

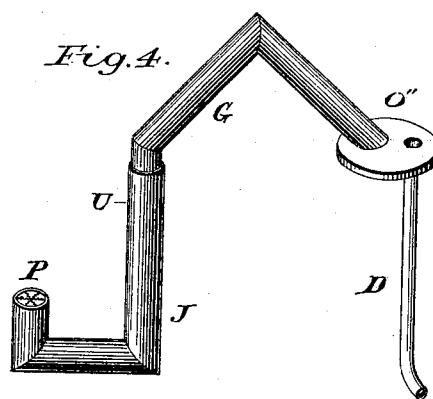
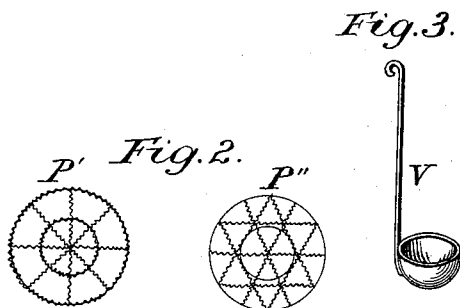
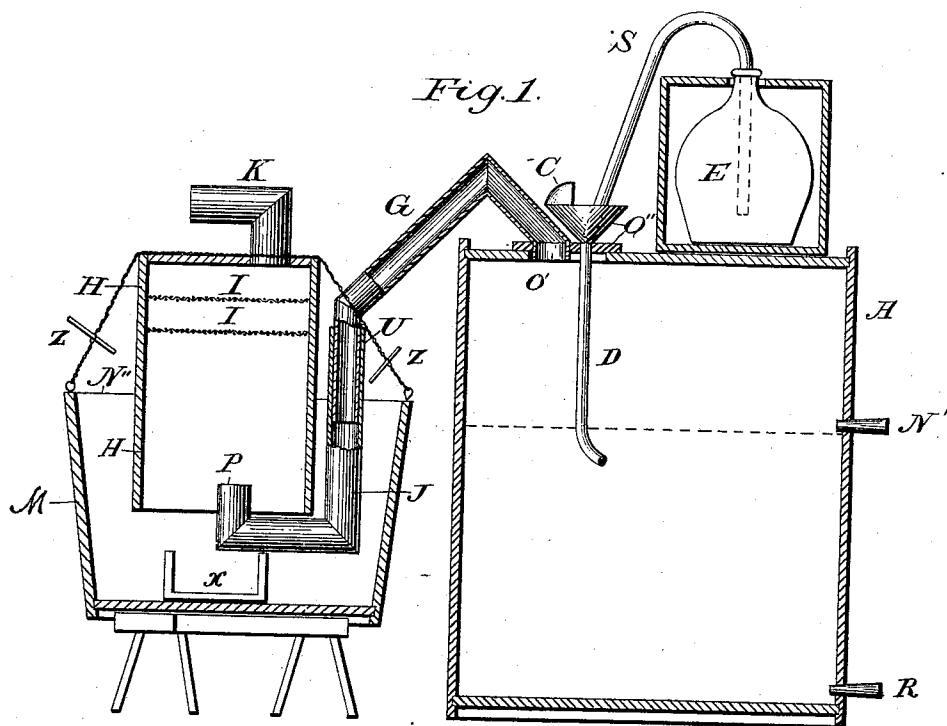
(No Model.)

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PORTABLE GAS GENERATOR FOR FILLING BALLOONS.

No. 320,885.

Patented June 23, 1885.



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PORTABLE GAS-GENERATOR FOR FILLING BALLOONS.

SPECIFICATION forming part of Letters Patent No. 320,885, dated June 23, 1885.

Application filed January 30, 1885. (No model.)

To all whom it may concern:

Be it known that I, CARL E. MYERS, a citizen of the United States, residing at Mohawk, in the county of Herkimer and State of New York, have invented a new and useful Improvement in Portable Gas-Generators for Filling Balloons by the Vitriolic Process, which differs from those heretofore in use in being much more compact as to bulk, portable as to weight, and more durable or capable of repeated action, without serious injury from the destructive energy of the sulphuric acid used with it, while it is also more readily set in operation, and is more rapid in action and develops more gas at less expense than any vitriolic apparatus heretofore in use for the purpose.

Figure 1 represents a vertical sectional apparatus. Figs. 2, 3, and 4 are detail views of parts of the apparatus.

In the accompanying drawings, Fig. 1, A represents a tank, which may be four feet in height and four feet in diameter, built of wood, and soaked, saturated, or impregnated with a heavy hydrocarbon—such as linseed-oil, whale-oil, or paraffine—the exposed surface of which saturated wood is by subsequent contact with dilute sulphuric acid converted into a coating of indestructible carbon, which protects the underlying wood and the oil which impregnates it, and thus secures it from further attacks.

The wood may be conveniently saturated with oil, or a less fluid hydrocarbon, by immersing the parts in a vat containing the protecting medium, which may be heated when desirable to facilitate the impregnation, or the fluid hydrocarbon may be, at a suitable temperature, poured into the wooden tank and allowed to soak into all parts for such time as may be necessary, heat facilitating the process. The subsequent application of dilute sulphuric acid to the interior of the tank in actual use, while generating hydrogen gas by the action of vitriol on fine iron turnings, is sufficient to burn, carbonize, or otherwise change the exposed oil-soaked wood, so that it is enabled to resist the further corrosive action of the acid. This comparative indestructibility permits of the repeated charging and discharging of the tanks, so that small ones may, by continuous and repeated use, serve in place of

a much larger tank not so protected, while the smaller size permits of easy movement by one person, and cheaper transportation, the operations of gas-ballooning being largely itinerant and the necessity of cheap and easy transportation imperative.

In operations with the large tanks commonly in use (generally eight or ten feet in height by eight or ten feet in diameter, built of heavy plank not prepared in any way to resist corrosion,) the charges of iron are shoveled into the tank through a large man-hole in the top or head, which hole also admits men, who arrange or distribute the iron turnings upon shelves or tables erected within the tank, after which water is admitted through the same man-hole, and afterward acid is poured by hand through another hole in the head of the tank, and gas passes out from still another orifice in the head, all of which holes have to be separately luted and secured against waste of gas. After an operation with such tank several hours must elapse before the interior of the tank cools sufficiently to allow workmen to enter the man-hole, shovel up, elevate, and remove the debris, without danger from the heat and acid fumes. Further, such wooden tanks not being specially prepared in their substance to resist the destructive action of vitriol are soon rendered leaky, rotten, and useless.

In the apparatus invented by me only a single orifice, O', Fig. 1, about five inches in diameter, is arranged in the head of the tank, through which water is first introduced till the upper surface reaches a vent or gage hole, N, in the side of the tank, after which several hundred pounds of iron turnings are introduced through the same hole O', each particle of iron thus becoming wet and washed by falling through the water, and may conveniently be further washed and distributed on the bottom of the tank, by simply stirring with a pole dirt, sawdust, lubricating-oils, or other foreign matter which often contaminate machine-shop refuse, iron turnings being thus separated or removed by passing out with surface water through the gage-vent N, which may then be plugged. The particles of iron by this treatment become at once wet upon their surfaces throughout the mass, and in condition for immediate corrosive action by

acid, while if iron be first put into the tank and then water upon it, much dirt, oil, and air remain permanently inclosed and adherent throughout the mass, and entirely prevent or greatly retard the action of acid upon such portions, as is the case with the large tanks heretofore mentioned, where large or coarse particles possessing less surface in proportion to weight have to be used, instead of the finer iron-dust, which may be consumed by my method with greatly-increased rapidity of action, which can only take place upon the exposed surface of each particle, and not within its substance.

After suitably charging the generator-tank A with water and iron, the single orifice O' in the head of the tank is closed by means of the flanged cover O'', to which are permanently attached the entrance-pipe D for acid, and the escape-pipe G for gas, the single operation of fastening the cover O'' serving to secure both pipes in position. Pipe G, leaving the flange at an acute angle, extends upward and outward from the tank about one foot, turns a right angle outward and downward for a distance of about two feet, and then directly downward, and enters the pipe J by a sliding joint, which permits the pipe J to slip up or down upon it, or to revolve in horizontal plane for adjustment of height or of angular position. Pipe J is immersed in a "washer-tub" of iced lime-water M, the surface water N'' of which must be kept higher than that in the generator-tank A, to prevent overflow or "foaming" of the generator in energetic action, this overflow being of frequent occurrence and a constant source of danger with the large tanks in use, as the water-level of them is much higher, while the washer is placed on the ground below it, the result of which arrangement is that energetic action in the generator readily precipitates an overflow, when the connecting-pipe for gas acts as a siphon and decants the boiling-hot acid water from the generator into the washer till the fluid-surfaces of both are at the same level, thus imperiling the success of the operation and injuring the balloon by injecting hot acid vapors or acidulated water. Placing the water-level of the washer M above that of the generator-tank A prevents such an overflow by furnishing a water-head pressure at N'' against the level N', which represses any undue disposition to overflowing or siphoning.

Pipe J has near its lower extremity two square elbows, equivalent to a "return-bend," which permits thus the escape upward of the hydrogen through the opening P, which is furnished with a ragged-edged star-shaped grating or "bubble-breaker," (shown in section, Fig. 2,) P' P'', and which serves to check the belching or surging of the gas, steady its flow, and, by division, bring it in sufficiently close contact with the iced lime-water within the washer, while a fine grating or perforations might become clogged with scum or sediment from the generator-tank. The saw-teeth edges

of this bubble-breaker have a peculiar tearing or disrupting effect on a large bubble as discharged, so that instead of its ascending as a single large globule from an open pipe, or as a rapidly-discharged stream from a number of perforations, the entire globule of gas is shattered and ascends as foam.

Pipe J rests upon a support, X, in the bottom of the washer, so as to leave free water-space for circulation below it, and is held firmly in place against the surging of gas or water by the edge of the gasometer H, which is pressed down upon the pipe J by the twisted strainers Z Z, which extend from one edge of the washer up and across the gasometer-top to the opposite side of the washer, and which are kept in tension by twisting with a stick, as shown. This arrangement keeps an elastic strain upon the gasometer H to hold in place a series of pipes, like J, arranged on the support X in the same washing-tub, while it at the same time permits the rotation of the gasometer, so that the escape-pipe K may be turned in any direction desired.

Within the gasometer H, near the top, are placed one or more gratings or trays, I I, supporting caustic lime or other material for further purifying the gas and eliminating moisture by its affinity while still in the gasometer and before it escapes to the balloon through the pipe K.

In use, for filling a balloon as many small tanks like A as may be necessary, usually three or four, are grouped in a circle about the washing-tub M, with their several pipes adjusted as stated.

In operation the flow of sulphuric acid is begun by introducing into a carboy, E, a siphon, S, filled with water, when the acid immediately flows over into the hooded funnel C and through the lead pipe D, which passes below the surface of water in the generator-tank A, the curved lower end of pipe D assisting to "seal" it from the entrance of gas or gas-bubbles as they rise. Action being commenced in one tank is followed by the others as soon as they can be successively set in operation, and when action ceases in one through exhaustion of free water the then saturated solution of sulphate of iron may be discharged through R, another supply of water is furnished through C D to the gage-point N', and on the addition of more acid through C D action is continued upon the remaining iron stored in the tank.

At the close of an operation for filling a balloon, requiring usually two or three hours, the pipes are detached, separated, and with the gasometer, siphons, funnels, &c., are stored or packed in the emptied washing-tub M ready for shipment. The generator-tanks after discharging solution are immediately turned head downward, precipitating the remaining iron or refuse toward the hole O', where it partly escapes, and is wholly removed by the cup-shaped hoes V, Fig. 3, the entire operation of emptying, cleaning, and packing up the apparatus being readily concluded in thirty min-

utes after filling the balloon, instead of requiring several hours or a day, as is the case with the apparatus heretofore in use.

Having given such a full, clear, and exact description of my invention as will enable any one skilled in the art to which it appertains to make and use the same, and disclaiming any features of special process other than those naturally incident to the use of my described apparatus in connection with the generation of hydrogen gas, for which it is designed,

I claim—

1. In combination with other necessary parts of a portable apparatus for generating hydrogen gas from water by the action of sulphuric acid on iron particles, the gas-generator tank A, having orifices O' N' R, when constructed and arranged to operate substantially as described, and for the purposes mentioned.

2. The combination of the curved acid-pipe D, flange O'', and the gas-pipes G and J, connected by an adjustable sliding and revolving joint U, constructed and arranged to operate substantially as shown and described, and for purposes mentioned.

3. A portable apparatus for generating hydrogen gas from water by the action of sulphuric acid upon iron particles, consisting, substantially, of a generating-tank, A, washing-tub M, and connecting-pipes G U J, the tub M or its overflow-point N'' being elevated at a higher level than the gage-vent N' in the generator A, as shown and described, and for purposes mentioned.

4. The generator-tank A, having described openings O' N' R, in combination with the cup-shaped cleaning-hoe V, described and shown.

5. In combination with the washing-tub M and one or more pipes, J, the support X, gas-

ometer H, and twisted strainer-cords Z Z, confining the whole together without preventing rotation of H, as described.

6. In combination with carboy E, elevated on or above generator A, the siphon S, hooded funnel C, and curved pipe D, constituting an extension of the siphon system, as described and shown, and arranged to precipitate by gravity preponderance the acid contents of E to and within generator A without influx of air or waste escape of hydrogen.

7. In combination with the washing-fluid in tub M, the gas-escape pipe P, subdivided into perpendicular and corrugated channels forming the star or ray shaped bubble-breaker, described and shown, and operating by surging of gas and fluid through it to convert the same into foam or to shatter a single large bubble into many small ones without said breaker acting to considerably close the escape-pipe, as would a perforated or serrated diaphragm or plate.

8. In a portable hydrogen-gas apparatus, the combination of an elevated carboy, E, containing sulphuric acid, siphon S, containing water, hooded funnel C, and the curved pipe D, constituting a siphon-extension terminating under water within a gas-generator, A O' N' R, containing water and iron particles, flange O', and gas-pipe G, having sliding and revolving joint U, connecting a pipe, J, terminating in a bubble-breaker, P, within tub M, containing lime-water, together with pipe-support X, gasometer H, and twisted strainer-cords Z Z, all arranged, combined, and constructed to operate substantially as described and shown, and for purposes mentioned.

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Witnesses:

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