaging a radial pin 59 on the cover. The lower end of each plate is provided with a pair of arms 60 pivoted to the ends of a pin 61 journaled transversely of a latch arm 62 intermediate the ends thereof. The latch arm is pivoted at one end between a pair of lugs 63 on the container 1, and the free end of the arm is a handle for manipulating the same. When the latch arm is turned down into the position of Fig. 4, after the slot has engaged the pin, the cover is locked firmly to the container. The latches are arranged in spaced relation, and the container is provided with handles 64 pivoted to bearing lugs 65 on the container. A gasket ring 5^a is arranged between the cover and the container.

In the embodiment of the invention shown in Fig. 5 the receptacle or container 1^a and the cover 2^a are the same, the difference being in the annular depending flange 66, which is of greater length. The rod 67 is threaded intermediate its ends, and a disk 68 is provided with an opening for the rod and is held thereon by nuts 69 above and below the disk. The disk fits within the flange 66, and the spring 70 is arranged between disk

68 and a disk 71 on the lower end of the plug 5^a. The flexible diaphragm or closure is of cylindrical form and has its lower end secured to the lower end of the flange 66 by means of a ring 73, and the upper end is secured to the bottom of disk 68, as indicated at 74. A ring 75 is secured to the lower face of disk 68 at the edge thereof, and the said ring is of angle shape, having one portion secured to the disk and the other engaging the inner face of the flange 66. The lower end of the rod 67 is forked, as shown, the arms of the fork extending radially from the rod, as shown at 76, and then longitudinally of the rod, as shown at 77. The construction is otherwise the same as that shown in Figs. 1 and 2, and the operation is practically the same.

The generator is designed for generating any sort of gas that may be generated in a device of this character, as, for instance, oxygen or acetylene gas, and it is obvious that the proper materials are supplied in the cartridge for generating the particular gas when brought in contact with the liquid in the holder 47. The operation of generating acetylene gas will be described.

In operation, the cartridge 78 of carbid is seated on the holding plate on the offset convex bottom, and a shield or hood 79 of perforate material, as, for instance, wire gauze, encircles the cartridge, the lower end of the hood or shield being secured to the plate. The water holder 47 is filled with water to about the lower end of the funnel. When gas is not desired, the cartridge is lifted out of the water, as shown in Fig. 2, the rod being locked in elevated position by the latch. When gas is desired, the latch is released and the rod is lowered until the cartridge strikes the water. The gas evolved is held in the container until valve 55 is opened, when it passes into the tube 50 from tube 53 and is washed and purified by the washing fluid in the tube. From tube 50 the gas passes to service pipe 52, which may be a burner, if desired. The gas may be shut off from service by valve 55, and should the pressure in container 1 pass beyond the danger point the safety valve consisting of opening 16, plate 17 and spring arm 19 will permit the excess gas to escape. When no more gas is desired, the rod is lifted and the cartridge is raised into the container or holder 31 closed by the holding plate 37, the said plate fitting closely against the bottom of the holder 31. The safety valve 43 permits excess pressure to escape from the cartridge holder and the water drains back into the water holder. When the cartridge is lifted out of the water, the water drains quickly away, so that the evolution of gas soon ceases. The holder and plate form a closed holder for the cartridge, and there is no waste, since any gas evolved in the carbid

holder after the cartridge is lifted is yet in the container 1.

The device as a whole is compact and light and may be easily transported. The device is at all times ready to furnish gas, and the formation of gas may be checked whenever desired.

When the cover 2 is removed, all parts of the generator are accessible for cleaning or the like. The removal of the cover removes also the carbid holder, the cross and arms, spring, and all parts connected with the rod, as also the washing and scrubbing device. The water holder and funnel may then be lifted from the container. The supporting plate 37 may be lifted from the lugs 36, resting loosely thereon. The tension of springs 30 or 70 may be varied by turning the plugs 6 or 5^a. The cover plates 17 and 43 are preferably of rubber, or at least rubber faced, on the face fitting over the opening. The water holder 47 is preferably of glass and the funnel is of metal.

The opening 15 in the cover permits the air to be drawn in or driven out of the space within the flange above the diaphragm. The diaphragm thus does not affect the movement of the rod. The diaphragm closes the lower end of the flange and prevents the escape of gas from the container proper into the space above the diaphragm.

The generator is especially advantageous in mines, in case of accident, for the generation of oxygen. It is obvious that different materials are necessary for different gases. The generators may be retained in readiness for operation, so that all that is necessary is to lower the supporting plate 37.

The scale 10 on rod 8 is to indicate the pressure of gas in container 1. The pressure acting against the diaphragm 25 forces up the spring 30 and measures the pressure with scale 10, the action of the pressure against the diaphragm and members attached lifts the cartridge from the water and stops the generation automatically, when the gas is drawn off or cut out of container 1, the spring forces the diaphragm down and through the members attached forces the cartridge into the water causing the generation again, and so on until the cartridge is exhausted. The safety valve 17 and 18 is to relieve the pressure in case the automatic device should hang or fail to work correctly.

I claim:

1. A gas generator comprising a container, a cover detachably connected to the container and provided with an annular depending flange, a rod slidable through the cover at the center thereof and within the annular flange, a cross on the lower end of the rod, said cross having depending arms, each arm having an inwardly extending lug at its lower end, a supporting plate for the cartridge on the lugs, an inverted cup-

shaped cartridge holder supported above the said plate from the cover, said plate having a convex upper surface provided with radial grooves, a gasket on the plate for engaging the lower edge of the holder, a spring pressing the rod downward, a latch for locking the rod with the supporting plate against the lower end of the holder, the said holder and the cover for the container each having a vent opening in its top, a yielding cover for each opening, a service pipe connected to the cover of the container, and a flexible closure between the rod and the lower end of the annular flange.

2. A gas generator comprising a container, a cover detachably connected to the container, a rod slidable through the cover at the center thereof, a cross on the lower end of the rod, said cross having depending arms, each arm having an inwardly extending lug at its lower end, a supporting plate for the cartridge on the lugs, an inverted cup-shaped cartridge holder supported above the said plate from the cover, said plate having a convex upper surface provided with radial grooves, a gasket on the plate for engaging the lower edge of the holder, a spring pressing the rod downward, a latch for locking the rod with the supporting plate against the lower end of the holder, the said holder and the cover for the container each having a vent opening in its top, a yielding cover for each opening, and a service pipe connected to the cover of the container.

3. A gas generator comprising a container, a cover detachably connected to the container, and provided with a depending annular concentric flange, a rod slidable through the cover at the center thereof, a cross on the lower end of the rod, said cross having depending arms, each arm having an inwardly extending lug at its lower end, a supporting plate for the cartridge on the lugs, an inverted cup-shaped cartridge holder supported above the said plate from the cover, said plate having a convex upper surface provided with radial grooves, a gasket on the plate for engaging the lower edge of the holder, a spring pressing the rod downwardly, a latch for locking the rod with the supporting plate against the lower end of the holder, an annular hood of perforate material connected to the supporting plate for inclosing the carbid, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

4. A gas generator comprising a container, a cover detachably connected to the container, and provided with an annular depending concentric flange, a rod slidable through the cover at the center thereof, a

cross on the lower end of the rod, said cross having depending arms, each arm having an inwardly extending lug at its lower end, a supporting plate for the cartridge on the lugs, an inverted cup-shaped cartridge holder supported above the said plate from the cover, said plate having a convex upper surface provided with radial grooves, a gasket on the plate for engaging the lower edge of the holder, a spring pressing the rod downward, a latch for locking the rod with the supporting plate against the lower end of the holder, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

5. A gas generator comprising a container, a cover detachably connected to the container, and provided with an annular depending concentric flange, a rod slidable through the cover at the center thereof, a cross on the lower end of the rod, said cross having depending arms, each arm having an inwardly extending lug at its lower end, a supporting plate for the cartridge on the lugs, an inverted cup-shaped cartridge holder supported above the said plate from the cover, said plate having a convex upper surface provided with radial grooves, a gasket on the plate for engaging the lower edge of the holder, means for holding the supporting plate against the lower end of the carbide holder, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

6. A gas generator comprising a container, a cover detachably connected to the container, and provided with a depending annular concentric flange, a rod slidable through the cover at the center thereof, a cross on the lower end of the rod, said cross having depending arms, each arm having an inwardly extending lug at its lower end, a supporting plate for the cartridge on the lugs, an inverted cup-shaped cartridge holder supported above the said plate from the cover, means for locking the plate against the lower end of the said holder, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

7. A gas generator comprising a container, a cover for the container, and provided with a depending annular concentric flange, a rod slidable through the cover, a supporting plate for the carbide, means at the lower end of the rod for supporting the plate, an inverted cup-shaped holder sup-

ported above the plate, said plate fitting against the lower end of the holder when the rod is lifted, means for locking the rod in elevated position, a spring pressing the rod downward, a service pipe connected to the cover, a water holder on the bottom of the container, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

8. A gas generator comprising a container, a cover for the container, and provided with a depending annular concentric flange, a rod slidable through the cover, a supporting plate for the carbide, means at the lower end of the rod for supporting the plate, an inverted cup-shaped holder supported above the plate, said plate fitting against the lower end of the holder when the rod is lifted, and a shield of perforate material on the plate for encircling the carbide, means for locking the plate against the lower end of the holder, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

9. A gas generator comprising a container, a cover for the container, and provided with a depending annular concentric flange, a rod slidable through the cover, a supporting plate for the carbide, means at the lower end of the rod for supporting the plate, an inverted cup-shaped holder supported above the plate, said plate fitting against the lower end of the holder when the rod is lifted, means for locking the rod in elevated position, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

10. A gas generator comprising a container, a cover for the container, and provided with a depending annular concentric flange, a rod slidable through the cover, a supporting plate for the carbide, means at the lower end of the rod for supporting the plate, an inverted cup-shaped holder supported above the plate, said plate fitting against the lower end of the holder when the rod is lifted, a flexible diaphragm closing the lower end of the flange and secured at its center to the rod for lifting and lowering the rod as the pressure in the container varies, said cover having an opening within the flange.

11. A gas generator comprising a container having means at its lower end for holding water, a cover provided with an annular concentric depending flange and an opening within the flange, a flexible dia-

phragm closing the lower end of the flange, a rod slidable through the cover and secured to the center of the diaphragm, a cartridge supporting plate at the lower end of the rod, and an inverted cup-shaped cartridge holder supported above the water level, the plate engaging the lower end thereof when the rod is lifted by the pressure below the diaphragm.

10 12. A gas generator comprising a container having means at its lower end for holding water, a cover provided with an annular concentric depending flange and an opening within the flange, a flexible diaphragm closing the lower end of the flange, a rod slidable through the cover and secured to the center of the diaphragm, means for supporting a cartridge on the lower end of the rod, and a holder above the water level for coöperating with the said supporting means to inclose the cartridge when the pressure below the diaphragm lifts the rod.

15 13. A gas generator comprising a container having means at its lower end for holding water, a flexible diaphragm arranged transversely of the holder above the water level, a cover for the container having an opening for placing the space above the diaphragm in communication with the atmosphere, a rod connected to the diaphragm and slidable through the cover, a cartridge supporting plate at the lower end of the rod, and a holder above the water level for coöperating with the plate to inclose the cartridge when the rod is lifted by the pressure beneath the diaphragm.

20 14. A gas generator comprising a container having means at its lower end for holding water, a flexible diaphragm arranged transversely of the holder above the water level, a cover for the container hav-

ing an opening for placing the space above the diaphragm in communication with the atmosphere, means depending from the diaphragm for supporting a cartridge, means above the water level coöperating with the supporting means for inclosing the cartridge when the said means is lifted by the pressure below the diaphragm, a spring forcing the supporting means downward, and means for locking the said means with the cartridge inclosed.

15. A gas generator comprising a container having means at its lower end for holding water, a flexible diaphragm arranged transversely of the holder above the water level, a cover for the container having an opening for placing the space above the diaphragm in communication with the atmosphere, means depending from the diaphragm for supporting a cartridge, and means above the water level coöperating with the supporting means for inclosing the cartridge when the said means is lifted by the pressure below the diaphragm.

16. In a gas generator comprising a container for holding water, a cartridge inclosing means supported above the water level, means for supporting a cartridge movable vertically in the container and coöperating with the inclosing means when lifted above the water level to inclose the cartridge, and a flexible diaphragm arranged transversely of the container and connected to the supporting means for raising and lowering the same as the pressure below the diaphragm varies.

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Witnesses:

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