

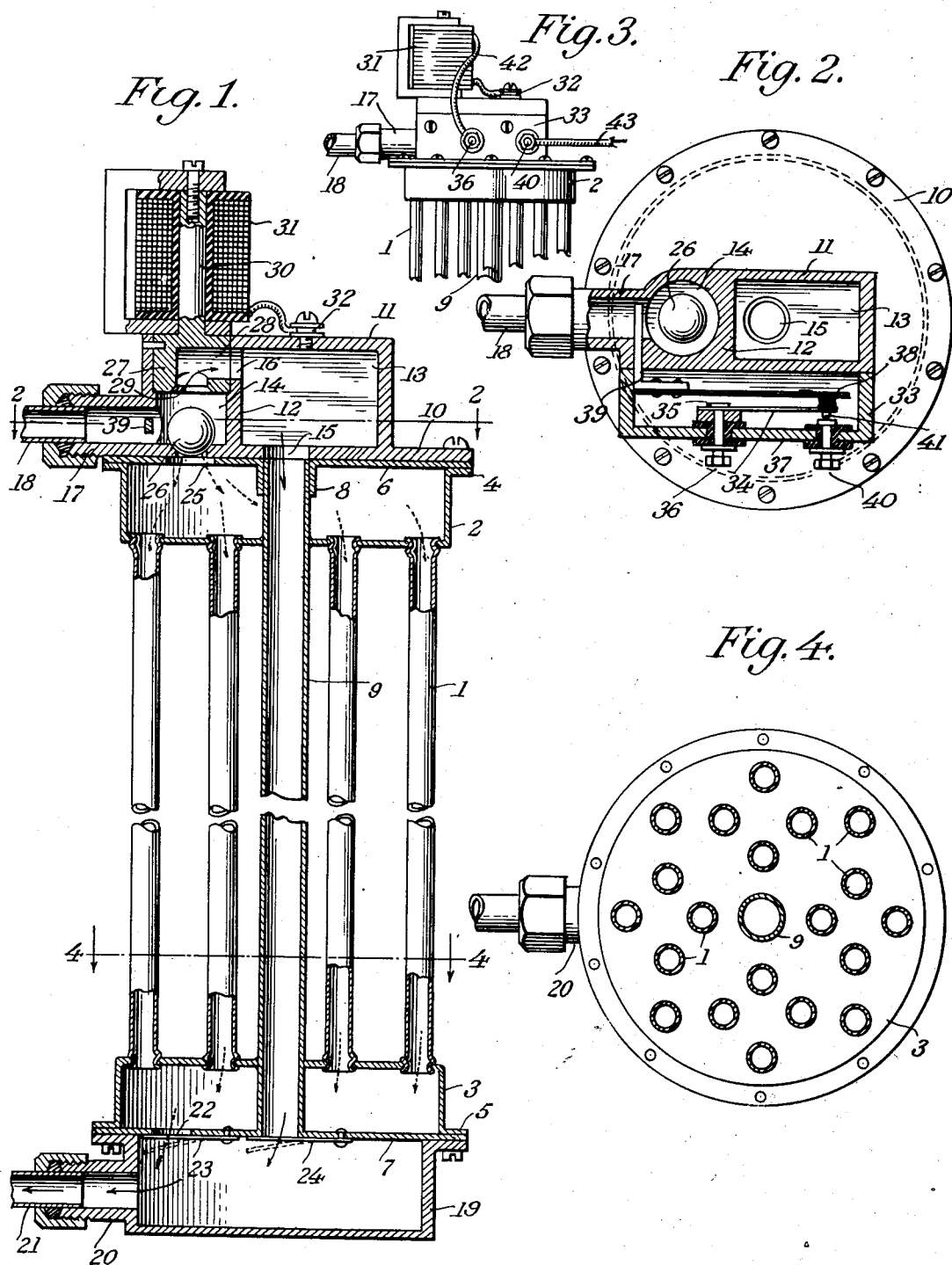
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LUBRICANT COOLING DEVICE

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LUBRICANT COOLING DEVICE

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2 Claims. (Cl. 257-2)

This invention relates to lubricant cooling devices, and its general object is to provide an electrical thermostatic device that is primarily designed for installation in the lubricating system of an internal combustion engine for the purpose of maintaining the oil at a low operating temperature, thus prolonging the lubricating qualities thereof, so as to allow the use of oil of light viscosity, in order to assure proper lubrication of the engine and easy starting thereof in cold weather, but without fear of the oil breaking down or thinning under the action of heat.

A further object is to provide a lubricant cooling device that is normally inactive and allows oil at a low temperature to pass directly there-through, but when the oil reaches a predetermined high temperature, the device is rendered active to divert the oil from its regular course, and directs the same for passage through cooling tubes, and when the temperature of the oil again becomes normal, it is diverted from the cooling tubes back to its regular course, thus it will be seen that my device is entirely automatic and is controlled solely by the temperature of the oil to retain the latter at a low temperature under all running conditions of the engine.

Another object is to provide a lubricant cooling device that can be installed in an easy and expeditious manner and preferably between the crank case and the outlet of the oil pump, and the device is simple in construction, inexpensive to manufacture, and extremely efficient in operation, use and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a vertical sectional view taken through the device which forms the subject matter of the present invention.

Figure 2 is a sectional view taken approximately on line 2-2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a detail fragmentary side elevation illustrating the electro-magnet for controlling the inlet valve.

Figure 4 is a sectional view taken approxi-

mately on line 4-4 of Figure 1, looking in the direction of the arrows.

Referring to the drawing in detail, and particularly to Figure 1, it will be noted that my device includes a plurality of vertically arranged cooling tubes 1 fixed at their ends in openings provided in the horizontal walls of flat cylindrical upper and lower receptacles 2 and 3 that provide inlet and outlet chambers for the tubes 1. Formed on the outer ends of the vertical walls of the receptacles are outwardly directed marginal flanges 4 and 5 and mounted on the flanges are closure plates 6 and 7, the upper plate 6 having formed on and depending from a central opening therein, a collar 8 which has the upper end of a direct flow tube 9 mounted therein. The tube 9 is of greater diameter than that of the cooling tubes and extends through the horizontal walls of the receptacle for disposal centrally of the group of cooling tubes, and the lower end of the tube 9 is fixed to the lower plate 7 about an opening centrally arranged therein, with the result it will be seen that oil within the upper receptacle 2 can reach the lower receptacle 3 only by passing through the cooling tubes 1, as the tube 9 extends through the receptacles and has no communication whatsoever therewith.

Mounted on the upper closure plate 6 is a cap plate 10 that is secured to the flange 4 by screws that likewise secure the plate 6 to the flange 4, as will be apparent, and formed on the cap plate 10 and rising therefrom is a substantially rectangular casing 11 having a partition 12 adjacent one end thereof to provide a relatively large direct flow chamber 13 and an inlet chamber 14. The chamber 13 communicates with the upper end of the tube 9 by an opening 15 in the cap plate 10 and the inlet chamber 14 communicates with the chamber 13 by a port or opening 16 in the partition 12. Formed on the casing 11 and extending from the inlet chamber 14 is a threaded inlet nipple 17 for connection of a pipe or tubing 18 thereto for installing the device in the lubricating system of the engine, and the tubing 18 preferably extends from the oil pump.

Secured to the lower closure plate 7 by screws threaded in the flange 5 is the flanged upper end of a depending outlet receptacle 19 having formed thereon a threaded outlet nipple 20 for connection of a pipe 21 thereto that leads to the crank case of the engine, and the nipple 20 is shown as being disposed in parallelism with the inlet nipple 17. The plate 7 has an outlet opening 22 therein for communication between the receptacles 3 and 19 and fixed to the plate 7 for

disposal on the under face thereof are spring strips 23 and 24 providing check valves normally closing the opening 22 and the lower end of the direct flow tube 9, the valves being shown in closed position in full lines and in open position in dotted lines.

An opening 25 is disposed in the upper closure plate 6 to provide an inlet for the upper receptacle 2 and registering with the opening 25 and formed in that portion of the cap plate 10 that provides the bottom of the inlet chamber 14 is an opening having a valve seat in the upper edge thereof for a metallic ball valve 26, the valve 26 being normally arranged on its seat, as shown in full lines in Figure 1, so that the inlet opening 25 to the upper receptacle or chamber 2 is normally closed. Mounted within the upper portion of the chamber 14 is a shell like member 27 having a right angle passage 28 therethrough, with the lower end of the passage disposed in the path of the ball valve 26 and having a seat 29 for receiving the same, while the opposite end of the passage 28 registers with the port 16.

The member 27 is integral with the core 30 of an electro-magnet 31 that is mounted on the top of the casing 11, with the shell member extending through an opening in the top, as clearly shown in Figure 1, and the coil of the magnet is grounded to the casing 11 as at 32.

Suitably secured to one side of the casing 11 is a switch 33 that includes a spring arm 34 having one end fixed to the inner headed end 35 of a binding post 36 that extends through and is insulated from the wall 37 of the switch casing, as best shown in Figure 2. The opposite end of the arm 34 is fixed adjacent to and insulated from one end of a thermostatic or bimetal strip 38 that has secured to its opposite end a right angle member 39 of a material having high heat conducting qualities, such as for example copper, and the member 39 extends into the casing 11 for disposal at the inner end of the inlet nipple 17, to be arranged in the path of the incoming oil, as will be apparent upon inspection of Figures 1 and 2. Extending through and insulated from the wall 37 is a binding post 40 having a contact head on the inner end thereof for disposal in the path of a contact test 41 on the free end of the arm 34. The binding post 36 has a conductor 42 from the coil, connected thereto, and a conductor 43 that extends from a suitable source of current, is connected to the binding post 40.

From the above description and the disclosure in the drawing, it is believed that the operation of my device will be obvious, but it might be mentioned that when the ball valve 26 is mounted on its seat in the opening of the cap plate 10, as shown in full lines in Figure 1, the oil is caused to flow through the passage 28, the direct flow chamber 13, the tube 9, the receptacle 19, and thence out through the nipple 20 to the crank case, it being apparent that the oil follows that course when it is at a normal (140° to 160° F.) operating temperature. However, in the event the temperature of the oil should rise above normal, the heat thereof will be conducted by the member 39 to the strip 38 and cause the latter to move the contact 41 in engagement with the head of the binding post 40 to close the circuit to the electro-magnet 31 and thus energize the same, so that the shell like member 27 will attract the ball valve 26 and

lift it to its seat 29 to close the passageway 28 to the chamber 13, consequently the oil will then pass through the opening 25, the receptacle 2, the cooling tubes 1, the receptacle 3, the opening 22, and the receptacle 19, and from the latter through the outlet nipple 20. After the oil has been cooled to a normal temperature, the switch will open to deenergize the electro-magnet and the ball 26 will drop by gravity to close the opening 25, so that the oil will again flow normally through the device, with the result it will be seen that my device maintains the oil at a low operating temperature, to bring about the advantages previously set forth.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:

1. A lubricant cooling device for the lubricating system of an engine, comprising cooling tubes and a direct flow tube, said tubes being vertically arranged, upper and lower chambers having the ends of the cooling tubes connected thereto for communication therewith and said direct flow tube extending through the chambers, a casing mounted on the upper chamber and having the direct flow tube opening therein, said casing communicating with the upper chamber, inlet means for the casing, a valve within the casing for controlling the passage of lubricant from the inlet means to either the direct flow tube or the cooling tubes, means acted upon by the temperature of the lubricant passing through the inlet means for controlling the valve, a receptacle secured to the lower chamber for receiving lubricant therefrom and from the direct flow tube, and outlet means for the receptacle.

2. A lubricant cooling device for the lubricating system of an engine, comprising cooling tubes and a direct flow tube, said tubes being vertically arranged, upper and lower chambers having the ends of the cooling tubes connected thereto for communication therewith and said direct flow tube extending through the chambers, a casing mounted on the upper chamber, a partition dividing the casing into an inlet chamber and a direct flow chamber, the latter having the direct flow tube opening therein, said inlet chamber communicating with said upper chamber and having a valve seat therein, said partition having an opening therein, a shell like member mounted in said inlet chamber and providing a passage registering with the opening of the partition, said shell like member being formed with a valve seat, inlet means for the casing and opening into said inlet chamber, a valve in said inlet chamber and receivable on either of the seats for controlling the passage of lubricant to the direct flow chamber and said upper chamber, means acted upon by the temperature of the lubricant passing through the inlet means for controlling the valve, a receptacle secured to the lower chamber for receiving lubricant therefrom and from the direct flow tube, check valves within the receptacle, and outlet means for the receptacle.

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