W. PIERCE.

Thermostat for Carbureters.

No. 211,306. Patented Jan. 14, 1879.

Fig. 1.

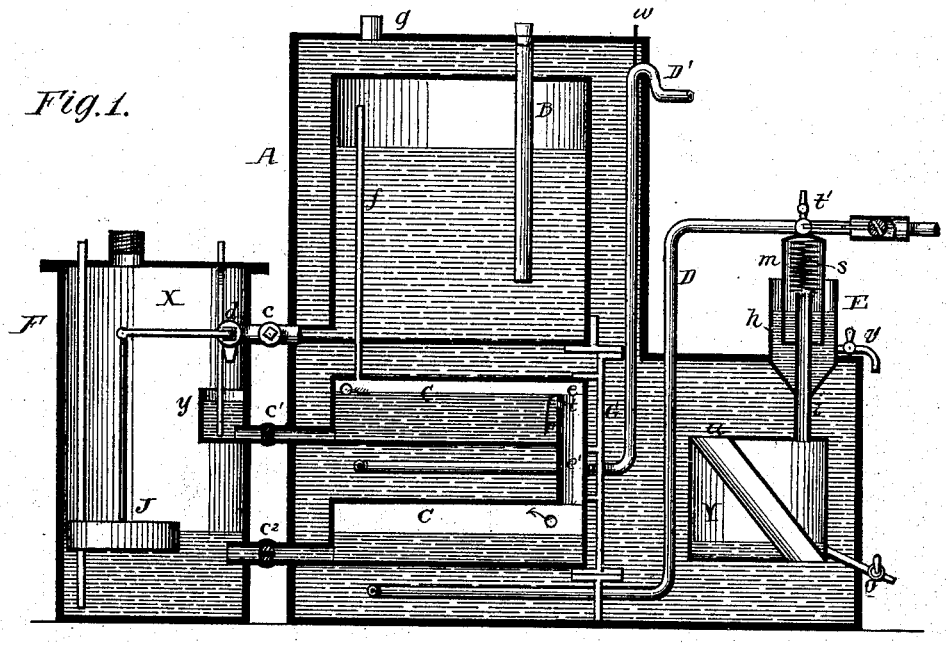
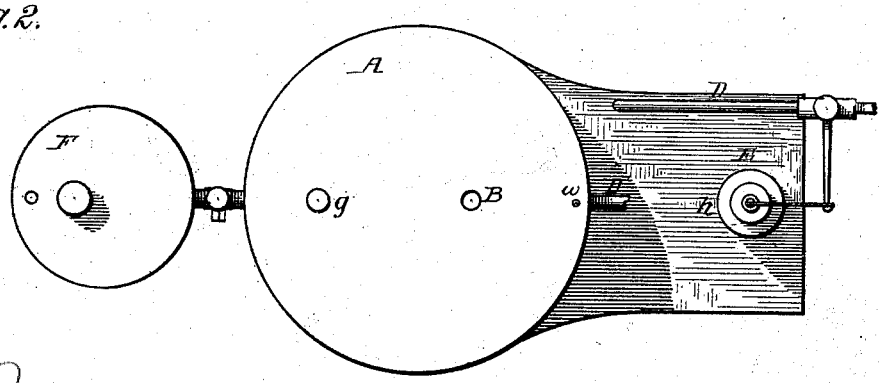


Fig. 2.



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WILLIAM PIERCE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN THERMOSTATS FOR CARBURETERS.

Specification forming part of Letters Patent No. **211,306**, dated January 14, 1879; application filed December 13, 1878.

To all whom it may concern:

Be it known that I, WILLIAM PIERCE, of Boston, Suffolk county, Massachusetts, have invented Improvements in Carbureters, of which the following is a specification:

The object of my invention is to maintain a uniform temperature within a carbureter, notwithstanding the tendency from the evaporation of the hydrocarbon to lower the temperature and cause frequent variations of the degree of heat within the casing, and to effect this purpose in such a manner that a leak at any portion of the apparatus shall either be inoperative or shall cut off the introduction or passage of hot water or steam, and prevent absolutely the further heating of the contents.

The further object is to improve the construction and operation of the apparatus.

In the drawing forming part of this specification, Figure 1 is a sectional elevation, showing the parts as arranged when the heat is cut off, and Fig. 2 a plan view of the apparatus.

The apparatus consists of a casing, A, reservoir B, one or more evaporating-pans, C, arranged to be surrounded by water, heater or hot-water pipe D, thermostat E, and with these may be combined a feed device, F, operating automatically to supply and maintain the level of the hydrocarbon in the pans C.

These devices may all be arranged within one casing or in separate cases properly connected, the form and arrangement being immaterial, except as is necessary for the hereinafter-described operations.

The reservoir and pans are suitably supported within the casing, and branches c c^1 c^2, provided with cocks, extend from the reservoir and pans into the chamber X of the regulator F, in which there is a float, J, for operating the valve d of the inlet-pipe c.

Within the chamber at one side is a receptacle, y, the edge of which is level with the fluid-line in the upper pan C. A flange, e, forms part of a tube, e', by which the upper pan communicates with that below. The flange e has an opening, t, communicating with a tube or passage, p, extending nearly to the bottom of the pan, so that when an excess of fluid is in the latter it will run up the passage p, through an opening, t, into the tube e', thus discharging the heavy oil from the bottom of the pan.

The float J is adjustable to close the valve d when the fluid in the lower pan is at the proper height. When the fluid sinks in this pan the valve d is opened, and a supply flows into the receptacle y to the level of the opening t in the upper pan, and then overflows, carrying the heavy oil from the bottom into the lower pan and chamber, X, until the proper level is attained, when the valve is closed by the float.

An equalizing-tube, f, prevents the suspension of the fluid. The casing is filled with water through an inlet, g, which water is heated by the steam-pipe D, or the hot water is admitted through the latter and carried off through the pipe D′.

The necessity of maintaining the water at an ordinary temperature (usually 60°) results, as is well known, from the absorption of heat by the evaporation of the hydrocarbon.

It is most important to prevent any undue increase of the heat, as well as maintain a uniform temperature, inasmuch as an excessive temperature would volatilize the fluid with rapidity and fill the pipes with its condensation and produce other effects accompanied by injurious or dangerous results. In order to obviate this difficulty thermostats have been combined with carbureters heretofore; but the construction of the apparatus has been such that a leak was apt to have the same effect as the reduction of temperature, increasing the heat and unduly vaporizing the fluid.

In my improved apparatus the thermostat E may be constructed in any suitable manner, but is shown as consisting of a vessel, h, containing mercury, into which extends a tube, i, communicating with an air-chamber, Y, an inverted cup, m, extending into said vessel, and a spring, s, arranged to lift the cup, which is suitably connected to or arranged to operate the valve or cock which regulates the transmission of hot water or steam to the carbureter.

When the air in the chamber Y is contracted by the reduction in temperature of the surrounding body of water there is a partial vacuum, and the atmospheric pressure forces

downward the cup *m* against the action of the spring, thereby opening the valve and admitting steam or hot water to the casing. When the air in the chamber is expanded by the heating of the surrounding body of water the atmospheric pressure will be overcome or neutralized, and the pressure within the chamber Y will act auxiliary to the spring *s* to elevate the cap and close the valve.

Should a leak occur in the cup *m*, or in the walls of the chamber Y, water or air would be admitted beneath the cup, thereby increasing the pressure in the chamber Y, which co-operates with the spring to raise the cup and close the valve, cutting off the access of heat to the casing or pipe D, so that any leak in the latter would not then, as heretofore, increase the flow of steam or hot water. The same result would occur if the mercury escape through a leak or is thrown out. Should the water escape from a leak in the body of the machine, no increase in the temperature would result.

It will thus be seen that in the cases mentioned the heat-regulating apparatus invariably operates as a safety appliance to shut off the heat from the carbureter, this result being effected by combining with the thermostat, operated by the expansion and contraction of the air, a spring-weight or other equivalent device, which will operate auxiliary to the thermostat to automatically cut off the passage of hot water or other fluid to the casing the instant that the air in the chamber is brought into communication with the external atmosphere or is rarefied to an undue extent. To effect the adjustment of the cup in the first instance, it is provided at the top with the tube and valve-cock *t'*, or a cock, *v*, may be used to withdraw the mercury until the desired adjustment is made, after which it is passed back into the cup E.

To prevent injury from excessive internal pressure and siphoning, a tube, *w*, is arranged to communicate with the bend in the pipe D', as shown, affording relief if the pressure increases, and admitting air to the pipe. To recover the mercury, should any be thrown into the tube *i*, the case Y is provided with a discharge-pipe, *o*, closed by a cock.

It will be noted that the cup *m* prevents the spring *s* from injury and from being tampered with.

The air-chamber Y may be formed within the casing. I prefer, however, to employ a separate case, Y, within an inclined central tube, *u*, affording additional surface and facilitating the transmission of heat to the air, and a little water may be placed in the case, so as to form a vapor and afford a better conductor of heat than results when dry air alone is in the case.

It will be apparent that the thermostat may be constructed for use with carbureters of various descriptions, either as part thereof or as an attachment.

I claim—

1. A thermostat arranged to operate auxiliary to a self-closing heat-cut-off valve, substantially as described.

2. The combination, with a carbureter, of a thermostat provided with a spring, *s*, or its equivalent, arranged to close the inlet-valve when the pressure within the air-chamber is increased, substantially as set forth.

3. The combination, with the cup *m* of a thermostat, of a spring, *s*, arranged within the cup, to elevate the cup when the pressure beneath the same is increased or equalized with that of external air, substantially as set forth.

4. The combination, with the tube *i*, of a casing, Y, having an inclined tube, substantially as and for the purpose described.

5. The combination, with the mercury-vessel *h* and cup *m*, of the cock *v*, as and for the purpose set forth.

6. The combination, with the casing Y, of the outlet *o*, as and for the purpose set forth.

7. The mode of increasing the sensitiveness of the thermostat by the introduction of water to the air-chamber Y, as set forth.

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

WILLIAM PIERCE.

Witnesses:
T. W. FREDERICKSON,
C. W. HASTINGS.