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HEATER FOR FLUID CIRCULATING SYSTEMS

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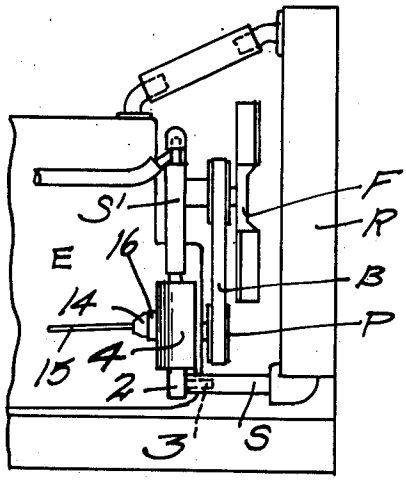



Fig. 1

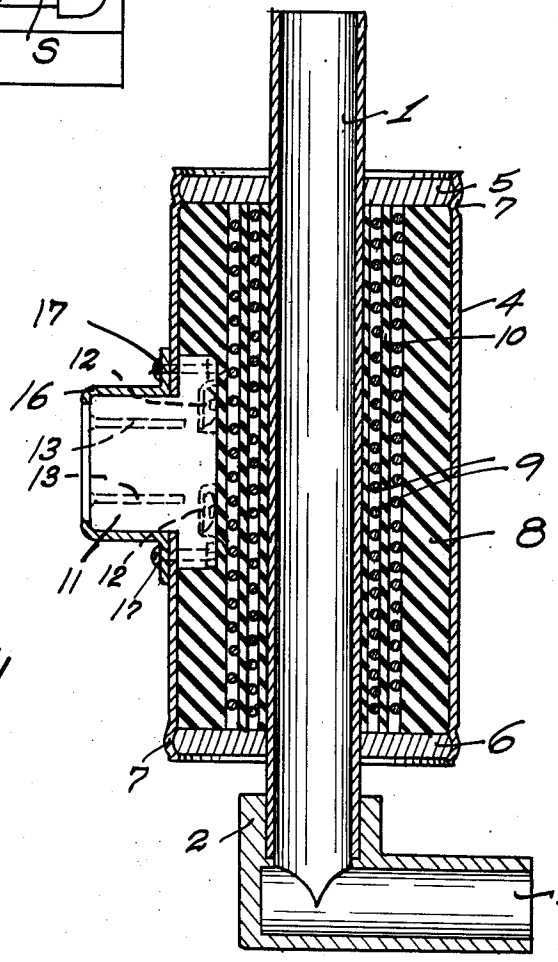



Fig. 2

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## HEATER FOR FLUID CIRCULATING SYSTEMS

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2 Claims. (Cl. 219—38)

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The present invention relates to the general class of internal combustion engines employing a liquid-coolant circulating system, and more specifically to an auxiliary electrical pre-heater for the liquid-coolant of the engine. The pre-heating appliance is especially adapted for use in extremely cold weather in raising the temperature of the liquid coolant of the circulating system to a desirable degree preparatory to starting the motor of an automotive vehicle.

Preferably the appliance of my invention is affixed to a conveniently located portion of the coolant circulating system and forms a component accessory thereof; and the pre-heater is equipped with an electrical socket-connection that is adapted to receive the attaching plug of an electrical conductor cable for conveying the heating current to the appliance from a suitable source of energy.

In the physical embodiment of my invention I utilize a minimum number of parts that are readily available, and may be manufactured with facility and low cost of production, and the parts may be assembled with convenience, and compactly arranged to occupy a minimum space, in order to assure a durable and efficient accessory for the desired purpose.

The invention consists in certain novel features of construction and novel combinations of parts as will hereinafter be described and more specifically set forth in the appended claims.

In the accompanying drawings I have illustrated a complete example of a physical embodiment of the invention constructed in accord with one mode I have devised for the practical application of the principles of the invention; it will however be understood that changes and alterations are contemplated in the exemplifying drawings, and made in the mechanical structures, within the scope of my claims, without departing from the principles of the invention.

Figure 1 is a fragmentary view in side elevation at the front of an automotive vehicle showing the pre-heater affixed to and surrounding an upright pipe section or conduit of the liquid-coolant system of the engine, and indicating the manner of connecting the pre-heater with an electrical source of supply for heating purposes; and

Figure 2 is an enlarged vertical sectional view of the pre-heating appliance that is interposed in and becomes a component part of the coolant system of the engine.

In order that the utility and operation of the appliance may readily be understood I have

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shown in Fig. 1 an internal combustion engine E with its radiator R, fan F, and fluid pump P driven by the belt B for circulating the liquid coolant. The pre-heater is preferably located, as a permanent fixture between a low horizontal section S connected to the radiator, and an upper vertically disposed pipe-section S' of the coolant system, where it is readily accessible for use when desirable.

In carrying out my invention I utilize a vertically arranged heating tube or conduit 1 of copper or other suitable material, the upper end of which is connected in suitable manner with the pipe section S', and the lower end of the heating tube is equipped with an elbow fixture having an upper flange 2 that is pressed or otherwise fixed on the tube, while the pipe-end of the elbow fixture is fitted and sealed within the pipe-section S of the radiator, to provide for a continuous circulation of the liquid coolant through the heating tube as a part of the circulating system.

The heating tube 1 forms a core or base for supporting the heating appliance which includes an exterior cylindrical jacket 4, initially open at its ends, and these ends are closed by vertically spaced annular disks 5 and 6 that are die-cast pressed over the heating tube to provide a sealed connection and fitted in the ends of the cylindrical jacket. The ends of the jacket are pressure rolled and swaged to form crimps 7 for permanently sealing the annular disks or heads through which the heating tube passes.

Within the closed jacket a tubular cylindrical lining 8 is encased, and the lining surrounds an inner electric heating coil 9, or heating element equipped with interposed separators or insulators 10.

The insulated lining is cut away to receive a flanged insulating block or connector 11, and the inner face of the block is recessed to accommodate the two terminal contacts 12, 12, of the heating coil as indicated by dotted lines in Fig. 2. The block or connector projects through an opening in the exterior jacket, and two sockets 13, 13, leading to the terminal contacts, are shown by dotted lines, and adapted to receive the complementary prongs or blades of a plug 14 attached on the end of the conductor or cord 15 in Fig. 1 which is connected in usual manner to an outlet for a supply of heating current to the pre-heater.

The socket block or connector 11 is secured in place by means of a metallic housing 16 having an attaching flange that is secured by rivets or screws 17 to the exterior of the jacket, as in-

dicated by dotted lines in Fig. 2. In order to warm up the liquid coolant in the radiator, the circulating system, and the engine block, and if necessary to prevent freezing of the fluid coolant within the system, the conductor, by means of the plug 14 is connected with the heating element surrounding the heating tube. The generated heat is conveyed to the heating tube and thence to the liquid coolant therein, the rise in temperature of the liquid in the heating tube induces an upward movement of the liquid through the tube, and in this manner a circulation of the liquid coolant is established throughout the entire system. When the engine has been warmed up or heated to the desired temperature the connector plug is of course disconnected, and the engine or motor is in proper condition for starting.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an auxiliary heater for a liquid-coolant system, the combination with a central tube of heat-conveying material forming a component part of the system, of a heating element encasing the tube, an insulating sleeve encasing the element and an exterior enclosing jacket for the sleeve heads lifted over the tube and pressed thereon forming a sealed connection and closing the open ends of said jacket, said heads being secured in said jacket by means of rolled edges forming crimps about the peripheral edges of said heads and sealing the ends of said jacket,



an insulated socket-block mounted in a recess of the sleeve and projecting laterally through the jacket, a housing fixed to the jacket and enclosing the block, terminal contacts for the element mounted in the block, and means within the block for the reception of an electrical connector, whereby electrical heating currents may be conveyed to the element and the tube.

2. An auxiliary heater for liquid coolant systems comprising a central tube of heat conveying material adapted to be connected in and form a component part of the system; a diametrically larger tube substantially shorter than said first tube disposed in concentric relation encircling said first named tube and forming an enclosing jacket; die-cast heads having central apertures pressed on said first named tube and into the ends of said jacket and fixed therein by means of crimping; a heating element including a socket block disposed within the jacket in encircling relation to the first named tube and insulated from said jacket and tube; a stamped housing fixed to the jacket and having an opening in registry with the socket block.

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