

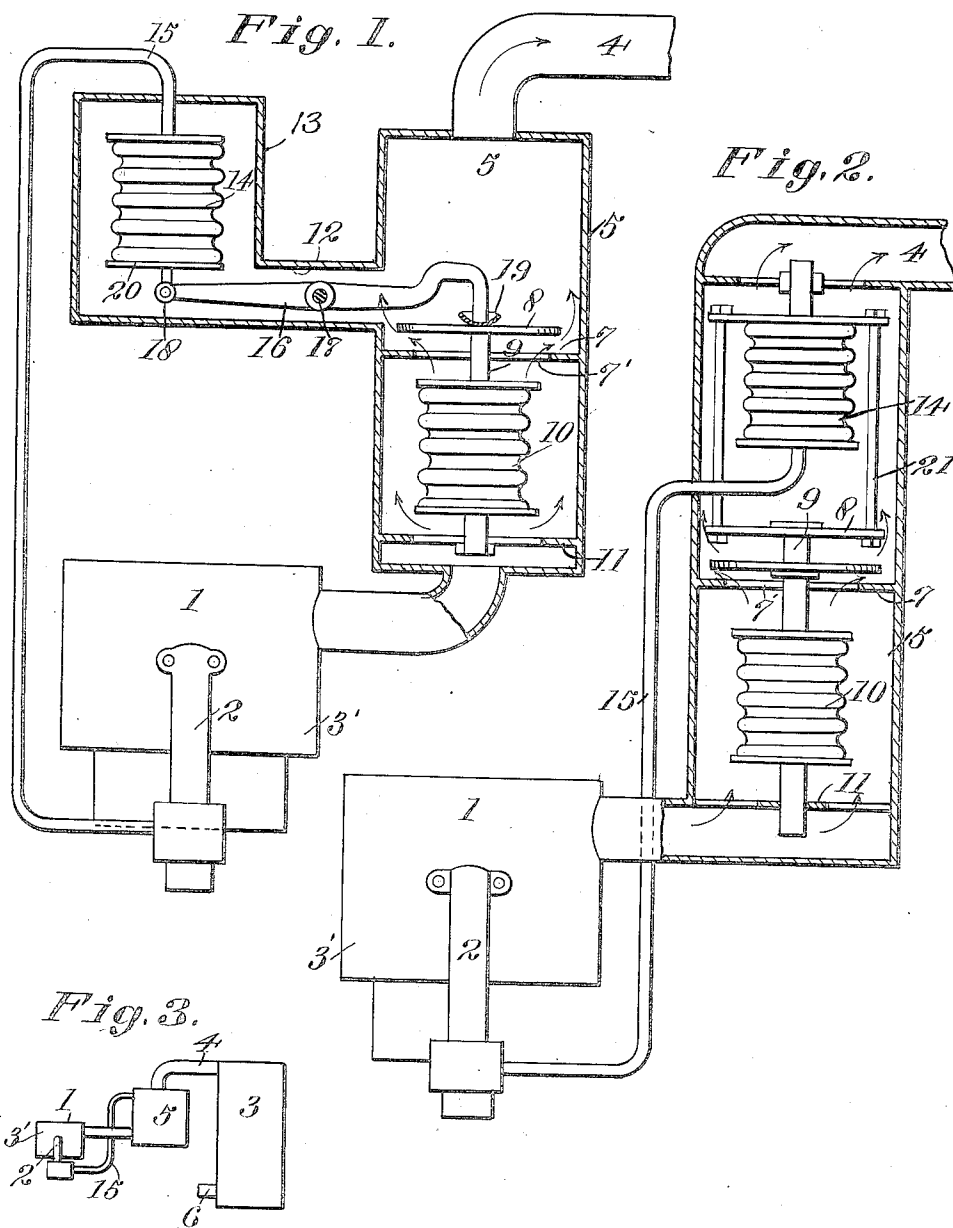
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MOTOR TEMPERATURE CONTROLLING MEANS

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UNITED STATES PATENT OFFICE

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MOTOR-TEMPERATURE-CONTROLLING MEANS

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The present invention relates to motor temperature controlling means of the type set forth in the United States Letters Patent 1,393,902 and 1,442,966 granted respectively 5 October 18th, 1921, and January 23rd, 1923, jointly to myself and Jacob B. Struble.

The principal objects of this invention are to provide a simple, efficient, and cheaply constructed mechanism actuated by the temperature of an internal combustion motor cooling element, and also by the pressure in the inlet manifold whereby the temperature of the motor is automatically varied inversely with the power output thereof; to arrange the various parts in a simple, compact form whereby when the motor is operating under a light load, the temperature of the cylinder is relatively high due to the low pressure in the inlet manifold, and when operating under a heavy load the cylinder is at a comparatively lower temperature due to the increasing pressure in the inlet manifold; to provide diaphragm members or collapsible chamber units preferably of a modern type of the conventional expansion member form purchasable on the open market directly connected together, and which between them operate valve means for controlling the temperature of a cooling element.

With the above mentioned and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings forming a part of the present application:

Fig. 1 is a view in elevation with parts in section disclosing one embodiment of my invention arranged in its preferred manner.

Fig. 2 is a view similar to Fig. 1 with the parts arranged in a slightly different manner, and

Fig. 3 is a view of the invention illustrating

the connection with the circulating cooling system.

Referring to the drawings wherein like characters of reference designate corresponding parts, 1 indicates the cylinder of an internal combustion engine with which is connected an inlet manifold 2 extending from a carburetor, not shown. 3 illustrates a conventional radiator connected with the jacket 3' of the cylinder 1 through a circulating duct 4, in which is interposed a hollow chamber 5. The circulating cooling system is adapted to contain a cooling element such as water and the return from the radiator 3 to the cylinder jacket 3' is made through the pipe or duct 6 extending from the base of the radiator 3. In the structure illustrated in Fig. 1, the chamber 5 is provided with a transversely disposed wall 7, ported at 7', the passage of the cooling element through the port 7' of the wall 7 being controlled by a suitable valve 8 carried by a stem 9 extending axially through the wall port. The stem extends from one end of a suitable thermostatic cylindrical member or diaphragm 10, illustrated in the form of the conventionally known expansion member, which is purchasable on the open market. The lower end of the member 10 is anchored to a cross member 11 in the base of the chamber 5. The chamber 5 has a lateral extension 12, which terminates in a secondary chamber 13 in which is mounted a second expansion member 14, the interior of which is closed and communicates with a suction pipe 15 extending to and connecting with the inlet manifold 2. The suction pipe 15, or other means not shown, affords an anchor for one end of the expansion member 14. A lever 16 fulcrumed at 17 in the lateral extension 12 is pivotally associated at its opposite ends as at 18 and 19, with the bottom plate 20 of the suction operated expansion member 14 and with the upper end of the stem 9 of the valve 8. The arrangements of the lever connection 16 is such that the creation of low pressure within the expansion member 14 when the motor is operating under a light load, will tend to collapse the expansion member 10.

The same elements as employed in the disclosure in Fig. 1 are disclosed in Fig. 2 in a slightly different arrangement, the lever 16 being omitted from the latter construction, and the expansion members 10 and 14 being directly connected by operating rods 21 which serve the same purpose and act in the same manner as does the lever 16. In the disclosure in Fig. 2 the expansion members 10 and 14 are arranged in alignment in a single chamber, with the valve for controlling the flow of the cooling element there-through interposed between the same.

With the parts assembled as in the drawings, the structure operates in the following manner:—

With the motor operating under a light load, a comparatively low pressure is created in the expansion member 14 which acts against the expanding tendency of the thermostatic expansion member 10 and consequently maintains the valve 8 in a relatively closed position to retard the circulating action of the cooling element in the system. The retardation of the circulation of the cooling element causes the creation of a relatively high temperature in the cylinder jacket maintaining the cylinder temperature such that the exploding charge within the cylinder loses a minimum number of heat units through the cooling element. As the pressure in the expansion member 14 increases, due to an increase in load on the motor, the action of the expanding or lengthening of the expansion member 14 on the temperature operated expansion member 10 is correspondingly reduced, enabling the temperature of the cooling element to expand the expansion member 10, open the valve 8, enabling a freer flow of the cooling element through the circulating system, thus providing a high temperature of the cooling element when the motor is operating under a light load, and a lower temperature in proportion to an increase in load on the motor; thus by the present invention the cooling effect of the cooling element is varied in accordance with a variation in the power output of the motor, and varies the temperature of the motor inversely with a variation in the power output thereof.

While the disclosed embodiment of the invention illustrates and describes diaphragm members preferably of the collapsible bellows type, sets forth the heat absorbing structure as including a radiator through which liquid circulates, it is to be understood that any suitable type of collapsible unit either bellows, diaphragm, or piston and cylinder, may be employed, also that the apparatus is equally as well adapted for use in connection with air cooled motors.

I claim:—

1. In combination with an internal combustion motor provided with an element for

cooling the cylinder thereof and an inlet manifold, a means for controlling the cooling effect of the cooling element, a diaphragm operated by a variation of pressure in the inlet manifold, a diaphragm operated by a variation of the temperature of the cooling element, a member connecting the two diaphragms together and with said means, whereby the operation of said diaphragms actuates the means to vary the cooling effect of the cooling element to vary the temperature of the cylinder inversely with a variation in the power output thereof.

2. In combination with an internal combustion motor, a circulating system containing an element for cooling the cylinder thereof, an inlet manifold, a valve associated with the circulating system for controlling the cooling effect of the cooling element, a diaphragm operated by a variation of pressure in the inlet manifold, a thermostatic element in the circulating system operated by a variation of the temperature of the cooling element therein, a member connecting the diaphragm and thermostat together and with the valve, whereby the operation of the diaphragm and thermostat actuate the valve to vary the cooling effect of the cooling element to vary the temperature of the cylinder inversely with a variation in the power output thereof.

3. In combination with an internal combustion motor provided with a circulating system containing an element for cooling the cylinder, an inlet manifold, a chamber in the circulating system, a valve in the chamber controlling the passage of the cooling element through the system, a diaphragm in the chamber operated by a variation of pressure within the inlet manifold, a thermostat in the chamber operated by a variation of the temperature of the cooling element, a member connecting the diaphragm and thermostat together and positioned within the chamber, said member connecting the diaphragm and thermostat with the valve whereby the operation of the diaphragm and thermostat actuate the valve to vary the cooling effect of the cooling element in accordance with a variation in the power output of the engine cylinder to vary the temperature of the cylinder inversely with a variation in the power output thereof.

4. In combination with an internal combustion motor provided with a circulating system containing an element for cooling the cylinder, an inlet manifold, a chamber in the circulating system and through which the cooling element passes, a valve in the chamber controlling the passage of the cooling element therethrough and through the system, a diaphragm in the chamber operated by a variation of pressure in the inlet manifold, a tubular connection between the diaphragm and the inlet manifold, a thermostat in the cham-

ber exposed to the cooling element passing therethrough and operated by a variation of the temperature of the cooling element, a lever within the chamber connecting the diaphragm and thermostat together, said lever connecting the diaphragm and thermostat with the valve whereby the operation of the diaphragm and thermostat actuate the valve to vary the cooling effect of the cooling element in accordance with a variation in the power output of the engine cylinder to vary the temperature of the cylinder inversely with a variation in the power output thereof.

5. In combination with an internal combustion motor provided with fluid for cooling the cylinder thereof and an inlet manifold, means for varying the flow of the cooling fluid, pressure responsive means operated by a variation of pressure in the inlet manifold, temperature responsive means operated by a variation of temperature of the cooling fluid, means interconnecting the two immediately preceding means and the means for varying the flow of the cooling fluid, whereby the operation of the pressure responsive means and the temperature responsive means actuates the means for varying the flow of cooling fluid to vary the temperature of the cylinder inversely as the power output thereof.

In testimony whereof I have signed my name to this specification.

STANLEY H. PAGE.

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