

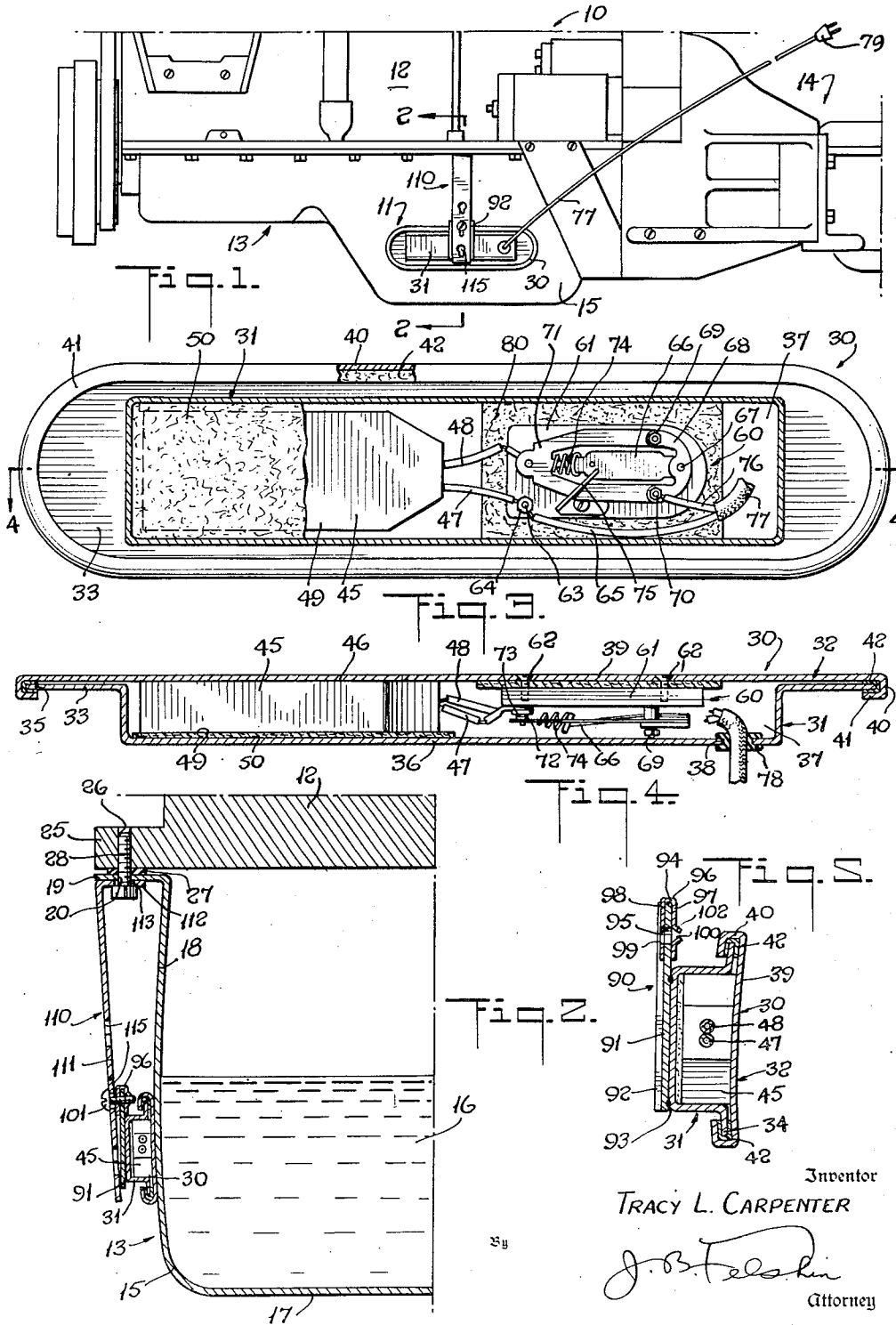
Dec. 28, 1954

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2,698,374

HEATER FOR VEHICLE ENGINES

Filed Aug. 16, 1952



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2,698,374

HEATER FOR VEHICLE ENGINES

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Application August 16, 1952, Serial No. 304,700

6 Claims. (Cl. 219—38)

This invention relates to a heater for vehicle engines, and, more particularly, to an electric heater for warming an engine and its lubricant prior to starting of the engine.

One object of the present invention is to improve the electric heaters disclosed in my copending application, Ser. No. 226,804, filed May 17, 1951, now abandoned.

The particular embodiment of the present invention, which is illustrated in the drawings and which will be described hereinafter in greater detail, comprises generally, a casing adapted to engage the side wall of a crankcase, a heating element in the casing, a thermostat also in the casing, wiring connecting the heating element through the thermostat to a source of electric power, and a bracket for resiliently holding the casing against the crankcase to transmit heat therethrough.

As is well known, a major part of the vehicle engine wear occurs while starting a cold engine and continues until the engine reaches normal operating temperature. Accordingly, it is a principal object of the present invention to substantially eliminate this period of cold starting.

Especially in the winter season when the temperatures are low, the vehicle engine lubricating oil becomes more viscous and offers greater resistance to moving parts of the engine. This is so in many sections of our country even though the vehicle be housed in a garage. Thus, it is another object of the present invention to provide an electric heater which may be affixed to the crankcase of a vehicle engine to warm the lubricating oil contained in the crankcase.

During cold starting it is often necessary to run the vehicle engine for a period of time at a standstill, that is without taking power off of the engine, as the engine cannot overcome internal friction and also deliver power. This requires the expense of gasoline for heating the engine, and lubricating oil. By the present invention the expense of time and gasoline for bringing the engine up to normal operating temperature is substantially eliminated.

The device of the present invention operates without attendance and utilizes electricity, a more inexpensive form of power. This is effected by a thermostat within the heater which cuts out when the lubricating oil reaches a predetermined temperature. Obviously, the instant invention may be used with engines having widely varying oil capacities, as the device is responsive only to the temperature of the oil.

Also, the device may be affixed to engines having various sizes and crankcases. This is accomplished by using a single depending bracket along which the heater may be secured at a selected point. The bracket portion below the heater is severed to prevent its engagement with snow, ice or other road obstruction.

As the heater is held against the side wall of the crankcase and no part of the device is below the crankcase, there is no danger of the device being ripped off by a road obstruction or interfering with maintenance of the engine.

Furthermore, the heater is shaped to have surface contact with the crankcase side wall to most efficiently utilize the generated heat.

The unit, in accordance with the invention, is designed for simple mechanical attachment, which necessitates the removal and replacement of only a single bolt. The bolt fixedly secures to the engine the upper end of a resilient bracket which holds the casing against the side wall of an oil pan.

As oil pans vary in depth, the bracket is slidably re-

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ceived in a channel on the heater casing, and a bolt or other fastener holds the heater casing at the desired position on the bracket.

Still another advantage of the present invention lies in the efficiency of heat conduction and the resultant operating economies. The heating element bears against the wall of the casing which contacts the oil pan and is insulated on its other side to prevent heat from escaping.

However, some heat will escape, and if the heater is placed near the starter and distributor, the formation thereon of ice will be prevented by the escaping heat.

A further object of the present invention is to prevent the entry of dirt, dust and oil into the heating element and thermostat by sealing the casing. The casing is formed in two parts with a heat resistant seal therebetween, and the wiring outlet is also provided with a heat resistant seal, such seals serving the additional function of directing the heat toward the engine.

Thus, the device is a completely sealed unit, and the surfaces exposed during operation are relatively cool so that there is no likelihood of fire.

Under certain conditions, as with vehicles having automatic transmissions and fluid drives, the device may be attached to the transmission for heating the fluid therein.

Another object of the present invention is to provide a heater for vehicle engines which conformably engages the side wall of an oil pan to effect maximum heat transmission into the engine.

Yet another object of the present invention is to provide a simple and efficient means for resiliently holding a heater against an oil pan, which means permits the heater to be selectively positioned in relation to the oil pan and is adapted for use with various sizes of oil pans.

A further object of the present invention is to provide a heater for vehicle engines which requires a minimum amount of power for heating the engine and its lubricant.

A still further object of the present invention is to provide a heater of the type described which is simple and durable, which is effective for its intended purposes and which can be manufactured and sold at a reasonable cost.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the accompanying drawings in which are shown various illustrative embodiments of this invention:

Fig. 1 is a side elevational view of an engine block, a crankcase oil pan, and a transmission housing, and shows a heater embodying the invention and fixed in place;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a side elevational view, partly in section, of a heater constructed in accordance with the present invention;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3, and

Fig. 5 is an enlarged sectional view similar to Fig. 2 but showing the heater detached from the mounting bracket.

Referring now more particularly to the drawings, in which corresponding reference numerals indicate corresponding parts, the engine of a vehicle is generally designated 10, and is provided with an attached heating device 11 which embodies the present invention. The engine 10 includes a cylinder block 12, a crankcase oil pan 13 secured below the block, and a transmission housing 14 rearwardly of the block and oil pan.

The oil pan 13 is provided with a well 15 for collecting oil, designated 16, the well being formed with a bottom wall 17, and a side wall 18, best seen in Fig. 2. Adjacent the upper edge of oil pan side wall 18 and extending therealong is a laterally outwardly extending flange 19 which is provided with a series of spaced apertures 20. The oil pan 13 is arranged below block 12 so that flange 19 underlies a flange 25 which is formed on the block

and provided with a plurality of threaded apertures 20. Intermediate the flanges 19 and 25 is disposed a gasket 27, and a plurality of bolts 28 extend through flange 19, gasket 27 and into flange 25 for securing the oil pan in place and sealing the oil therein.

The construction thus far described is conventional in vehicle engines of all sizes, and types, and no modification of the conventional structure is required for attachment of the heating device 11. It is only necessary to remove and replace a single one of the bolts 28, as will be further described hereinafter.

The heating device 11, embodying the present invention, comprises an elongated casing 30 which is fabricated of complementary casing sections 31 and 32. The section 31 is formed of a plate 33 having parallel spaced side edges 34, rounded end edges 35, and a depressed portion 36 which provides a longitudinally extending recess 37 spaced inwardly from the side and end edges 34 and 35, respectively. Adjacent one end of the portion 36 is an aperture 38, for a purpose to be hereinafter described.

The casing section 32 is formed of an elongated plate 39 which is transversely curved, as shown in Fig. 5, and provided with an upstanding peripheral wall 40. On the wall 40 and coextensive therewith is an intumed flange 41 in facing spaced relation with respect to the adjacent portion of plate 39. The flange 41, wall 40 and plate 39 combine to form an inwardly peripheral groove for the reception of the side and end edges 34 and 35, respectively, of the plate 33. Within the groove and spacing the plate 33 from the flange 41, wall 40 and plate 39 is a seal or gasket 42 which is U-shaped in section and preferably fabricated of asbestos or other heat resistant material. As the casing section 32 is conformably shaped for surface contact with the side wall 18 of oil pan 13, and is constructed of a highly conductive material, such as metal, and, as the casing section 31 is insulated from the casing section 32 by the seal 42, it is seen that heat from within the casing will be transmitted in substantially one direction, toward the oil pan.

Disposed within the recess 37 of casing 30 remote from aperture 38 is a heating element 45, which is preferably fabricated of fire cement brick and has one face 46 in abutting engagement with plate 39. Electric heating coils (not shown) are positioned within the heating element 45 adjacent to face 46 and are provided with wires 47 and 48 which project from the heating element for operative connection to a source of electric power. Intermediate and abutting the depressed portion 36 and face 49 of the heating element 45 is a sheet 50 of asbestos or other insulating material. This serves to further direct the flow of heat toward the oil pan.

Also disposed within the recess 37 of casing 30 adjacent the aperture 38 is a thermostat 60 having a base 61 which is fabricated of non-conducting plastic or other suitable material and which is secured to plate 39 by threaded fasteners 62, 62. Mounted on the base 61 is a contact post 63 provided with a nut 64 for securing wires 47 and 65 to the post. A heat sensitive element 66 which may be a bimetal or trimetal resilient strip has one end fixedly secured by a rivet 67 to the bight portion of U-shaped member 68. The U-shaped member 68 is substantially rigid and is fixedly secured to posts 69 and 70 in spaced relation with respect to the base. An oppositely disposed U-shaped member 71 is fabricated of resilient material and has its free ends secured to the posts 69 and 70. On the underside of the bight portion of U-shaped member 71 is a contact 72 which moves with the bight portion into and out of engagement with the wire terminal contact 73 for wire 48. Intermediate and engaging the free end of strip 66 and the bight portion of U-shaped member 71 is a compression coil spring 74. As the heat sensitive strip 66 moves toward and away from base 61 in response to temperature changes, the U-shaped element 71 will be snapped in the opposite direction, by spring 74. Upon movement of the U-shaped member 71 away from base 61, the engagement between contacts 72 and 73 is broken and the member will engage abutment 75. With the contacts 72 and 73 in engagement the electrical circuit is closed and heat will be generated. One side of the electrical circuit extends from the element through wire 47, post 63 and wire 65. The other side of the circuit extends from the heating element, through wire 48, contacts 72 and 73, U-shaped member 71, post 70 and wire 76. The wires 65 and 76

are held in a sheath 77 and conducted outwardly through aperture 38. In order to prevent dirt, dust and moisture from entering the casing 30 through aperture 38, a seal 78 extends around the aperture and embraces the sheath

77. It has been found preferable to fabricate the seal 78 of rubber or other suitable material, and to form the seal with a U-shaped cross-section. The extending ends of wires 65 and 76 may be provided with a plug 79 or other suitable means for connection to a source of electric power.

Intermediate and abutting the plate 39 and thermostat base 61 is a sheet 80 fabricated of asbestos or other heat resistant material for insulating the thermostat from the oil pan.

It has been found in practice that a 250 watt heating element, operable on 110 or 115 volts, either A. C. or D. C. current, will deliver the required heat most economically. The thermostat is adjusted to cut in when the ambient temperature goes below 110° F. and to cut out when the temperature of the heating element reaches 400° F. This will keep the oil in the oil pan between 110° F. and 130° F., and maintain the proper viscosity for optimum engine operation.

Exteriorly of the casing 30 on the depressed portion 36 is a transversely extending channel 90 having a bottom wall 91 and spaced side walls or lips 92. The channel may be secured adjacent its lower end to casing section 31 by tack welding as at 93, or other suitable means and is provided with an upwardly extending portion 94. The portion 94 is formed with a transverse aperture 95 extending through the bottom wall 91. Embracing the upper portion 94 of bottom wall 91 is a U-shaped member 96 having depending legs 97 and 98 abutting opposite surfaces of the bottom wall. The legs 97 and 98 are provided with transverse apertures 99 and 100 which register with each other and with aperture 95 for receiving a threaded fastener 101. A plurality of projections 102 are spaced about aperture 100 for firmly grasping the threaded portion of fastener 101.

In order to secure the heater to the engine in a firm yet resilient manner, the bracket 110 is provided. The bracket is generally L-shaped having a depending arm 111 and a lateral arm 112, and is fabricated of resilient metal or other suitable material. The lateral arm 112 is provided with an aperture 113 which is adapted to register with aperture 20 when the lateral arm is arranged abutting the underside of flange 19. Thus, the head of bolt 28 will firmly hold the lateral arm 112 against the flange 19.

The depending arm 111 of bracket 110 is of a width to conformably engage in channel 90 and is provided with a plurality of longitudinally spaced elongated apertures 115, which are arranged to selectively register with the apertures 95, 99 and 100 as the casing 30 is moved along depending arm 111 for vertical adjustment. The channel walls 92 guide the casing 30 and prevent rotation of the casing relative to the depending arm 111. The fastener is inserted through the selected aperture 115, and the apertures 95, 99 and 100 and the fastener head tightened against the arm 111 for fixed securement to the latter. As the apertures 115 are elongated, a further amount of adjustment is possible after selection of the aperture 115 and, of course, the device is shiftable longitudinally of the oil pan by utilizing a different one of the bolts 28.

While it has been found preferable to position the heater adjacent to the oil pan well 15, the heater may be positioned adjacent another portion of the oil pan or adjacent the transmission, as desired. Under certain circumstances it may be necessary to move the heater to different locations in order to thin out or break up accumulations of sludge, etc.

The bracket 110 is constructed so that the casing 30 when attached to the depending arm 111, will be resiliently held against the oil pan by the arm. This is so no matter what the position of the casing along the arm. If it is desired to space the casing from the lower end of arm 111, that portion of the arm below the casing may be severed to avoid it catching on an obstacle and to facilitate maintenance. When not in use for instance during the summer season, the casing and bracket may be quickly and easily removed without disturbing other parts of the engine.

From the foregoing detailed description, it is seen that a device is provided which accomplishes the intended

objects and which is adapted to operate under conditions of practical use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

Having thus described my invention, I claim as new and desire to protect by Letters Patent:

1. A device for heating an engine comprising a casing adapted to engage said engine, a heating element within said casing, wiring extending from said heating element through and out of said casing for connection to a source of power, a thermostat within said casing and interposed in said wiring, and a bracket adapted to be secured to said engine for holding said casing in engagement with said engine, said casing being formed of two sections, one of said casing sections having an end wall and four side walls joined therewith and extending perpendicular therefrom to form a hollow enclosure having an open end opposite said end wall, said side walls having outwardly directed flanges extending peripherally around said open end of said enclosure formed by said one casing section, the other casing section being in the form of a plate extending over said enclosure open end to cover the latter and having around its periphery a plurality of flanges each extending exteriorly around a respective one of said outwardly directed flanges on said one casing section and having an inturned flange portion, said inturned flange portions, said outwardly directed flanges, and said plate being in spaced parallel relation with respect to each other with said outwardly directed flange portions extending between the respective inturned flange portions and the plate, and a U-shaped heat insulating member extending around each of said outwardly directed flanges and within the spaces between the latter and said inturned flange portions and the plate, whereby said casing sections are insulated from each other, said bracket being connected to said first section and said second section being shaped to conform to the engine surface and to abut thereagainst, and a sheet of insulating material between said end wall and said heating element.

2. An electric heater for heating an engine, comprising a casing having one wall adapted to conformably engage said engine, a heating element within said casing adjacent said one wall, a heat resistant plate intermediate said heating element and the opposite wall of said casing, wiring extending from said heating element through and out of said casing for connection to a source of power, a thermostat within said casing and interposed in said wiring, and a bracket having one end secured to said casing and having the other end adapted to be secured to said engine for resiliently holding said casing in engagement with said engine, said casing being formed of two sections each having a respective one of said walls, said casing sections being held together in assembled relation by peripheral flange portions extending therearound, and insulating means contacting said flange portions and separating the flange portions of one section from the flange portions of the other section.

3. An electric heater for heating an engine, comprising a casing having one wall adapted to conformably engage said engine, a heating element within said casing adjacent said one wall, a heat resistant plate intermediate said heating element and the opposite wall of said casing, wiring extending from said heating element through and out of said casing for connection to a source of power, a thermostat within said casing and interposed in said wiring, and a bracket having one end secured to said casing and having the other end adapted to be secured to said engine for resiliently holding said casing in engagement with said engine, said bracket being fabricated of resilient material and having a depending arm, and means for securing the upper end of said arm to said engine, said casing being formed of two sections each having a respective one of said walls, said casing sections being held together in assembled relation by peripheral flange portions extending therearound, and insulating means contacting said flange portions and separating the flange portions of one section from the flange portions of the other section.

4. In combination with an oil pan for an engine, hav-

ing a bottom wall, side walls, and outwardly extending flanges at the upper ends of said side walls, a heater comprising a casing arranged exteriorly of said oil pan above the level of said bottom wall and having one wall in surface contact with one side wall of said oil pan, a heater element within said casing adjacent said one wall thereof, wiring extending from said heater element through and out of said casing for connection to a source of power, a thermostat within said casing and interposed in said wiring, and a bracket adapted to be secured to said flange for holding said casing in surface contact with said one side wall of said oil pan, said casing being formed of two sections each having a respective one of said walls, said casing sections being held together in assembled relation by peripheral flange portions extending therearound, and insulating means contacting said flange portions and separating the flange portions of one section from the flange portions of the other section.

5. In combination with an oil pan for an engine, having a bottom wall, side walls, and outwardly extending flanges at the upper ends of said side walls, a heater comprising a casing arranged exteriorly of said oil pan above the level of said bottom wall, a heater element within said casing, wiring extending from said heater element through and out of said casing for connection to a source of power, a thermostat within said casing and interposed in said wiring, and a bracket adapted to be secured to said flange for holding said casing in surface contact with said one side wall of said oil pan, said bracket being fabricated of resilient material and having a depending arm, and means for securing said casing to said depending arm, said means comprising a channel on the opposite wall of said casing for receiving said depending arm, and a fastener for securing said arm in said channel, said casing being formed of two sections, one of said casing sections having an end wall and four side walls joined therewith and extending perpendicular therefrom to form a hollow enclosure having an open end opposite said end wall, said side walls having outwardly directed flanges extending peripherally around said open end of said enclosure formed by said one casing section, the other casing section being in the form of a plate extending over said enclosure open end to cover the latter and having around its periphery a plurality of flanges each extending exteriorly around a respective one of said outwardly directed flanges on said one casing section and having an inturned flange portion, said inturned flange portions, said outwardly directed flanges, and said plate being in spaced parallel relation with respect to each other with said outwardly directed flange portions extending between the respective inturned flange portions and the plate, and a U-shaped heat insulating member extending around each of said outwardly directed flanges and within the spaces between the latter and said inturned flange portions and the plate, whereby said casing sections are insulated from each other, said plate being in surface contact with one side wall of said oil pan, and a sheet of insulating material between said end wall and said heater element, the latter being in heat conducting relation to said plate.

6. In combination with an oil pan for an engine, having a bottom wall, side walls, and outwardly extending flanges at the upper ends of said side walls, a heater comprising a casing arranged exteriorly of said oil pan above the level of said bottom wall, a heater element within said casing, wiring extending from said heater element through and out of said casing for connection to a source of power, a thermostat within said casing and interposed in said wiring, and a bracket adapted to be secured to said flange for holding said casing in surface contact with said one side wall of said oil pan, said bracket being fabricated of resilient material and having a depending arm, and means for securing said casing to said depending arm, said means comprising a channel on the opposite wall of said casing for slidably receiving said depending arm, and fastener means extending through said channel to said arm for securing said casing at a selected position along said arm, said casing being formed of two sections, one of said casing sections having an end wall and four side walls joined therewith and extending perpendicular therefrom to form a hollow enclosure having an open end opposite said end wall, said side walls having outwardly directed flanges extending peripherally around said open end of said en-

closure formed by said one casing section, the other casing section being in the form of a plate extending over said enclosure open end to cover the latter and having around its periphery a plurality of flanges each extending exteriorly around a respective one of said outwardly directed flanges on said one casing section and having an inturned flange portion, said inturned flange portions, said outwardly directed flanges, and said plate being in spaced parallel relation with respect to each other with said outwardly directed flange portions extending between the respective inturned flange portions and the plate, and a U-shaped heat insulating member extending around each of said outwardly directed flanges and within the spaces between the latter and said inturned flange portions and the plate, whereby said casing

sections are insulated from each other, said plate being in surface contact with one side wall of said oil pan, and a sheet of insulating material between said end wall and said heater element, the latter being in heat conducting relation to said plate.

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