No. 676,199. Patented June 11, 1901.

S. D. MOTT.

COMBINED GAS AND STEAM GENERATOR.

(Application filed Oct. 9, 1900.)

(No Model.)

Fig. 1.

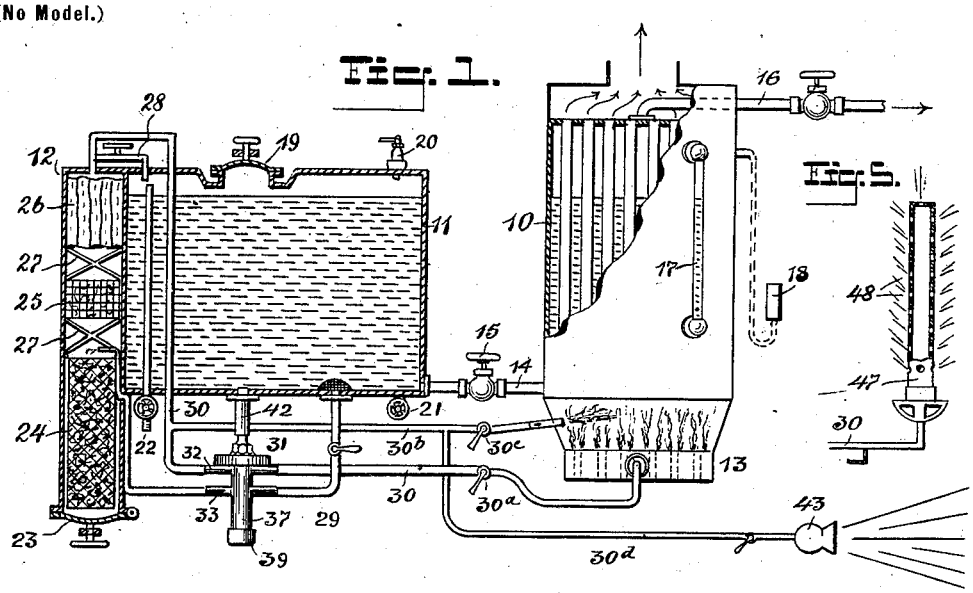


Fig. 2.

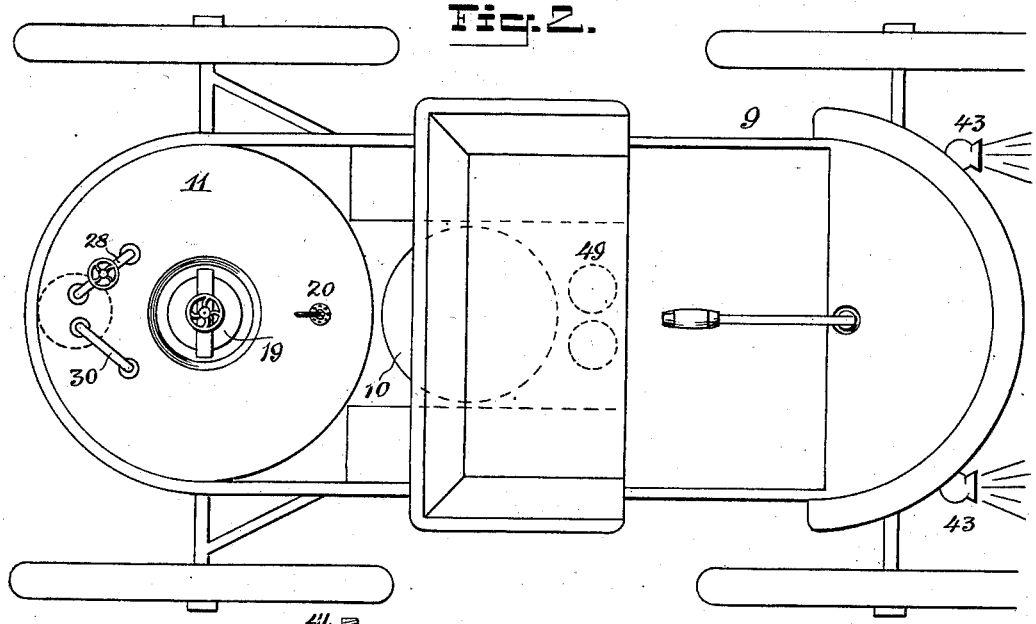


Fig. 3.

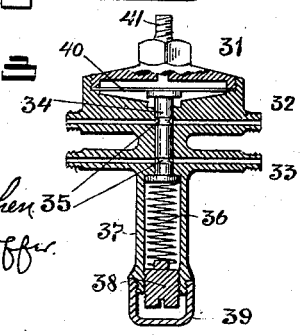
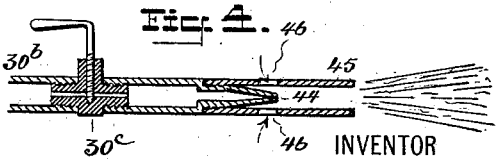


Fig. 4.



WITNESSES:

Israel Cohen

Harland L. Oberteuffer.

INVENTOR

Samuel D. Mott,

BY

W. B. Hutchinson,

ATTORNEY

UNITED STATES PATENT OFFICE.

SAMUEL D. MOTT, OF PASSAIC, NEW JERSEY.

COMBINED GAS AND STEAM GENERATOR.

SPECIFICATION forming part of Letters Patent No. 676,199, dated June 11, 1901.

Application filed October 9, 1900. Serial No. 32,535. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. MOTT, of Passaic, Passaic county, New Jersey, have invented certain new and useful Improvements in a Combined Gas and Steam Generator, of which the following is a full, clear, and exact description.

My invention relates to improvements in apparatus for generating power, and particularly in that class of apparatus which is used for generating power for automobiles, although it will be seen from the following description that my apparatus need not be confined in its use to this business.

One object of my invention is to produce a very simple and efficient apparatus which is adapted to cheaply and safely generate acetylene gas, so that the same may be used for making steam or for other purposes.

Another object of my invention is to produce means by which the internal pressure of the apparatus works automatically to control both the generation and consumption of gas, to the end that the internal pressure may be kept constant and at a predetermined limit.

Still another object of my invention is to arrange and connect the water-tank of the gas-generator and the boiler, so that the pressure shall be the same in both parts of the apparatus, to the end that the pressure in each may be utilized either for operating the motor or for operating the controlling mechanism of the apparatus.

With these ends in view my invention consists of a power-generating apparatus, the construction and organization of which will be hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar figures of reference refer to similar parts throughout the several views.

Figure 1 is a broken side elevation, with parts in vertical section, of my improved apparatus. Fig. 2 is a plan view of the apparatus as applied to an automobile. Fig. 3 is a detail vertical longitudinal section of the regulator for controlling the supply of water to the generator and the supply of gas to the burner. Fig. 4 is a detail sectional view of a type of pilot-burner which may be used; and Fig. 5 is a detail sectional view, partly in elevation, of a form of burner adapted for use in connection with a water-tube boiler.

My improved apparatus comprises in its organization a boiler 10, a water-tank 11, and an acetylene-gas generator 12, which are preferably arranged as shown and which can be mounted on an automobile 9, as in Fig. 2; but it will be clearly understood that the generator, the controlling mechanism, and the steam-boiler can be used for other power purposes and that the particular type of boiler or generator may be varied indefinitely without affecting the principle of the invention.

The boiler 10, as illustrated, is a common upright tubular boiler having a burner 13, which also may be of any approved type. The water to the boiler is supplied through a pipe 14, which is controlled by a valve 15, which leads to the water-tank 11. The boiler has also the usual engine-feed pipe 16, which is controlled by a valve and should be provided with the customary gage-glass 17 and pressure-indicator 18. The tank 11 may be arranged at any point adjacent to the boiler and may be of any approved shape, the one illustrated being circular in cross-section, as shown in Fig. 2, and it is provided with a removable cover 19, with a safety-valve 20, and with a drain-cock 21. It will be understood, however, that as the pressure in the tank and boiler is equal the safety-valve may be located at any convenient point in the system. The tank is also provided with a pipe 22, which is controlled by a valve, and it leads from the upper part of the tank, (see Fig. 1,) so that in case there is a surplus of gas after a run has been made with the vehicle or after the motor has been used for any purpose the said surplus can be conveniently drawn off and stored for other purposes, or the pipe 22 can be utilized for charging the tank with gas, if desired.

The generator 12 may be of any usual type, and, as illustrated, it is contained partly within the tank 11 and is provided with a swinging bottom 23 to enable it to be conveniently loaded or cleaned out. Within the generator and next the bottom is a common wire basket of carbid 24, and above this is another body of carbid 25, serving as a drier, while in the top of the generator is a filter 26. The

two bodies of carbid 24 and 25 and the filter 26 are spaced apart by means of a framework, as at 27. The gas generated passes from the top of the generator 12 through a pipe 28 into the tank 11, and the water to the generator is supplied through a cock-controlled pipe 29, leading from the bottom of the tank 11 and discharging into the generator just above the body of carbid 24.

The gas to supply the burner 13 is taken from the top of the generator through a pipe 30, which for convenience is shown as running downward through the tank 11, and the gas-supply in the pipe 30 and the water-supply in the pipe 29 pass through the regulator 31, which is shown in a general way in Fig. 1 and in detail in Fig. 3. The water passes through the lower duct 33 of the regulator, while the gas passes through a second duct 32; but obviously the relative position of these ducts may be reversed or they may be placed in any relative position, but for convenience should be parallel. The piston 34 is held to slide in the regulator, and it traverses the ducts 32 and 33, being grooved, as shown at 35, at points which may register with the ducts, and it will be noticed that when the ducts and the grooves register the water and gas can pass through the ducts; but when they do not register both water and gas are shut off. The piston 35 is pressed in one direction by a spring 36, which is held in a chamber 37 of the regulator and abuts with a screw-plug 38, (see Fig. 3,) the latter being preferably covered by a dust-cap 39, which screws to the part 37. The opposite end of the piston 35 extends into an upper chamber of the regulator 31 and abuts with a diaphragm 40, which is pressed by the internal pressure from the tank 11, and consequently from the boiler 10. The precise construction of this regulator 31 is of course not essential so long as the proper relation of ducts, piston, spring, and diaphragm is preserved; but for convenience I have shown the regulator provided with a nipple 41, adapted to screw into the pipe 42, (see Fig. 1,) which pipe depends from the tank 11.

It will be seen by referring to the drawings and the foregoing description that the regulator 31 can be adjusted so that the requisite internal pressure of the system can be maintained. We will suppose that the spring 36 has a tension equal to the pounds pressure desired in the system. If now the pressure in the system rises above the desired limit, it will act on the diaphragm 40 against the tension of the spring 36 and move the piston 34, so as to shut off both water and gas by closing the ducts 32 and 33. If, however, the pressure is too light, the spring 36 will move the piston 34 against the pressure of the diaphragm 40, so as to hold the grooves 35 in registry with the ducts 32 and 33, thus permitting the free passage of both gas and water.

It will be seen from the foregoing description that the apparatus described in connection with the controlling-diaphragm regulates both the supply of gas to the burner and the supply of water to the carbid. Consequently the apparatus is regulated so that the production of gas and steam is practically uniform and the gas-pressure above the water in the tank 11 will balance the steam-pressure above the water in the boiler. It will be understood, therefore, that all parts of the apparatus should be made to resist the same internal pressure, and it will also be understood that as the pressure above the water in the tank and boiler is equal the water-feed will be a gravity feed.

The pipe 30 is controlled by a cock 30^a, and it is also provided with a branch pipe 30^b, which is controlled by a cock 30^c and which delivers above the burner 13 and which serves as a pilot by means of which the burner 13 may be conveniently lighted. The gas-pipe 30 also supplies the pipes 30^d, which lead to lamps 43, which can be arranged on the vehicle 9; but obviously such accessories are not essential, though they illustrate the advantage of having an economical gas-generator.

It will be understood that the burners in such a system as mine must be on the Bunsen principle, and a convenient means of applying this principle is shown on the pilot-burner illustrated in detail in Fig. 4. Here the pipe 30^b has a reduced end 44, which is inclosed in a pipe 45, and this has air-openings 46 to permit the atmosphere to enter and unite with the gas.

My generator is well adapted for use with different types of boilers, and in Fig. 5 I have illustrated a type of burner which is well adapted for use in connection with a water-tube boiler, as the burner can extend up among the tubes and radiate heat in all directions. As illustrated here, the burner consists merely of a relatively large pipe 47, which is pierced at frequent intervals with small openings 48, from which the gas passes and at which it is ignited. Let it be understood that instead of one pipe 47 any number may be used, and the size will of course vary according to circumstances; but this burner I do not claim as a part of this present invention and show it merely to illustrate one of the advantages of my system.

In the accompanying drawings I have shown the boiler in connection with an engine which is indicated merely at 49; but it will be understood that any type of steam-engine can be used, and it will also be understood that any type of boiler can be substituted for that shown. Further, the generator can even be used in connection with a gas-engine, which can be supplied by the gas generated in the manner set forth.

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

1. In an apparatus of the kind described, the combination of the acetylene-gas gener-

ator, the water-tank and the steam-boiler, all connected up in series so as to have the same internal pressure, a burner for the boiler and a regulator operated by the variation of internal pressure in the system to control the flow of water to the generator and the flow of gas from the generator to the burner.

2. An apparatus of the kind described, comprising a steam-boiler having a suitable burner, an acetylene-gas generator, a water-tank supplying both the boiler and the gas-generator, a gas-pipe leading from the gas-generator to the burner of the boiler, and means operated by the rise and fall of the pressure in the boiler to control the water-supply to the gas-generator and the gas-supply to the burner.

3. An apparatus of the kind described, comprising in its organization a steam-boiler, a water-tank, an acetylene-gas generator, and a burner for the boiler, together with means operated by the change of boiler-pressure to control the water-supply to the gas-generator and the gas-supply to the burner.

4. An apparatus of the kind described, comprising a steam-boiler, a water-tank, an acetylene-gas generator, a burner for the boiler, means for supplying water from the tank to both boiler and gas-generator, and a gas connection between the gas-generator and the burner.

5. In an apparatus of the kind described, the combination of the acetylene-gas generator, the water-tank and the boiler, the boiler and the water-tank being connected so that the gas and steam pressure are equalized.

6. In an apparatus of the kind described, the combination with the water-tank, the acetylene-gas generator, and the pressure-containing portion of the apparatus, of a regulator controlling the water-supply to the generator and the gas-supply from the generator, said regulator comprising a plurality of ducts with passages for gas and water, a piston traversing the ducts in one direction and adapted by this transverse movement to open and close the ducts, a spring pressing the piston in one direction, and a diaphragm opposed to the spring and operated by the internal pressure of the system, substantially as described.

7. In an apparatus of the kind described, the combination of the acetylene-gas generator, the water-tank, the tank and generator being in communication so that gas may flow from one to the other, a water-pipe leading from the tank to the generator, a gas-pipe for the outflow of gas, and a regulator operated by the variation of internal pressure in the system to control the flow of water to the generator and the flow of gas from the generator.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL D. MOTT.

Witnesses:
WARREN B. HUTCHINSON,
WALTER S. ALLERTON.