May 27, 1930. W. TURNWALD 1,759,969

ENGINE HEATER

Filed Nov. 29, 1927

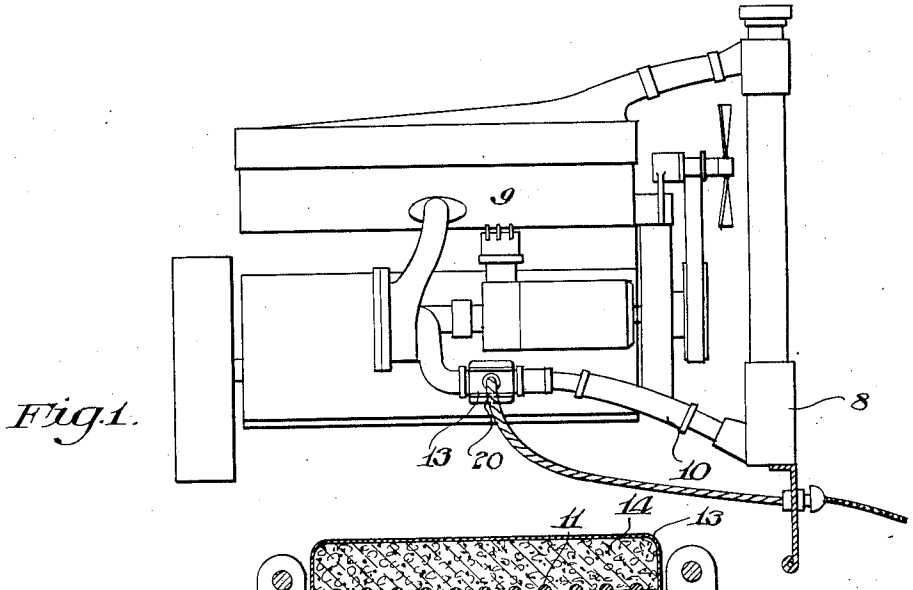

Fig. 1.

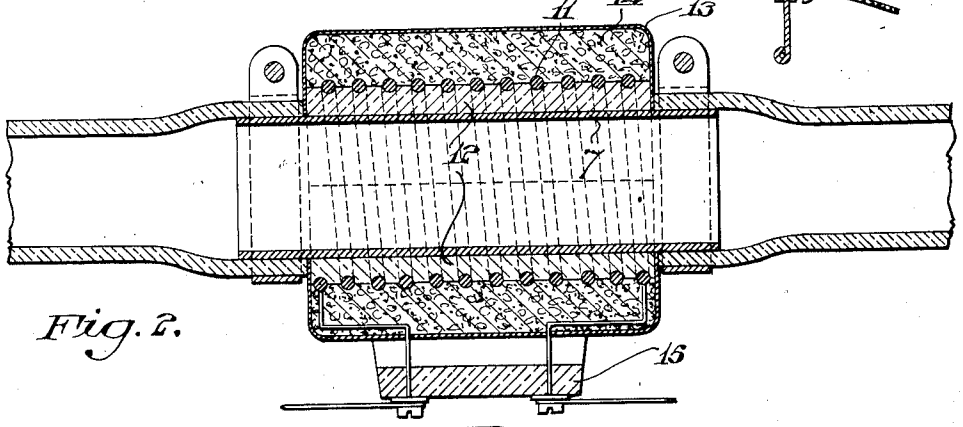

Fig. 2.

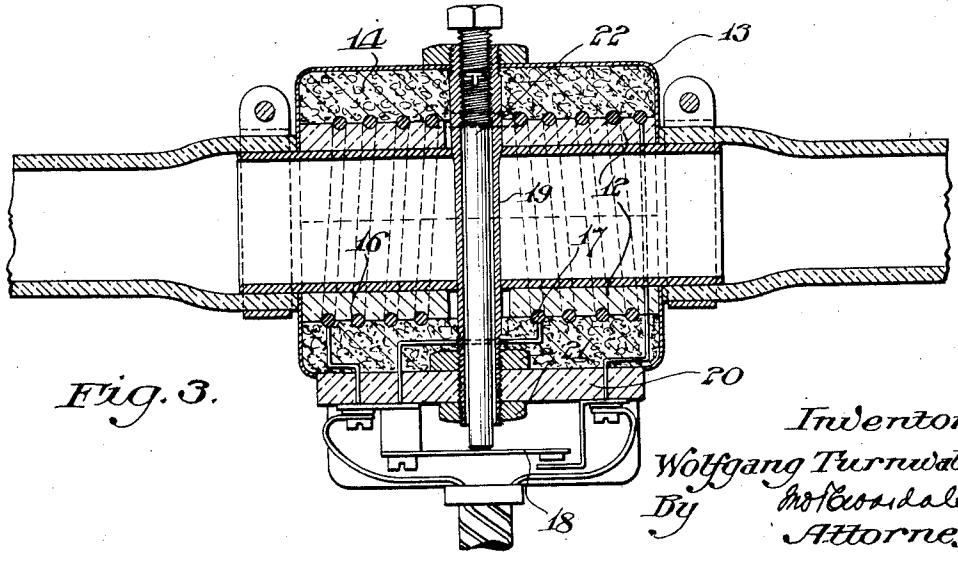

Fig. 3.

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ENGINE HEATER

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The invention relates to engine heaters, and is especially applicable to water cooled internal combustion engines for automobiles.

The object is to provide improved method and means for heating in connection with the water cooling system to maintain a required temperature of the engine while idle in cold weather.

The invention comprises a heating device in the line of the water system to cause a thermal circulation of the water to prevent freezing of the water and to maintain the engine at required temperature for easily starting the engine.

The operation of gasoline automobiles in winter time during periods of extremely low temperatures is still a matter of some inconvenience, despite all the progress that has been made in starting apparatus. At zero temperature gasoline does not vaporize readily, besides even light engine oil is very viscous which brings about a large resistance of pistons and bearings against movement. The result is that the starting motor operates much below normal speed with an excessive current flowing through the starter circuit. The corresponding reduction in battery voltage makes for a weak spark and the outcome is that in a good many cases the engine refuses to start and is loaded up with gasoline.

It is generally conceded, that the presence of raw gasoline in engine cylinders is detrimental to the life of the engine, because gasoline interferes with the lubricating oil film in the cylinders. Part of the gasoline also finds its way into the crank case and deteriorates the oil.

To overcome the above mentioned difficulites, it is customary to use a lighter lubricating oil in winter than in summer; although the operating temperature of the engine is practically the same during both seasons. Naturally with the engine warmed up to running temperature, the light winter oil is inferior in lubricating qualities to the heavier summer oil, but still the light oil has to be used unless means are provided to keep the engine at a fair temperature. This applies in particular while the car is standing idle over night or during similar periods. Some cars are kept in heated garages and naturally no difficulties are encountered. The majority of cars, however, are parked over night in unheated garages and it is for these cars that my invention is primarily applicable.

I propose to maintain the engine cylinders at a fair temperature by means of an electric heater which is placed preferably at a low point of the water circulating system. Connection to the electric light circuit is made by means of a plug switch the socket of which is mounted on the car preferably at the front mud apron immediately below the radiator. The heat applied to the cooling water will set up a thermosiphon circulation, irrespective of whether the cooling system employs a circulating pump and thermostat or not. In systems where the thermostat works on the by-pass principle, the heater must be located in the engine circuit so that water circulation will take place either through the radiator or the thermostat by-pass. My intention is that this heater is to be used only on cold nights when the car owner may expect difficulties when starting up the next morning. It is also intended, in order to conserve electric current, to have the engine hood covered with a robe or equivalent means.

If the car is used in such a way, that it is not subject to long idle periods during the day when not in the garage, then my heater will allow the use of the same oil as is used during the summer months with a corresponding beneficial effect on engine life.

In the accompanying drawings which illustrate merely by way of example suitable means for the embodiment of my invention :—

Fig. 1 is a side elevation showing the engine case and associated parts, showing location of the heater.

Fig. 2 is a sectional view showing a heater of simple design.

Fig. 3 is a similar view showing two heating coils with a thermostat control.

Similar numerals refer to similar parts throughout the several views.

Fig. 1 shows the general arrangement of the device in accordance with my invention, in which the heating element 4 is shown connected near the lower part of the circulating

system, the cable 5 having wires connecting the resistance to an element of the plug and socket switch 6. Said element, as shown in the drawings, is secured in a part of the framework of the automobile, preferably in the front mud apron immediately below the radiator, so that the same is readily accessible.

In Fig. 2, I show a simple heater, which consists of a piece of copper or brass tubing 7 connected between the bottom of the radiator 8 and the water jacket 9 of the engine by means of the usual flexible hose 10. A wire heating coil 11 is mounted on a porcelain core 12, preferably made in halves and slipped over the tube 7. A sheet metal or cast casing 13, filled with insulating material 14 such as asbestos wool surrounds the heating coil and has mounted on it the element 15 for connecting the lead wires of the heater to any suitable source of electric energy. This heater, by means of rubber hose connections is inserted in the lower branch of the circulating system, preferably close to the cylinder block of the engine. Such a type of heater is intended to be used where it is a matter of facilitating starting on cold mornings only. And where the engine is supplied with light winter oil.

In Fig. 3 is shown a modification which incorporates two heating coils 16 and 17 arranged in series, one of which is normally short-circuited by means of a thermostatic switch such as 18. This switch closes or stays closed as long as the water temperature is below the set figure. Upon opening, the current passes both coils in series and depending upon their combined resistance the current flow is cut down and the rate of heating the water is reduced. This type of heater is used where the engine is to be kept at a fair temperature during more or less of the whole freezing period. As an example of the thermostat control, I have shown a sleeve 19 inserted at right angles through the center of the main brass tube; one end of this sleeve carries the mounting 20 by means of the clamping nuts 21. The other end of the sleeve serves for insertion and adjustment of the steel pin 22 which actuates the switch. The heating coils 16 and 17 are placed on either side of the sleeve 19, are mounted on porcelain or equivalent cores and well insulated on the outside by means of asbestos wool and a metal casing as in Fig. 2. The switch is actuated by the difference in expansion between the heater as a whole which is made of brass and the steel pin which is made of special non-expanding steel. The switch 18 is shown in its simplest form merely as an illustration of the general principle. It will of course be understood that any of the well known quick acting, or snap switches will be preferable with a thermostat control in order to prevent sparking, as the action of the thermostat is necessarily slow. I do not consider myself limited to this particular design of heater or switch as shown.

What I claim is:

1. In a heating unit for the circulating system of water cooled engine cylinders, the combination of a simple section of metal pipe, a split porcelain core surrounding said pipe, a resistance coil surrounding said core, a metal casing having inturned ends provided with a filling such as a substantial body of asbestos wool enclosing said core with its resistance, a sleeve extending diametrically though said pipe, core and casing, having mounted therein a thermostat element, and a switch operated by said element for controlling a section of the resistance.

2. An engine heater comprising, in combination with a portion of the metal pipe of the circulating system, an electric insulating heat transmitting self-containing core formed of a clay product of substantial thickness and hardened, independently of the pipe, and adapted to embrace the pipe, a resistance associated with the core, and a jacket enclosing the resistance and core comprising a shell filled with a loose fibrous material having both heat and electric insulating qualities and formed independently of the core.

3. An engine heater comprising, in combination with a portion of the metal pipe of the circulating system, an electric insulating heat transmitting self-containing core formed in sections of a clay product, independently of the pipe, and adapted to embrace the pipe, a resistance associated with the core, a thermostat for changing the effective length of the resistance, and a jacket enclosing the resistance and core comprising a shell filled with a loose fibrous material having both heat and electric insulating qualities and formed independently of the core.

WOLFGANG TURNWALD.