

W. A. SIMONDS.
Improvement in Gas-Machines..

No. 114,358.

Patented May 2, 1871.

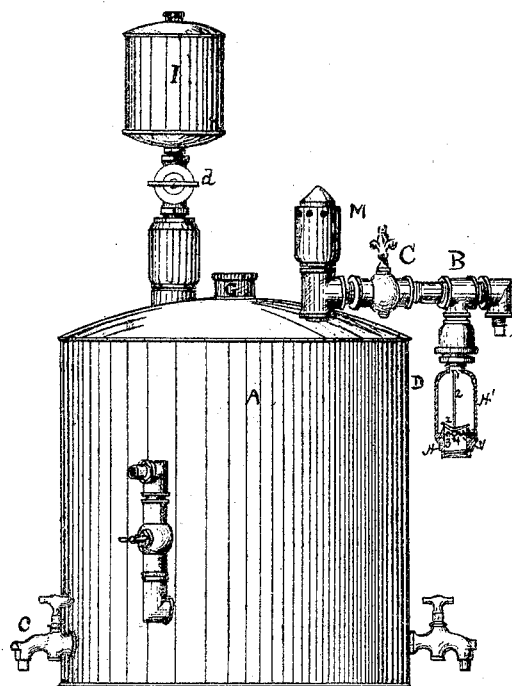


FIG. I.

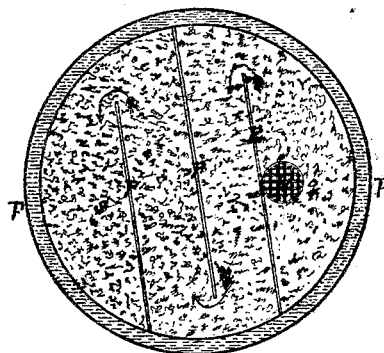


FIG. III.

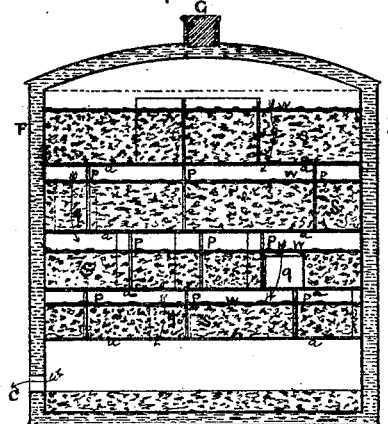
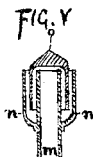
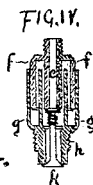


FIG. II.



Witnesses *John Bailey*

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UNITED STATES PATENT OFFICE

WARREN A. SIMONDS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN GAS-MACHINES.

Specification forming part of Letters Patent No. **114,358**, dated May 2, 1871.

Know all men by these presents:

That I, WARREN A. SIMONDS, of Boston, in the State of Massachusetts, have invented a new and useful Improved Gas-Machine, of which the following specification, with the accompanying drawing, is sufficient to enable one skilled in the art to make and operate my invention.

The nature of my invention consists, first, in constructing the gasoline-reservoir of a portable gas-machine with a water-jacket, so as to render it less exposed to danger from fire; second, in combining therewith an automatic atmospheric check-valve for the purpose of regulating the internal pressure at times when the atmospheric temperature lowers; third, in combining therewith a safety-valve, constructed as a loaded metallic thimble, fitting into an annular mercury-cup, and opening outward; fourth, in combining therewith a filter, constructed as a canister, with a central pipe entering the filling-tube of the reservoir and depressing a spring check-valve therein situated, and with an exterior annular flange or petticoat fitting into an annular mercury-cup on the outside of said filling-tube; fifth, in arranging within the gasoline-pans of the reservoir a sponge to absorb and present the gasoline to the passing air, confined and preserved in its proper position by a superior network of wire-gauze, forming the floor of the air-channel; sixth, in arranging and locating the gasoline-reservoir, through which the air to be carbureted is to be forced or pumped, above the burners, for the purpose of economizing the liquor; seventh, in employing for the jacketing liquor a mixture of water and glycerine to avoid thermal and refrigerating influences; eighth, in constructing the atmospheric check-valve with a V-shaped raised seat, a wire-gauze diaphragm having a central boss, and a flexible disk clamped to said boss by a screw-rod.

In the drawing, Figure I is an elevation of the machine with the atmospheric check-valve in section. Fig. II is a vertical section of the reservoir and jacket. Fig. III is a horizontal section of one of the pans *a a*. Fig. IV is a section of the filler-coupling. Fig. V is a section of the safety-valve.

Like letters indicate like parts in all the figures.

A is the gasoline-reservoir. It is divided into horizontal cells or channels by the pans *a a*, and these are again subdivided by partial partitions *p p*, and communicate with each other by pipes *q q*, which rise through the bottoms of the pans. The pans are packed with sponge *s* as high as the top of the pipes *q*, and this sponge is protected and confined from rising to obstruct the air-passage by a cover of wire-gauze, *w*, firmly fixed to the sides and partitions of the pans. A reservoir thus arranged upon a moving carriage or vessel will not have the air-passages obstructed by the swelling of the sponge, nor allow the liquor to slop about, and by this construction a great deal of surface will be exposed to the traverse of the air. I propose that this reservoir shall always be placed above the burners to be supplied, and this I consider very important, as by this means the carbureted air flows down and does not lose its hydrocarbon by lifting it to the burners.

It has been matter of observation that the hydrocarbon, unless very light, is, in cold weather, eliminated from the air by gravity, when forced upward more than twenty-five or thirty feet, and thus the great waste of all the heavier part of the liquor is caused; but by placing the reservoir above the burner a heavier hydrocarbon will be consumed, giving more light.

I am aware it has been proposed to do this without a pump; but I do not consider this practical, as a pump is required to regulate and maintain the stream of air to be carbureted and keep it constant, and besides the use of a machine without a pump requires that it shall be situated in the building to be lighted, which has heretofore, until my present invention of the jacketed or submerged machine, rendered buildings uninsurable at usual rates, while the machine now applied for is authorized both by insurers and the fire department to be placed in dwelling-houses as a safe machine, creating no extra risk.

This reservoir A is surrounded on every side or submerged by the water-jacket F, which serves to protect the gasoline from the influence of varying temperature, and also reduces very much the danger from fire, for, as will be readily seen, before the water could all evaporate the temperature of the gasoline would

be raised far above its boiling-point, and the whole of this inflammable material would be blown off.

I should, of course, propose to protect all the openings to the interior of the machine or reservoir A by wire-gauze placed over them, so as to prevent an explosion in the interior.

The apparatus I now present can be entirely emptied of liquor by heat, and the vapor burned without destroying the apparatus, so that in case of fire it is no more dangerous than coal-gas.

The water in the jacket may be supplied through pipe G, and drawn off by cock *c*. Opening G is preferably made with a pipe extending upward several inches, to prevent stop, and in any case must not be tightly closed, as by a screw-plug, for the force of the water at varying temperature must be considered, and it must not be confined. This matter being obvious, I make no claim upon it.

I speak of the fluid in this jacket as water, but I find that by mingling about ten per cent. of glycerine with water that a fluid is obtained which is congealed with great difficulty, and by carrying ten percentage as high as fifty we have a fluid almost uncongealable, while at the same time the addition of glycerine reduces the evaporative tendency of the water and renders it far more fit at any temperature for my purpose. I do not claim, however, to have discovered these properties of glycerine, but to have found a new and useful application of them in the arts. Crude glycerine will answer very well for my purposes.

B is the air-pipe, communicating with the pump and having its check-valve at *c*, and D is a valve, opening inward and supplying air to the reservoir when the pressure inside is less than the atmospheric pressure. The construction of this valve is new and peculiar, as shown in Fig. I.

H H' are two parts of the shell of the valve. In one of these is fixed the diaphragm V, having a circular opening, 3, across which is stretched a wire-gauze screen with a solid central boss, 4. This central opening 3 is bounded by a raised seat.

z is a flexible disk, larger than the opening, the center of which is clamped upon boss 4 by screw rod 2, which passes through yoke 1, attached to the shell. This makes an extremely delicate and efficient air-valve for light work.

M is the safety-valve. It consists of a tube, *m*, opening into the cavity of reservoir A, and having formed on its exterior an annular mercury-cup, *n*, into which fits the thimble-shaped valve *o*, loaded to resist the ordinary working pressure of the pump, but ready to be blown off as soon as the pressure within the reservoir overcomes this normal pressure, as it would in case of fire. If desirable, a tube can be extended from outside this valve to the open air, like the steam-chimney of a lock-up safety-valve, so as to conduct away dangerous fumes.

By the application of these means I have

produced an apparatus which will not explode in a burning building, and which is more economical than any now in use, inasmuch as by its use as prescribed the heavier and richer hydrocarbons are licked up by the air, and all consumed without serious loss by residuum, while other machines hardly use, as at present employed, half the liquor.

The filler of this apparatus is very much superior to any other in use.

I is the gasoline-canister, having an opening on top closing with a screw.

A tube, *h*, communicates with the interior of the reservoir A. Within this is valve *k*, closing against atmospheric pressure by the aid of a spring or other suitable device, and coming to a seat on part of the tube or reservoir, and presenting at the opening of tube *h* a rod, on whose upper surface the nozzle of the filler *e* may press when inserted to give a supply of material. Around this tube *h* is formed a deep annular mercury-cup, as shown, cavity upward, and around nozzle *e* is formed a petticoat-flange, *f*, to fit into the cavity of cup *g* and slip into the mercury.

At the bottom of the filler is the stop-cock *d*. A plug-cock on the filler, and also on the reservoir, have been used before, with a screw-coupling between; but it will be seen that this is an instantaneous coupling, which also opens the reservoir-valve at the same time. This valve arrangement differs from that in the English form of study-lamp because that is not combined with a coupling, and does not present the combination of two valves. Three ring-valves for air-pumps are shown in Bonne on the steam-engine as Figs. 398, 399, and 400; but they are all pierced in the center, and have no raised seats, and so differ from my atmospheric check-valve.

I claim as my invention and desire to secure by Letters Patent—

1. The safety-valve M, consisting of tube *m*, communicating with reservoir A, annular mercury-cup *n*, and loaded thimble *o*, all arranged in combination with each other and reservoir A, substantially as described.

2. The arrangement as an atmospheric valve within the shell H H' of the diaphragm, and having its central opening 3 surrounded by a raised seat and throttled by the gauze screen, with its central boss 4, and of flexible disk *z*, screw 2, and yoke 1, all substantially as described.

3. The arrangement for connecting or coupling filler I and reservoir A, consisting of pipe *h*, spring-valve *k*, and mercury-cup *g*, attached to the reservoir, and nozzle *l*, petticoat-flange *f*, and cock *d* on the filler, the whole operating to close the joint and open the channel or conduit at the same instant, all substantially as described.

4. The air-channels, of determined and constant height, as found by the arrangement of the bottoms of pans *a*, partial partitions *p*, wire-gauze floors *w*, beneath which, in the pans *a*, is fixed and held a sponge for the gaso-

line, to secure long, transverse, and vertical action of the air, and constant presentation of gasoline to the air-column moving through reservoir A, substantially as described.

5. The gasoline-reservoir A, provided with its water-jacket F and safety-valve M, when arranged to work with an air-forcing appa-

ratus, and placed above the burners it is to supply, substantially as described.

WARREN A. SIMONDS.

Witnesses:

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JOHN HALEY.