

Fig. 1

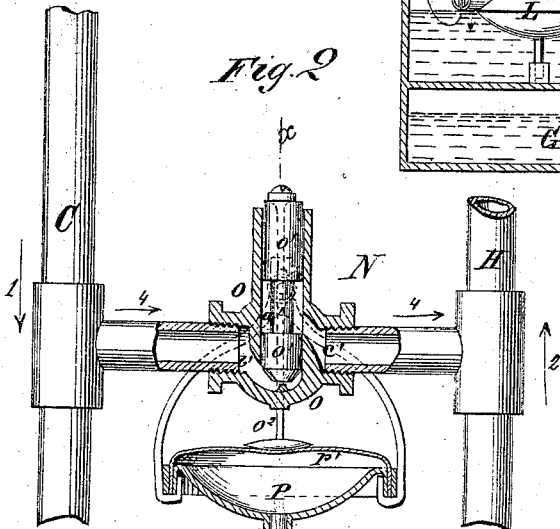


Fig. 2

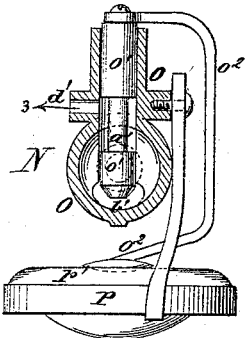


Fig. 3

Witnesses:
 John C. Young
 Harold Hewitt

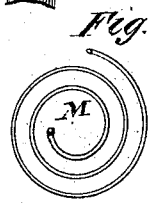


Fig. 4

Inventor:
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UNITED STATES PATENT OFFICE.

FRANK W. OFELDT, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF
AND CHANDLER C. COATS, OF SAME PLACE.

IMPROVEMENT IN AUTOMATIC HEAT-REGULATORS FOR GAS-MACHINES.

Specification forming part of Letters Patent No. **184,049**, dated November 7, 1876; application filed
September 22, 1876.

To all whom it may concern:

Be it known that I, FRANK W. OFELDT, of the city of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Automatic Heat-Regulator for Gas-Machines, which invention is fully set forth in the following specification, reference being had to the accompanying drawing.

The object of this invention is to regulate automatically the supply of heat in machines or apparatus generating gas, by the vaporization of volatile hydrocarbons, in such a manner as to increase and decrease the vaporization exactly in proportion to the larger or less number of burners to be used at a time; and it consists in a regulating-valve operated by a diaphragm, and so constructed and connected with the inlet and outlet pipes for the heating fluid to and from the generator, and with a float or other hollow vessel receiving its temperature from the generator, that the expansion and contraction of a volume of air, hermetically inclosed in the said float and in the pipe connecting it with the said valve, will operate the said valve by the movements of the said diaphragm.

The accompanying drawing represents my invention as applied to the gas-machine patented by me May 4, 1875. (Letters Patent No. 162,848.)

Figure 1 is a sectional elevation of the gas-generator and the aerometer with their connections. Fig. 2 is a vertical section of the regulator. Fig. 3 is a cross-section of the same through the line *x x* of Fig. 2. Fig. 4 is a detail of the pipe connecting the float with the regulator.

A is the aerometer; B, the steam-injector, operated by the aerometer, as described in my former patent. C is the inlet-pipe for steam and air to the air-heater D in the generating-tank E. F is the continuation of the pipe C from the heater D to the condenser G. H is the outlet or return pipe from the generator to the aerometer. I is the return-pipe for heated and dried air from the aerometer to the generator E, and through the heater D to the surface of gasoline in the tank. J is a gas-supply pipe to the burners. K is the oil-supply pipe to the generator. L is the float regulat-

ing the said oil-supply. The construction and operation of all the parts above enumerated by letters are fully described in my previous patent. M is a small pipe connecting the float L with the regulator. The portion of the pipe M in the generator, and nearest the connection with the float L, is bent in a spiral shape, as shown in Fig. 4, in order to give sufficient flexibility to allow of the slight movements of the float necessary for regulating the oil-supply. N is the heat-regulating valve. It is attached, at any suitable point, to connect the pipes C and H. The regulator N consists of a three-way cock or valve-chest, O, with its valve proper *o*¹, and a diaphragm-chamber, P, with its diaphragm *p*¹, connected to the upper end of the pipe M, and also to the valve-chest *o*, so as to occupy the position shown in the drawing. A stem or arm, *o*², secured to the upper end of the valve proper *o*¹, extends downward to the chamber P, and terminates with a plate or disk resting on the diaphragm *p*¹, so that the valve proper *o*¹ may rise and fall with the movements of the diaphragm. The valve proper *o*¹ is cylindrical, fitting tight to slide up and down in a cylindrical bore in the valve-chest, except a portion which is turned down so as to leave a space and form a port, *a*¹. The valve has two functions to perform, viz: opening and closing the connections, first, between the pipes C and H; and, secondly, between the pipe H and the atmosphere. *b*¹ *c*¹ *d*¹ are the ways or ports.

The operation is as follows: In starting the machine, a large number of burners being lighted simultaneously, it is necessary to work the aerometer fast, in order to oftener trip the injector-valve, and thus supply more steam and heat for rapid vaporization of gasoline. The valve *o*¹ then occupies its lowest position, or that shown in the drawing, closing the connection between the ports *b*¹ and *c*¹, and opening that between *c*¹ and *d*¹, to the atmosphere. Steam and air enter the heater D in the generating-tank E, through the pipe C, in direction of arrow 1. The steam gives off its latent heat to the gasoline, and passes condensed through the pipe F to the tank G below. The air continues its course, through the return-pipe H, in direction of arrow 2, toward the aerom-

eter A. The connection between the ports c' and d' being open by means of the space a' in the valve o^1 , a portion of the air escapes through the port d' , as indicated by arrow 3, into the atmosphere, which causes the aerometer to descend faster and trip the injector-valve, thus more rapidly repeating the supply of steam to heat the gasoline. As the heat increases, the air in the float L, pipe M, and diaphragm-chamber P expands, and the diaphragm p' raises the valve o^1 until it closes the port c' and stops the exit of air through the port d' , which causes the whole amount of air in pipe H to pass into the aerometer, causing the same to work slower, and thence through the pipe I to the surface of the gasoline, as usual, to be carbureted. Should, however, the temperature become too high, vaporizing too large a proportion of gasoline, and thus making the gas smoky, the diaphragm will expand until it raises the valve o^1 clear above the port c' , closing the exit d' , and opening the connection between the ports b' and

c' . The steam-heated air will then take the shortest route in direction of arrows 4, from the pipe C, through the ports $b' c'$, the pipe H, and aerometer A and pipe I, to the gasoline without ever entering and storing its heat into the heater D.

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

For the purpose of regulating the heat-supply, for the vaporization of a hydrocarbon liquid automatically by the temperature of said liquid, the regulator N, actuated by the expansion of a column of air (or other fluid) heated by the temperature of said hydrocarbon liquid, in combination with the inlet and outlet pipes C H, and the vessel L in the generator E, substantially as specified.

FRANK. W. OFELDT.

Witnesses:

JOHN C. YOUNG,
HORACE HARRIS.