

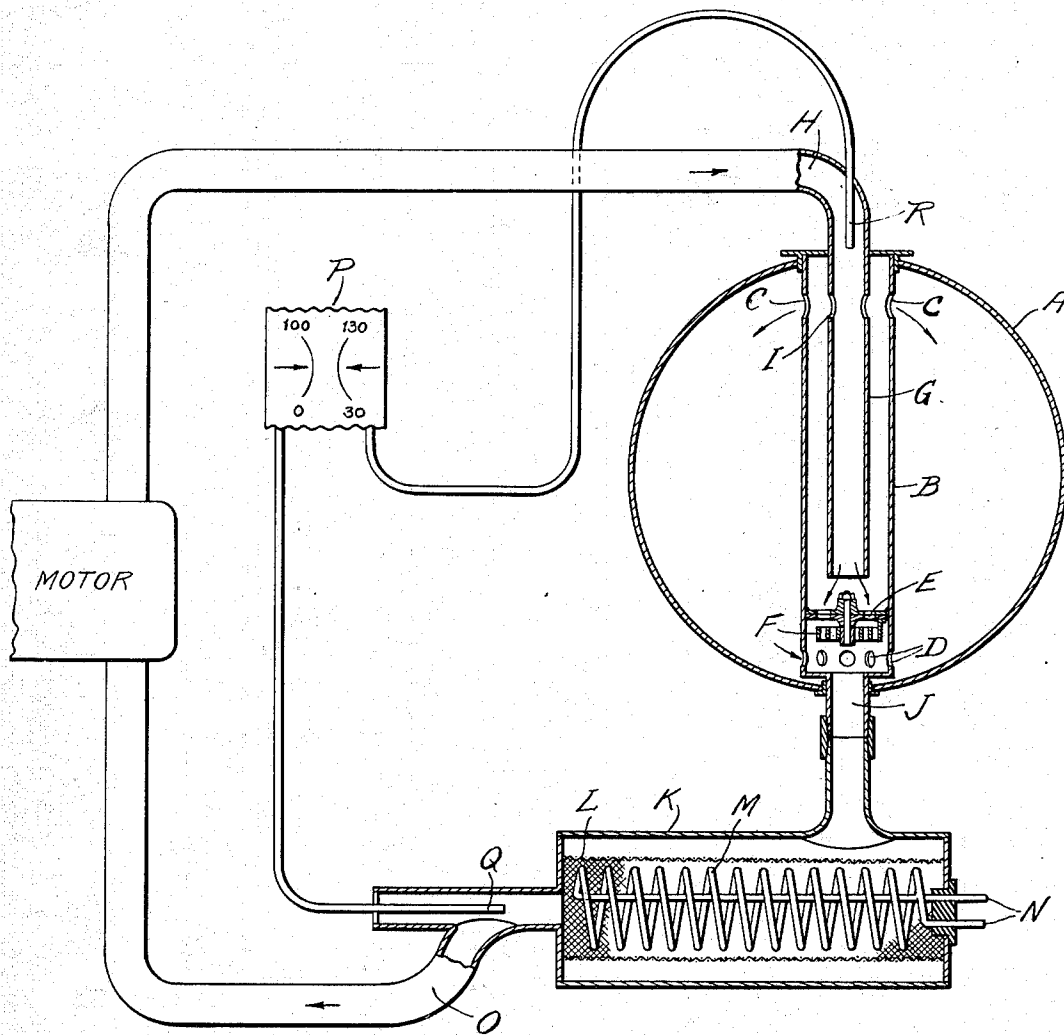
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AUTOMATIC OIL HEATER

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AUTOMATIC OIL HEATER

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The invention relates to means for rapidly heating the lubricating oil of internal combustion engines, and has particular application in the case of airplane engines.

The difficulties which are met with in starting internal combustion engines owing to the viscosity of the lubricating oil are well known, particularly when the lubricating oil is kept in a reservoir separate from the motor.

The remedies hitherto employed consist in heating the oil reservoir by some process (electricity, gas, etc.) and starting the motor when the temperature has been raised. These remedies have the drawback of requiring a rather long time to heat the mass of the oil, owing to the large number of heat units to be transmitted.

In the case of aircraft, it is necessary on the one hand to have a rapid starting, and on the other hand to ensure a constant temperature when at a high altitude or when descending. This condition is indispensable in order to permit a reliable starting of the motor.

According to the present invention it is proposed to heat a small quantity of oil just sufficient for starting the motor, passing said oil through the motor; and returning the hot oil from the motor to the oil reservoir where it is mixed with the mass of oil in the reservoir, thereby heating the same and rendering it more fluid. This procedure makes it possible to utilize the heat imparted to the initial small quantity of oil used for starting purposes for heating the larger body of oil in the reservoir.

By way of example, there is described below and with reference to the single figure of the annexed drawing, an installation of this nature in the case of an aeroplane engine.

A indicates the oil reservoir of the ordinary type, in which there is installed a system of internal circulation consisting of a tube B having at its upper part orifices C and, at its lower part, orifices D. Above these orifices is a throttle E controlled by a thermostat F (of the expanding or vapour tension type) permitting the opening and the closing of the tube at a particular temperature. The thermostat F may be of any suitable type, as for example the expanding metal type or the vapor tension type, and is here shown as of the expanding metal type well known in the art. In the interior of the tube B there is another tube G opening externally of the reservoir and placed in communication, at H, with the return oil of the motor. This tube G is provided with orifices I opposite the openings C of the tube B.

The outlet J of the reservoir A is placed in communication with a combined heater and filter comprising a casing K within which is located a filtering element L and an electric heating unit M, though it will be understood that other heating means may be employed, as for example, a heat exchange unit employing exhaust gases from the engine as the heating medium. The outlet O of the combined heater and filter communicates with the lubricating system of the engine while the pipe H serves to return heated oil from the engine. The control of the temperature is ensured by a double reading thermometer P the connections of which are located at Q and R respectively.

The operation is as follows:

Let θ^1 be the temperature for proper working. The thermostat F will control the throttle E between θ and θ^1 . On the starting of the motor, the temperature of the oil being below θ , the heater M is started, and the heat units given out thereby serve only to heat the oil going to the motor and not the total mass of oil contained in the reservoir. The oil flows from the reservoir at J, is heated in passing through the heating element M and flows towards the motor through O from which it returns to pass to the reservoir H. The temperature being below θ , the throttle E is completely open and the hot oil coming from the motor passes directly into the tube C to flow through the throttle E, being slightly charged with fresh oil through the holes D, to leave again at J and be heated afresh on the heating element.

When the temperature attains θ , indicated by the thermometer P, the heating is cut off and, at this moment the thermostat F operates progressively by closing the throttle E which will be completely closed when the temperature has reached θ^1 . During the time when the temperature varies from θ to θ^1 , by the progressive closing of the throttle E, the oil coming from the motor at H will diminish in quantity through the throttle E to increase through the orifices I and C, from where it flows to mix with the fresh oil. At this moment, the supply to the motor is ensured by the return oil flowing through the throttle E and by fresh oil flowing through the orifices D the delivery of which is equal to the delivery of the orifices I and C. As soon as the temperature θ^1 is attained, the throttle E closes completely, the return oil from the motor flows through the orifices I and C to mix with fresh oil. An oil supply to the motor is ensured by means of the orifices D which serve to place the

main reservoir A in free and constant communication with the outlet J leading to the heater and filter K and thence through pipe O to the motor.

When in flight with cold weather and at a low rate of the motor, the oil commences to cool between the temperatures θ^1 and θ , the device comes afresh into operation as has just been described.

I claim:

1. In a lubricating system for engines, a lubricating oil reservoir, a sleeve mounted therein having openings near the top and bottom thereof communicating with the interior of the reservoir, thermostatically controlled throttling means within the sleeve intermediate the upper and lower openings, an oil inlet tube leading from the engine and extending well into said sleeve for admitting return oil from the engine, said tube having an upper opening adjacent the upper opening of the sleeve, and having a lower opening adjacent said throttling means, and an

outlet from said sleeve communicating with the engine.

2. In a lubricating system for engines, a lubricating oil reservoir, separate from the engine, and an oil heater separate from the oil supply reservoir and having an outlet adapted to be connected with the engine inlet; said oil reservoir having a vertical sleeve therein provided with an outlet pipe connected directly with the inlet end of said heater, an oil inlet tube projecting a substantial distance into said sleeve having openings for admitting return oil from the engine thereinto, openings in said sleeve communicating with said reservoir above and below the mouth of said inlet tube, and a thermostatically controlled throttling means interposed between the mouth of said tube and the lower openings in said sleeve for controlling the path of the oil passing through the reservoir to the heater.

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