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R. F. SMITH

2,059,916

WATER AND TEMPERATURE REGULATOR FOR MOTORS

Filed July 1, 1935

2 Sheets-Sheet 1

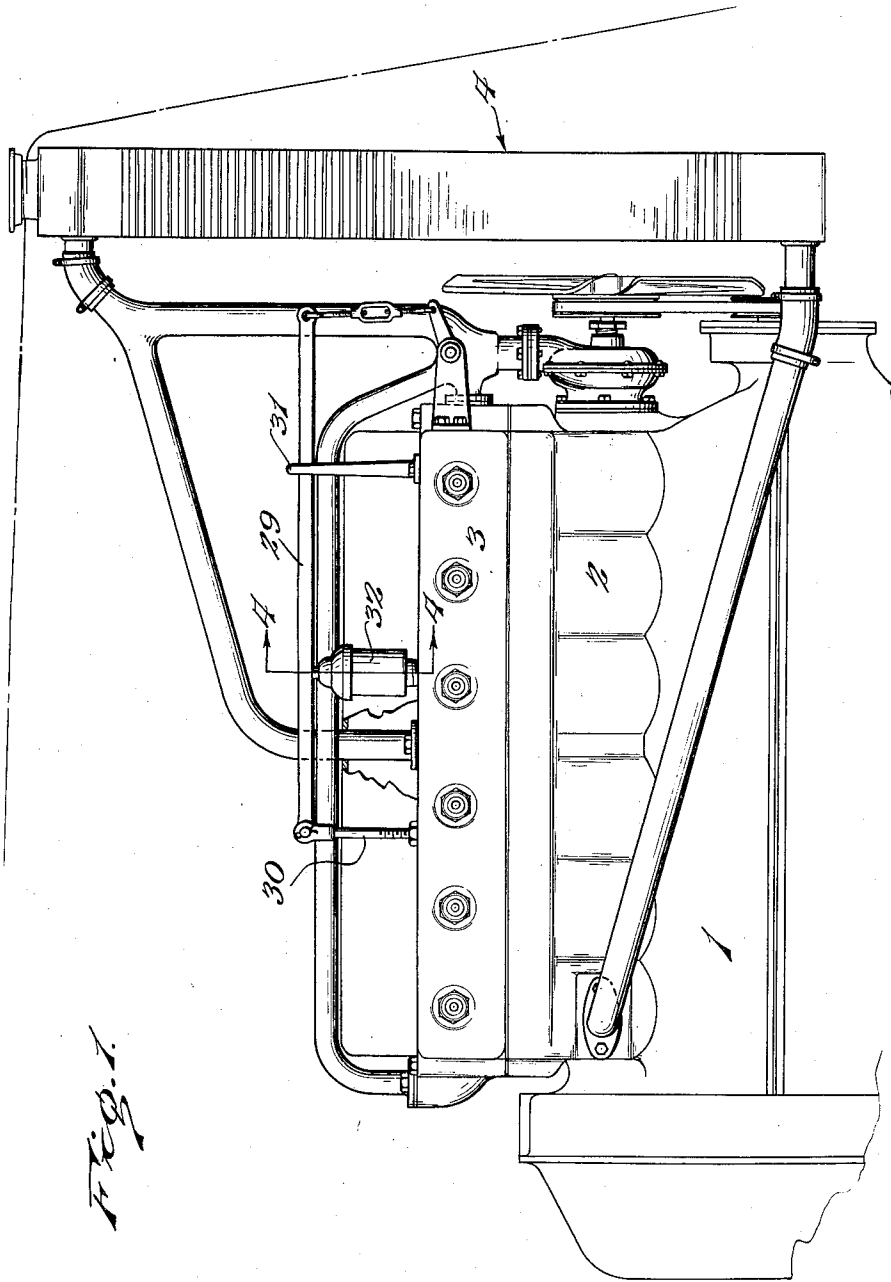


Fig. 1

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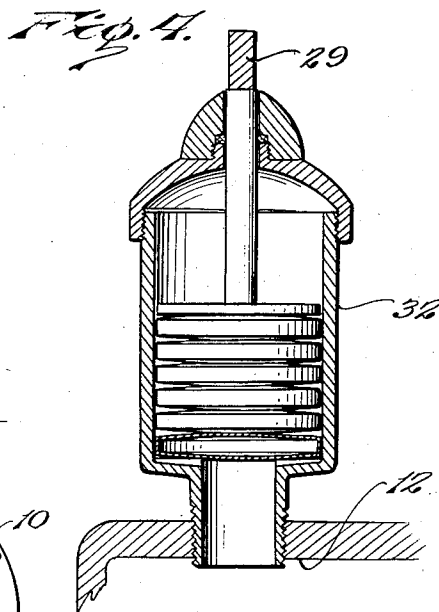
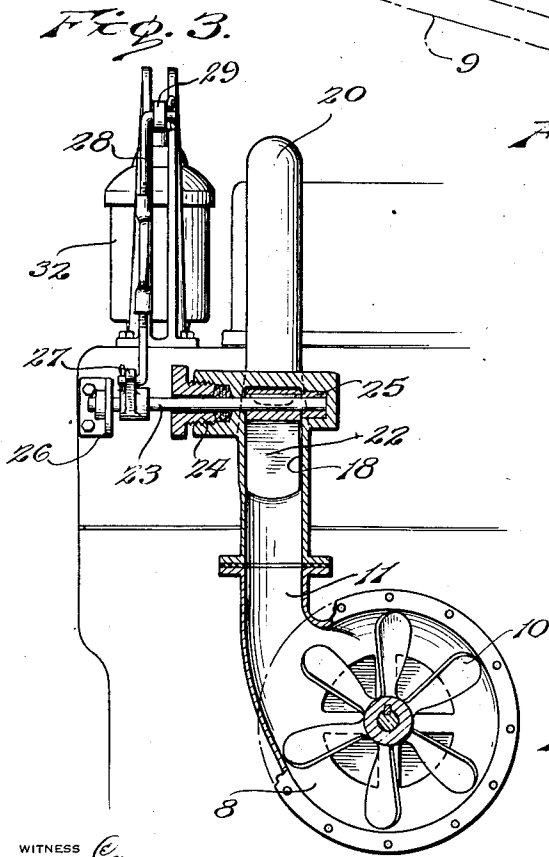
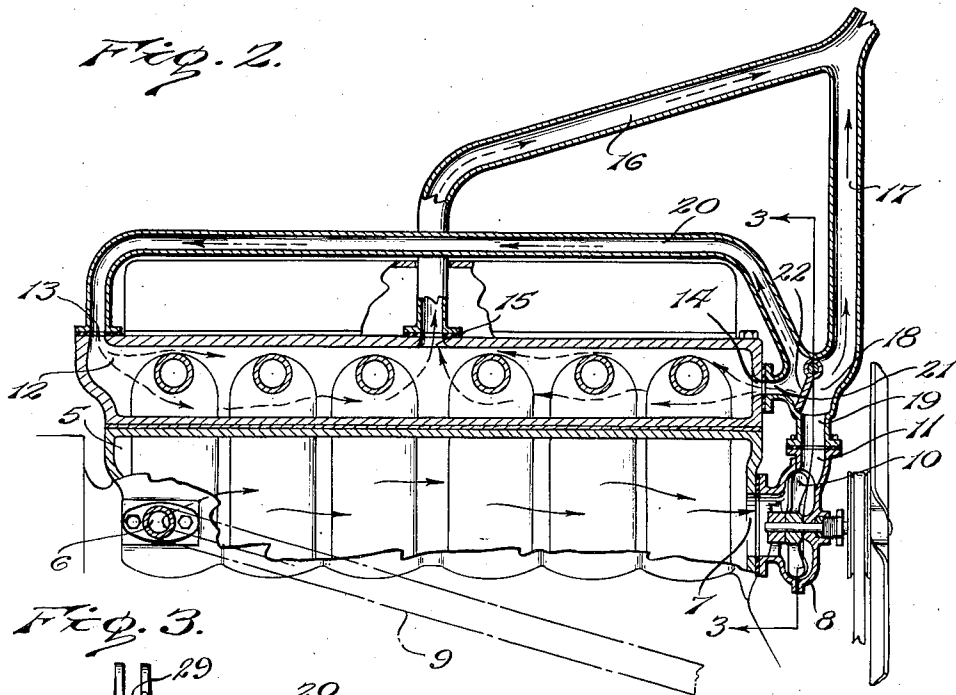
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WATER AND TEMPERATURE REGULATOR FOR MOTORS

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WATER AND TEMPERATURE REGULATOR FOR MOTORS

Robert Fulton Smith, Manheim, Pa.

Application July 1, 1935, Serial No. 29,407

3 Claims. (Cl. 123—178)

This invention relates to a liquid cooling system for an internal combustion engine wherein the engine has a novel arrangement of liquid cooling jackets, one directing cooling liquid about the lower portions of the cylinders and the other directing cooling liquid about the firing chambers located in the head of the engine with means for automatically controlling the cooling liquid to the jacket of the head of the engine in accordance with the temperatures of the engine so that a cold or cooled engine while running may rapidly raise and maintain a desired temperature which assures operation of the engine at its highest degree of efficiency.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a fragmentary side elevation illustrating an internal combustion engine equipped with a cooling system constructed in accordance with my invention.

Figure 2 is a fragmentary vertical sectional view illustrating the same.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Referring in detail to the drawings, the numeral 1 indicates a fragmentary portion of an internal combustion engine including a cylinder block 2 and a head 3. Also associated with the engine is a radiator 4 forming part of the cooling system. The cylinder block is shown as having multiple cylinders and is provided with a liquid cooling jacket 5 having an inlet 6 adjacent its rear end and an outlet 7 at its front end. A pump housing 8 is connected with the outlet 7 and a feed pipe 9 is connected with the inlet 6. The feed pipe leads to the bottom of the radiator 4 for conveying liquid from the radiator to the jacket 5. A conventional type of pump 10 is shown in the housing and acts to draw liquid from the radiator through the jacket 5 and to expel said liquid from the pump housing by way of an outlet 11. The head 3 has the firing chambers of the cylinders located therein and is provided with a liquid cooling jacket 12 non-communicative with the jacket 5. The jacket 12 is provided at opposite ends thereof with inlets 13 and 14. The jacket 12 is also provided with

an outlet 15 intermediate the ends of the head. Connected to the outlet 15 is a pipe 16 leading to the top of the radiator and communicative with the pipe 16 adjacent to the top of the radiator is a pipe 17 terminating into a valve chamber 18. The intake of the valve chamber 18 is shown at 19, and connects with the outlet 11 of the pump. A pipe 20 communicates with the valve chamber and with the inlet 13 of the head 3. A pipe 21 connects with the valve chamber adjacent to the pipe 20 and also is connected to the inlet 14 of the head 3. Operating in the valve chamber is a valve 22, which when in one position is adapted to direct liquid through the valve chamber of the pump to the pipe 17 and when in a second position is adapted to direct liquid from the pump through the pipes 20 and 21. The valve 22 is of the gate type having a shaft 23 journaled in bearings of the valve chamber, one of which is in the form of a stuffing gland, as shown at 24, and the other in the form of a bearing sleeve, as shown at 25. The outer end of the shaft 23 is rotatably supported by a bracket 26 secured to the engine and secured to the shaft 23 is an arm 27 to which is pivoted an adjustable link 28. The other end of the link is pivotally connected to one end of a lever 29, the other end of said lever being pivoted to a post 30 secured to the head of the engine. The lever operates in a guide 31 mounted to the engine. Arranged adjacent the pivoted end of the lever 29 is a thermostat 32 of any conventional construction wherein the operating member thereof contacts with the under face of the lever. The thermostat is suitably mounted to the engine and is in communication with the jacket 12 so that the temperature of the liquid therein effects the operation of the thermostat.

In operation, the thermostat is arranged so that cooling liquid is shut off to the jacket of the head when the temperature of the engine is below a predetermined degree and the pump returns the liquid to the radiator from the jacket 5 by way of the pipe 17. However, when the temperature of the engine rises above the predetermined degree, the thermostat actuates the valve to close the pipe 17 to the pump and opens the pipes 20 and 21 to the pump so that the liquid is driven by the pump through the jacket 12 and to the radiator by way of the pipe 16.

A device of the character described is very desirable on internal combustion engines of automobiles as it permits an engine of an automobile to readily warm up after becoming cold from standing for a period of time and also in ex-

trremely cold weather the thermostat during the operation or running of the engine will permit the temperature of the engine to remain near the selected or predetermined degree of temperature, all of which provides for a more efficient and economical operation of the engine. Further, it is to be noted that the arrangement of the jackets and their connections to the cooling system is such that all of the cylinders will be cooled approximately the same, this also applying to the firing chambers of the engine.

Having described the invention, I claim:

1. In an engine having a cylinder block and a head provided with liquid cooling jackets and a liquid cooling radiator, means connecting the outlet of the radiator to the jacket of the cylinder block, means connecting the inlet of the radiator to the jacket of the head, and a thermostatically controlled valve connected to the jacket of the cylinder block and to the jacket of the head and to the inlet of the radiator whereby liquid from the jacket of the cylinder block may be circulated from the latter to the radiator or through the jacket of the head to the radiator.

2. In an engine having a cylinder block and a head provided with liquid cooling jackets and a liquid cooling radiator, means connecting the outlet of the radiator to the jacket of the cylinder

block, means connecting the inlet of the radiator to the jacket of the head, a pump driven by the engine and connected to the jacket of the cylinder block to receive liquid therefrom, a valve chamber connected to the pump and connected to the inlet of the radiator and to the jacket of the head, and a valve operating in said chamber for directing liquid from the pump to the radiator or to the jacket of the head and thence to the radiator.

3. In an engine having a cylinder block and a head provided with liquid cooling jackets and a liquid cooling radiator, means connecting the outlet of the radiator to the jacket of the cylinder block, means connecting the inlet of the radiator to the jacket of the head, a pump driven by the engine and connected to the jacket of the cylinder block to receive liquid therefrom, a valve chamber connected to the pump and connected to the inlet of the radiator and to the jacket of the head, a valve operating in said chamber for directing liquid from the pump to the radiator or to the jacket of the head and thence to the radiator, and a thermostat connected to the valve and actuated by the temperature of the engine for effecting operation of the valve in accordance with the temperature variances of the engine.

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