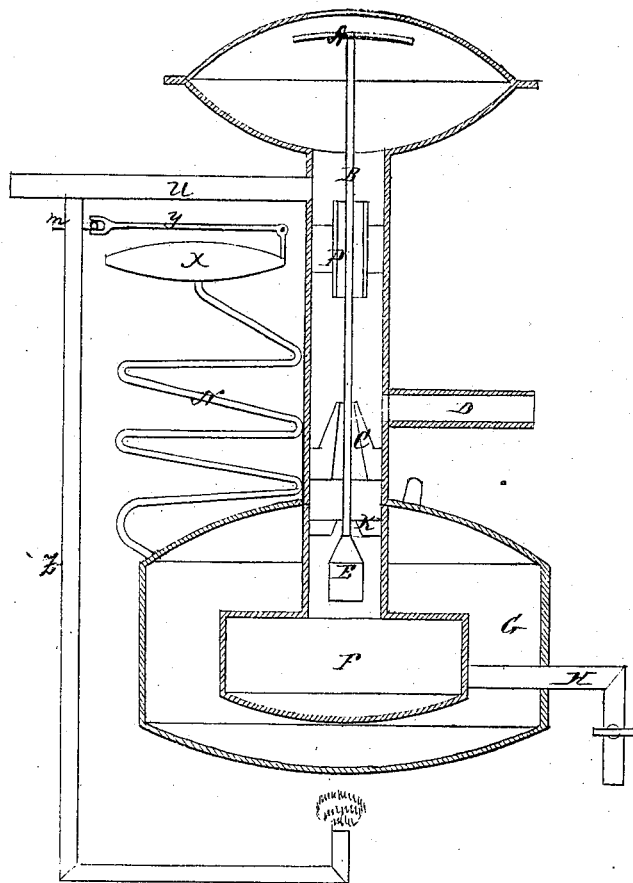


T.G. Springer, Gas Machine.

No. 112,975.

Patented Mar. 21. 1871.



Witnesses
A. A. Yeatman,
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per
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UNITED STATES PATENT OFFICE.

THEODORE G. SPRINGER, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN GAS-MACHINES.

Specification forming part of Letters Patent No. **112,975**, dated March 21, 1871; ante dated March 10, 1871.

To all whom it may concern:

Be it known that I, THEODORE G. SPRINGER, of St. Louis, in the county of St. Louis and in the State of Missouri, have invented certain new and useful Improvements in Gas-Machines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a machine for generating gas, as will be more fully hereinafter set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, which represents a longitudinal vertical section of the same.

A represents an elastic diaphragm, which rises when there is an excess of gas or an increased pressure, and forces the valve E into its seat K in the vapor-chamber, thereby stopping the flow of vapor, while the flow of gas lets the diaphragm A fall, when the valve E will open and admit more vapor. B is a small wire or thread running through the contracted vent C, and uniting the diaphragm A to valve E. C is a contracted vent, through which the vapor passes under pressure. F is the vaporizing-chamber, in which the gasoline or other hydrocarbon liquid is heated. G is a chamber, in which is put water or other suitable material, which is heated to the boiling-point, thereby heating the gasoline in chamber F. H is the pipe which connects the vaporizing-chamber with the gasoline-tank, which is either elevated to produce pressure, or pressure may be produced in the gasoline-tank by other methods, if preferable. D is an air-pipe directly opposite the contracted vent C, in which the vapor passes out under pressure, and coming through vent C with great velocity, forming a hollow stream of vapor. As it has to pass around the rod B through the vent, the vapor immediately mixes with the air and passes into tube P, causing a partial vacuum, which is immediately supplied with air through the tube D. P is a tube which the vapor and air pass through, as

they mix, into the diaphragm A to pipe U. U is the pipe through which the gas passes for consumption. Z is a pipe, which carries gas to the heating-chamber G, and is provided with a cock, *m*. *m* is a cock in the tube Z, so constructed that at any time, should the chamber G get so hot that it would throw off more steam than would be condensed in the worm N, the steam will press on the small diaphragm X on the end of the worm and raise the lever Y, which will cause the cock *m* to be moved, and a portion of the heat will be shut off. This causes the chamber G to cool, when the diaphragm on the worm relaxes and lever Y will move again, and the gas will be turned on to the chamber G again. The cock *m* is so constructed that the gas cannot be entirely shut off from burning under the chamber G. N is a worm connected with the heating-chamber G, and which will condense the steam, allowing the liquid to boil in said chamber at all times. O is a tube, which leads from the vaporizing-chamber F, connecting the same with the casing containing the diaphragm A, and which incloses the valve-seat K, vent C, pipe P, and rod B, as shown, the pipe D leading into the same at the vent, and the pipe U leading from the same above the pipe P.

In the heating-chamber G may be used any liquid that will boil at the temperature desired to be used. For instance, water boils at 212°; by mixing glycerine with the water it will boil in proportion to the amount of glycerine used. Put in sufficient glycerine with the water, and it will not boil under 300°, so that by the mixture the gasoline can be heated to any degree desired, and such heat governed by the mixture. Alcohol boils at a much lower temperature than water, so that I may have steam at almost any temperature.

In all machines where the gasoline is heated to fine vapor under pressure, and forced through a contracted vent, the vent must be so small that any dust that might be in the vapor is liable to lodge in the vent; but as I pass a rod or small wire, B, through the vent and compel the vapor to come out all around it, and the rod being moved by the diaphragm at every variation of pressure of the gas, which variation is caused every time a burner is lighted or one shut off, the motion will remove

any obstruction which should chance to lodge in the vent.

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

1. A mixing-tube with rod or thread running through the contracted vent, substantially as and for the purposes herein set forth.

2. The combination of the diaphragm A, rod B, valve E, seat K, vent C, and pipe P, all constructed and arranged to operate substantially as and for the purposes herein set forth.

3. In combination with the vaporizing-chamber F, I claim the heating-chamber G, worm N, diaphragm X, and lever Y, or their respective equivalents, constructed and arranged to operate substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of June, 1870.

THEODORE G. SPRINGER.

Witnesses:

WM. MCC. JONES,

WM. DE LACY.