C. G. Wheeler

Gas Generator.

No 94,157. Patented Aug 24 1869.

Fig. 1

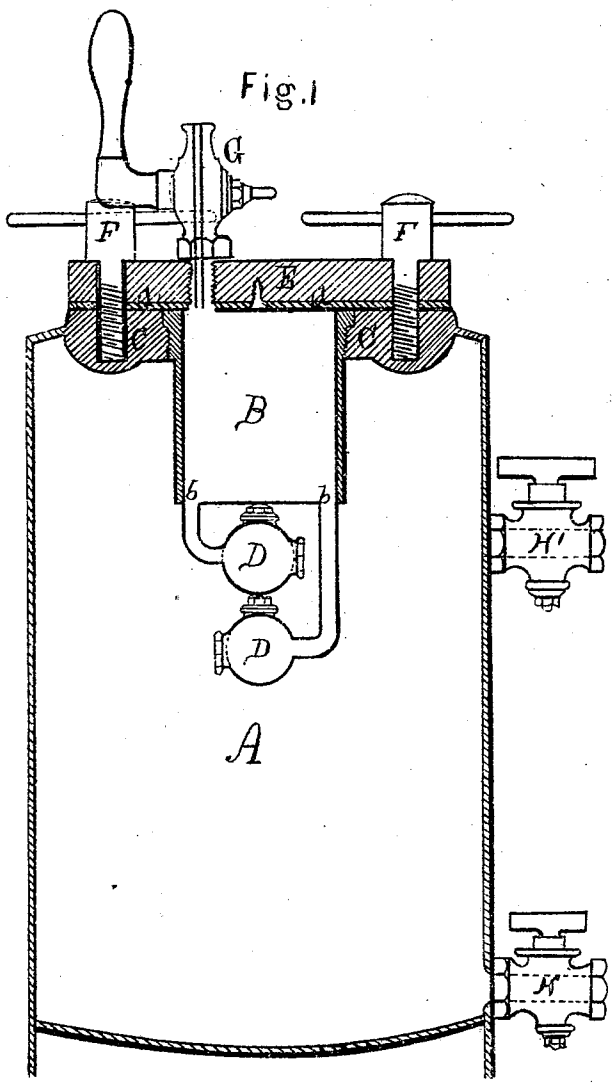


Fig 3

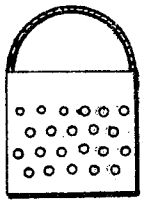
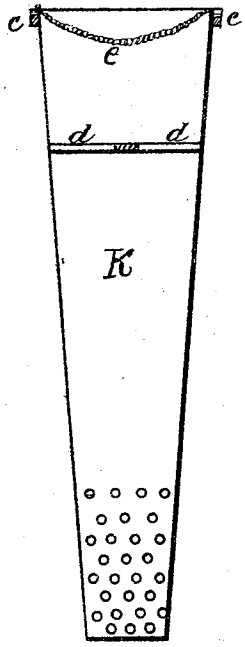


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES G. WHEELER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN GENERATING GAS FOR MOTIVE POWER, FOR EXTINGUISHING FIRES, AND FOR OTHER PURPOSES.

Specification forming part of Letters Patent No. **94,157**, dated August 24, 1869.

To all whom it may concern:

Be it known that I, CHARLES G. WHEELER, of the city of Chicago, in the State of Illinois, have invented certain new and useful Improvements in Gas-Generators; and I do declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 represents a vertical section. Figs. 2 and 3 variations of details, as hereinafter described.

The chief object of my invention is to so construct a gas-generator that the generated gas can be used as a motive power, or for other purposes, substantially as hereinafter set forth.

To enable other skilled in the art to make and use my improvements, I proceed to describe the construction and operation of the same.

A represents a strong vessel, made of iron, copper, or other suitable metal.

B is a cylinder or charge-chamber for holding the charge from which the gas is generated by combustion or otherwise. This cylinder, as shown, is screwed into a ring, C, properly secured to the top of the vessel or boiler A, and is made tight by packing *a*, the top of the cylinder B, when in place, being on a line with the top of the ring C. Small projections may be placed on the inner surface of this cylinder, to facilitate the removal and replacing the same by the use of a wrench. The cylinder B is provided with one or more check-valves, D D, two being shown in the drawings, so constructed as to admit the passage of gas from the cylinder B to the reservoir A, but closing when the pressure in the reservoir A becomes equal to or greater than the pressure in the chamber B, and retaining the generated gas in the reservoir. In consequence of this arrangement, when the charge placed in the chamber B has been consumed, the chamber can be opened and a new charge placed therein, thus keeping up a constant and continuous supply of gas.

The openings *b* to the valves may be covered with wire-gauze, to prevent the passage of anything but gas to the valves.

E is a strong cap covering the chamber B, and held in place by the screws F. The under side of this cap is provided with rubber packing.

G is a stop-cock designed as a waste-cock, by the use of which, when it is necessary to place a new charge in B, the small quantity of gas remaining in B can be allowed to pass off before opening the cap E. By means of a suitable pipe connected to the cock G this gas can be carried outside the building. As shown this cock passes through the cap E; but this is not essential, as the cock can be placed in the side of the chamber B, passing through the shell of the reservoir A. For the purpose of indicating the pressure in the chamber B, a gage may be connected with the cock G.

H H′ are two cocks, through one of which, H, the generated gas can be conveyed to the cylinder of an engine acting on a piston-head, to produce motion exactly as steam does. The other cock, H′, has a gage attached to it for the purpose of indicating the pressure within A.

I, Fig. 3, is a small iron basket for holding the charge, the composition of which is hereinafter stated.

The operation of this device, when used as a motive power, is as follows: The charge used is lighted and placed in the perforated basket I, which is placed in the chamber B, and the cap E is brought to its place by the screws F. By the combustion of the charge carbonic-acid gas is rapidly generated, which, having no other means of escape, passes into the reservoir A, filling the same, the gas being under great pressure. This gas can now be used as a motive power, as before described, being conveyed to the cylinder of an engine through the cock H and a suitable connecting-pipe. When the charge has been consumed the cock G is opened, relieving the pressure in B, when the valves D will immediately close, preventing the escape of gas from the reservoir A. A new charge is then placed in the chamber B, the cock G and cap E are closed, and gas is again generated and forced into the reservoir A. The gages will indicate the degree of pressure, so that the operator will know when it is necessary to renew the charge. The accumulated gas in the reservoir will be sufficient to keep machinery in motion while the charge is being renewed.

A safety-valve can be connected with the reservoir and with the chamber B to prevent accidents.

We thus have a constant power for working an engine, requiring neither water, pumps, chimney, flues, fire-chamber, or fuel, and safer than steam, as it is impossible for a single charge to produce more than a given pressure.

When all things are working properly, the two gages will indicate about the same degree of pressure in both the reservoir and chamber, so that the engineer can at all times know whether the valves are working. One valve D would be sufficient. The second may be used as matter of precaution, as it is not likely that both will cease to act at the same time through accident.

In using this power with large engines it will be advisable to construct a large central reservoir, having several small cylinders connected therewith, constructed substantially like B, each small cylinder being connected with the central reservoir. In this case several small charges would be used at the same time, and they would not require renewing simultaneously. Thus a more uniform pressure could be maintained in the central reservoir, from which the gas would be carried to the engine.

In many places this power will be found desirable—in stores, for sewing-machines, coffee and spice mills, in drug-grinding establishments, laboratories, laundries, and many other places. It can be used in locomotives where water is scarce or poor. It can be advantageously used in steam-vessels, economy of space compensating for expense of the charges.

With some slight changes my device can be used as a fire-extinguisher. The chamber B being removed by unscrewing, the cylinder K, Fig. 2, is placed in the reservoir A in place of the chamber B. This cylinder K extends nearly to the bottom of the reservoir A, and its lower end is provided with a number of perforations. The top is provided with a packing, *c*, causing it to fit tightly into the ring C. The cylinder K is made of iron, tin, or other metal. The bottom may be perforated. The cylinder may have supports *d d*, upon which the charge-basket may rest, though these are not essential when the cylinder is tapering, as shown. The cylinder can be handled by the chain *e*, or other suitable device for that purpose.

The apparatus is employed as a fire-extinguisher, as follows: The cylinder K is removed, the reservoir is filled with water up to H′. bicarbonate of soda, in the proportion of half a pound to about six gallons of water, is put into the water. K is then replaced, a charge is lighted and placed in the charge-basket, which is placed in the cylinder K, when the cover C is secured. The gas formed by the combustion of the charge passes through the openings in the lower part of K into the water and open space above the same. On opening the cock H the water, saturated with bicarbonate of soda and carbonic-acid gas, rushes out, and by hose and nozzle can be directed as desired. A great advantage is gained by making K removable, as when one charge has been used bicarbonate of soda can be introduced into the body of the water, and will be readily dissolved, which is not the case when it is introduced into the cylinder, as has been hitherto practiced. The charge which I use is composed of forty-eight parts of best nitre, from six to twelve parts of charcoal, and twenty to forty parts of bicarbonate of soda. These I moisten with a solution of gum-arabic, and give the mixture proper shape in cylindrical molds. Other nitrates and other bicarbonates may be used. This composition is far superior to that in general use, in which sand is used instead of bicarbonate of soda, sand being inert and used to moderate the action of the other ingredients. I accomplish the same object with the bicarbonate of soda, and as this is partly decomposed at the temperature at which charcoal burns, from twenty-five to fifty per cent. more gas is obtained than from the other composition. The gas is also more pure, is free from disagreeable odor, and more effective as an extinguisher.

When my device is used as an extinguisher the cock G is not necessary.

My generator can be used for the purpose of generating gas for soda-fountains, the charge being prepared from fresh-burned charcoal and kept in metallic wrappers.

The openings to the cocks H H′ may be covered with wire-gauze to prevent stoppage.

My charge can also be used for starting into action steam fire-engines, and other engines, with dispatch, the charge being suspended or supported in the boiler above the water, the boiler being provided with a suitable opening for that purpose. By this means the engine can be started at once, and used while the water of the boiler is being heated by the fires.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. The reservoir A, when provided with the chamber B, having a check-valve, D, and stop-cock G, substantially as specified.

2. The composition herein described, consisting of niter, charcoal, and bicarbonate of soda, substantially as and for the purpose specified.

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Witnesses:

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