Feb. 5, 1924. 1,482,574

S. L. MEYER

ELECTRICAL HEATER FOR AUTO RADIATOR SYSTEMS

Filed Feb. 16, 1920 2 Sheets-Sheet 1

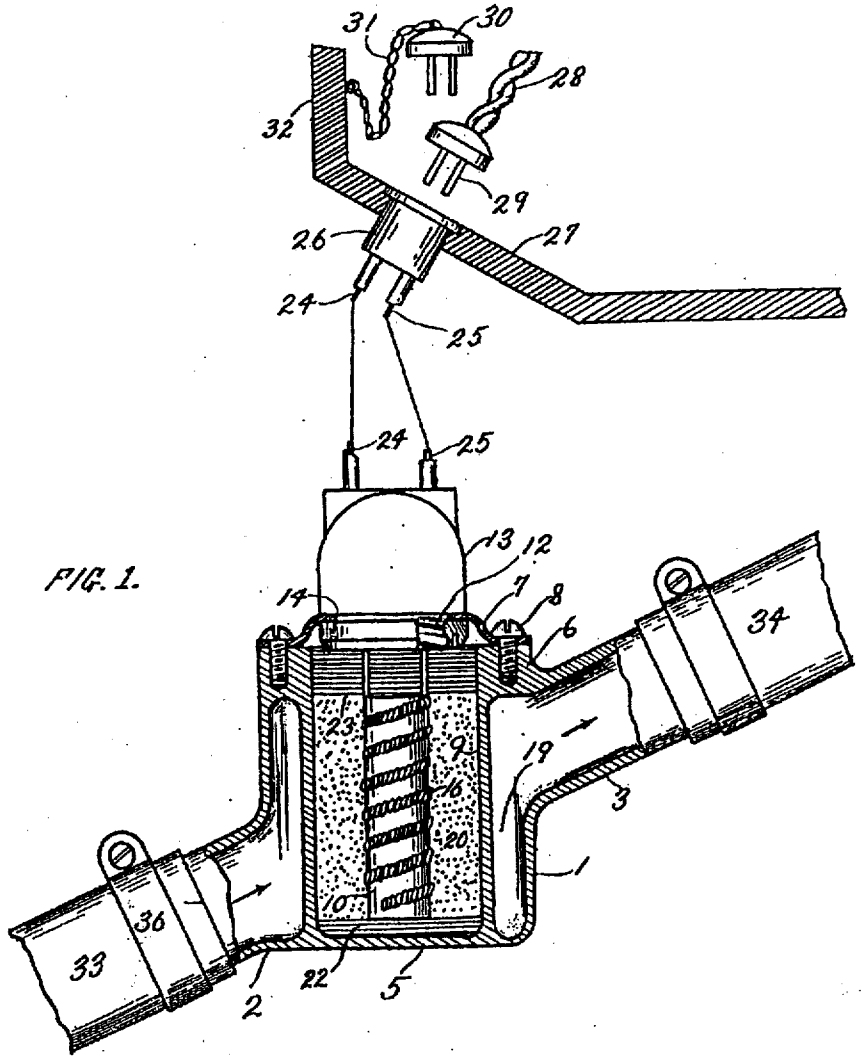


FIG. 1.

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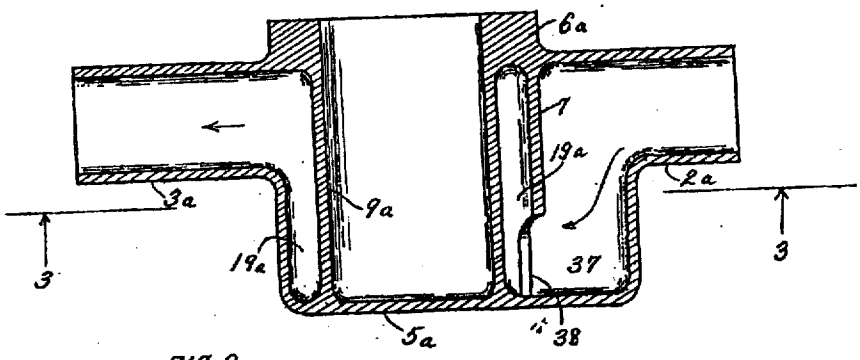


FIG. 2.

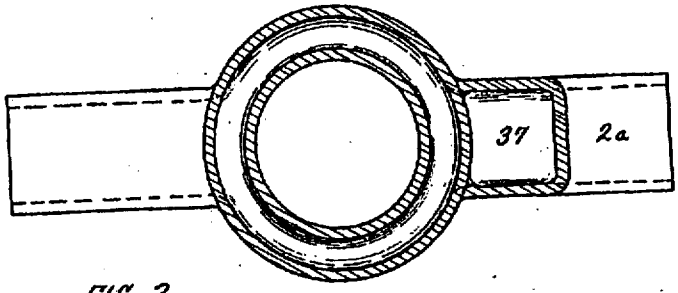


FIG. 3.

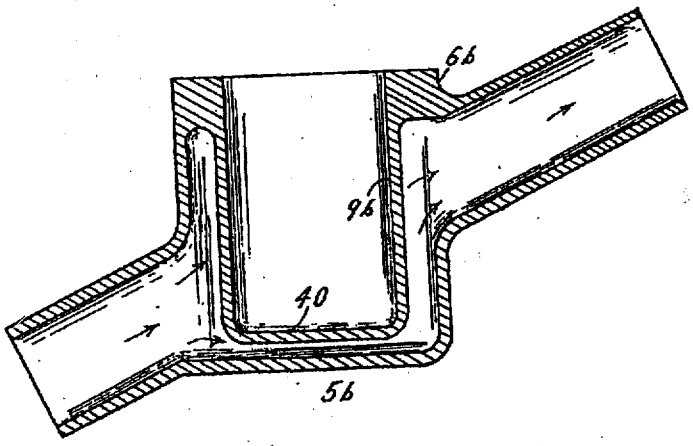


FIG. 4.

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Patented Feb. 5, 1924. 1,482,574

UNITED STATES PATENT OFFICE.

STARKE L. MEYER, OF MILWAUKEE, WISCONSIN.

ELECTRICAL HEATER FOR AUTO RADIATOR SYSTEMS.

Application filed February 16, 1920. Serial No. 359,142.

To all whom it may concern:

Be it known that I, STARKE L. MEYER, a citizen of the United States, and residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Electrical Heaters for Auto Radiator Systems, and do hereby declare that the following is a full, clear, and exact description thereof, such as will enable persons skilled in the art to which the invention pertains to make and use the same, reference being had to the drawings hereto attached for disclosure as to details of construction.

My invention relates to improvements in electrical heaters for auto radiator systems, and pertains especially to heaters of that class, in which an electrical heating unit is mounted in a fitting thru which water passes on its way from the radiator to the engine jacket.

The objects of my invention are to provide an improved form of fitting in which the heating unit may be mounted without exposure to the water. Also to provide means whereby the heating unit may be quickly and easily removed without opening the water passage; to provide means whereby the heat developed in the unit may be transferred into the water with minimum resistance, and without danger of short circuiting the heating unit; to provide means whereby the heating unit, altho detachable, may be left permanently in place while in good working condition, and connected with, or disconnected from, a source of electrical energy, and without inconvenience to the user of the vehicle.

More specifically stated, it is the object of my invention to provide an electrically heated fitting of high efficiency and durability, which can be interposed as an element in the flexible connections between the bottom of the radiator, and the hydrocarbon engine of a motor driven vehicle, with the heating element electrically connected to a socket located in a convenient place on the vehicle body, and adapted to receive current from the electric lighting connections of the garage, thru the medium of a flexible cord, and a plug adapted to be removably fitted to said socket while the vehicle is being left at the garage during cold weather.

In the drawings:—

Figure 1 is a fragmentary view partly in elevation and partly in section, showing my invention applied to the return duct of a water cooling system of an automobile engine, and showing also the electrical connections for supplying current to the heating element, and the means whereby the source of supply may be connected to the vehicle thru a plug flexibly connected with the supply, and adapted to fit a socket located in the foot board of the vehicle body.

Fig. 2 is a sectional view showing a modified form of fitting, adapted to be substituted for the fitting shown in Fig. 1 when the water system is so arranged as to require that the fitting be connected with horizontal lengths of piping.

Fig. 3 is a sectional view, drawn on line 3—3 of Fig. 2.

Fig. 4 is a sectional view illustrating a third modification, adapted for use in the same type of water system as that indicated in Fig. 1, and in which the return duct is inclined.

Like parts are identified by the same reference characters thruout the several views.

Referring to Fig. 1, it will be observed that a cylindrical casing 1 is provided at or near its lower end with a downwardly inclined tubular extension 2 and at or near its upper end with an upwardly inclined tubular extension 3 projecting from the opposite side of the casing from the extension 2. The lower end of the casing 1 is closed by a bottom wall 5. At the top of the casing, the wall of the cylinder is thickened to provide an annular seating 6 for a cap 7, the cap being secured to the seating by any suitable fastenings, such as the screws 8. The seating 6 has its inner margin connected with the bottom wall 5 by an interior cylindrical wall 9 which forms a socket open at the top when the cap 7 is removed. The central portion of the cap 7 is provided with an opening adapted to receive the screw 12 of a plug 13, the plug being clamped to the margin of the cap around the opening by a nut 14. A heating unit is suspended from the plug 13, and extends nearly to the bottom of the socket when the plug is in position. This heating unit comprises a supporting core 10 about which a heating element 16 is placed or wound, the heating element comprising a resistance member or wire thru which the current passes when connected with suitable source of current supply. To protect this resistance member or wire against corrosion, or possible short circuits, and also to greatly facilitate the transfer of heat from the wire

thru the wall of the socket to the surrounding annular cavity 19, I preferably fill the socket space between the heating unit and the wall 9 with a body of heat conducting di-electric material 20, such, for example, as any aluminium clay high in di-electric strength. Clay commonly known as fire clay will be found serviceable if free from iron or other material which would make it electrically conductive. It will be improved if fused and finely granulated.

To prevent loss of heat energy by radiation into the atmosphere, I preferably line the bottom wall of the socket with sheets of mica or other suitable heat insulating material 22, and I cover the embedding material 20 with similar heat insulating material 23. This lining material 22 and 23 serves the double purpose of preventing loss of heat to the atmosphere, and of holding the embedding material 20 in place. When the fitting is being handled commercially, or when it is removed from its installed position of use.

The feed wires 24 and 25 connect the heating unit electrically with a socket 26 located at any convenient point on the body or frame of the vehicle, preferably in an aperture formed in the foot board 27. The socket 26 is adapted to receive a terminal plug 29 having a flexible cord 28 adapted to connect it with any suitable source of electrical energy, such for example, as the electric lighting connections of a garage or other building in which the vehicle is stored. When the vehicle is used, the plug 29 will, of course, be withdrawn and left in the building. The socket 26 may then be closed by an ordinary cap 30 which is illustrated as connected by a chain 31 with the dash board or plate 32.

The fitting above described has its tubular extensions 2 and 3 adapted to fit within sections 33 and 34 of rubber hose such as is commonly used to connect the lower portion of a radiator with the internal combustion engine of a motor driven vehicle. The sections of hose are clamped upon the tubular members 2 and 3 respectively by suitable clamps 36. These are shown in Fig. 1 as inclined and owing to the fact that the duct 2 connects with the bottom portion of the cylinder 1 while the duct 3 leads from the upper portion thereof, it is obvious that where duct 3 is connected with the hose pipe 34 leading to the engine, circulation of water from the radiator thru the fitting to the engine will be greatly facilitated, the water rising in the annular space 19 and being continuously heated until it passes out thru the duct 3. In this manner, the water in the water jacket of the engine and in the radiator may easily be kept from freezing at small cost, particularly if the engine hood and radiator are properly blanketed or housed within a garage from which air currents are excluded.

Referring to Figs. 2 and 3 it will be understood that the fitting illustrated in these views is designed to receive an electrical heating unit connected up as illustrated in Fig. 1 and that the same will be connected with the water circulatory system of a motor driven vehicle in much the same manner. The same reference characters are therefore applied to the corresponding parts so far as applicable, but with the reference character *a* added for the purpose of distinction. This fitting is intended more particularly for use in cases where the connection between the radiator and the engine extends horizontally on the return side. By providing the inlet 2^a with a wall 37 formed by enlarging the casing 1^a, cold water entering the casing from the radiator will be deflected to the bottom and will pass thru an aperture 38 formed in the wall of the cylinder 1^a to the annular space 19^a from the upper portion of which the water will pass to the outlet duct 3^a as in Fig. 1. The heating unit and its connections may be the same as in Fig. 1 and are therefore omitted from Figs. 2 and 3.

In Fig. 4 I have shown a structure which embodies only a slight variation from the structure shown in Fig. 1 and the same reference characters are applied to the corresponding parts with the reference letter *b* added. The difference between this structure and that disclosed in Fig. 1 is that the wall 9^b of the socket which receives the heating unit does not extend to the bottom 5^b of the cylinder, the socket being provided with an independent bottom wall 40 which is spaced from the cylinder bottom 5^b to allow water to circulate underneath the socket. In this form of construction, the heat insulating sheets 22 illustrated in Fig. 1 may, of course, be omitted without any material loss of heat to the external atmosphere. The amount of heat which will be transferred from the circulating water thru the walls of the fitting will be negligible for the reason that the water is circulating and the further reason that the amount of heat delivered will ordinarly be sufficient to merely keep the water from freezing. The difference between the temperature of the water and the surrounding atmosphere underneath the hood of the car is insufficient for rapid radiation.

I attach considerable importance to the fact that my improved fitting can readily be removed for the purpose of repair or replacement; to the fact that there is no possibility of leakage from the water cavities into the socket, the walls of the socket and of the water cavities being integral and no joints or openings being provided thru which water might pass. I also attach considerable im-

portance to the fact that the socket which receives the heating unit is open at the top whereby it is not only impossible for the heating unit to become loose and drop out of the socket, but it is also impossible for any embedding material, (heat insulating or heat conducting) to drop out or become disarranged in such a manner as to allow of short circuits. I also consider it of great importance to the successful introduction of my improvement that the heating unit is connected to a socket convenient of access and adapted to permit an electrical connection to be instantly made between the permanent wiring of the garage and the heating unit when the vehicle is left in storage.

I claim:

1. An electrical heater for the water cooling systems of an internal combustion engine comprising a fitting adapted for water circulation and provided with a socket from which water is excluded, a heating element mounted in said socket, a di-electric heat conducting material interposed between the heating element and the wall of the socket, and feed wires connected with the heating element, said socket having its end portions lined with non-heat conducting material.

2. An electrical heater for water cooling systems of an internal combustion engine comprising a fitting adapted for water circulation and provided with a socket from which water is excluded, a heating element mounted in said socket, a di-electric heat conducting material interposed between the heating element and the wall of the socket and feed wires connected with the heating element, said fitting having an inlet at its bottom portion and an outlet at its top portion and also having a water circulating cavity surrounding said socket and affording communication between the inlet and outlet.

3. The combination with a water circulatory system of a motor driven vehicle of an electrical heating unit in heating relation to the water of said system, said unit comprising an integrally formed member having an interior cavity, a socket inside of said cavity and permanently separated therefrom by a wall integral with said unit, said unit having an inlet and outlet opening, a heating element positioned within said socket, and dielectric, heat conducting material interposed between said heating element and the walls of said socket, whereby the wall of said socket acts as a heat conductor to transmit heat to the water and whereby said heating element may be freely removed without opening any water passages.

In testimony whereof I affix my signature in the presence of two witnesses.

STARKE L. MEYER.

Witnesses:
LEVERETT C. WHEELER,
A. J. MCKERIHAN.