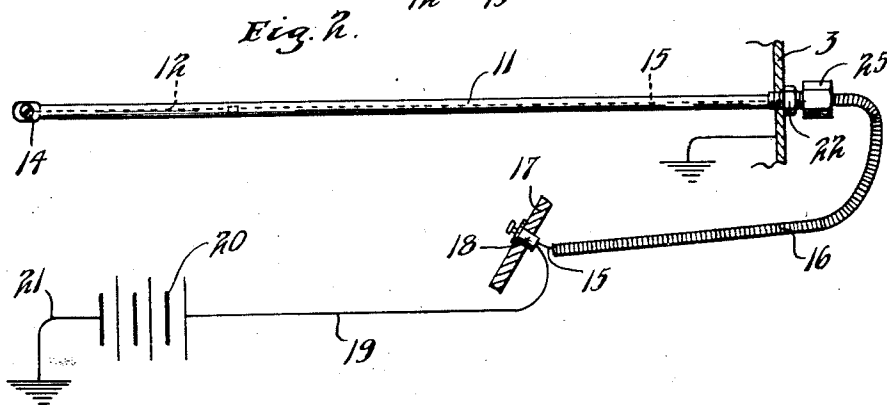
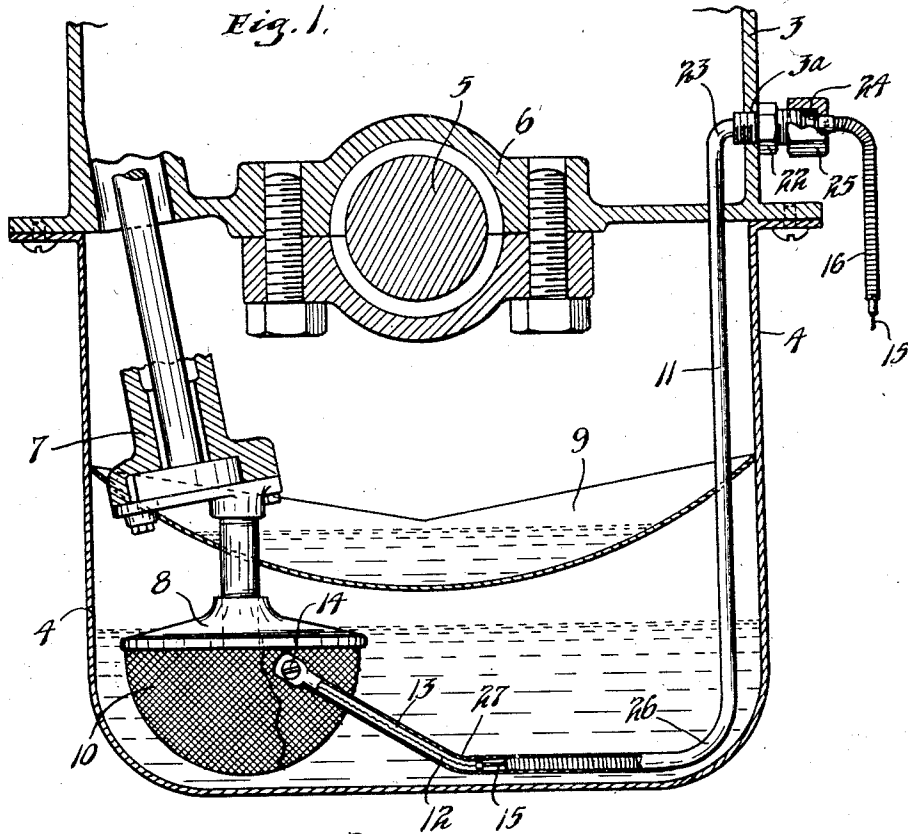


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CRANK CASE OIL HEATER
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CRANK-CASE-OIL HEATER.

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This invention relates to heaters for heating up the oil in the crank case of an internal combustion engine during cold weather.

In cold climates, when automobile engines, or any type of internal combustion engines are used, the oil in the crank cases of the engines will become stiff and viscous, if the engines are left out in the cold without being used for any length of time. When the oil is in such condition, the engine, when first started, will not pump sufficient oil to the bearings to insure perfect lubrication and there is thus danger of injuring certain of the movable parts of the engine, unless the oil is, at least, partially thawed out, by heating, before the engine is first started. A number of different means have been provided for heating the oil in a crank case prior to the starting of an internal combustion engine, but these means have not proved entirely satisfactory.

It is an object of this invention, therefore, to provide a novel and improved heater for heating the oil in the crank case of an internal combustion engine which will efficiently heat the oil for use, will be easy to install and can be economically operated without waste of heat.

To these ends, the invention consists in the novel parts and novel combinations of parts, hereinafter defined in the claims and described in the following specification, made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the various views, and, in which

Fig. 1 is a vertical section taken through the lower portion of an internal combustion engine, and illustrating an embodiment of the present invention applied thereto, and

Fig. 2 is a more or less diagrammatic view illustrating the electrical circuit for the device of the invention.

Referring to the drawings, portions of an internal combustion engine of standard construction are illustrated, which include the engine case 3 having outwardly projecting flanges at its lower end to which the crank case 4 of the engine is bolted. The crank shaft for the engine is designated by the numeral 5 and the main central bearing for the crank shaft is indicated by the numeral 6. A rotary oil pump 7 is shown which

works within the crank case 4, and the pump has a bell-shaped inlet portion 8 normally extending below the oil level in the crank case 4 and secured to the bottom of the pump 7, and projecting through an oil pan 9 secured to the crank case 4 in spaced relationship above the bottom thereof. The inlet portion 8 of the pump 7 is provided with a half spherical-shaped strainer 10 of the usual type for straining the oil before the admission thereof, into the inlet port. It will be understood that the construction, thus far described, is merely illustrative of one type of engine to which the present device can be applied.

In accordance with the present invention, a long straight tube 11, constructed preferably from copper or other conducting material, is provided, and an electrical heating element 12 which may be merely a short wire constructed from nichrome, or other similar metal is inserted in one end of the tube 11, hereinafter designated the lower end of the tube, to project from the said end of the tube for some little distance into the tube. The heating element 12 is insulated from the sides of the tube as by asbestos 13, or similar non-combustible material, and the extreme lower end of the tube 11 is flattened and one end of the heating element 12 is connected with the flattened portion of the tube as by means of a nutted bolt 14 running through the flattened portion and clamping the said end of the heating element thereto. The other end of the heating element 12 is connected to an insulated electrical conductor 15 incased within a flexible armored cable 16, which runs from the last mentioned end of the heating element 12 through the tube 11 to adjacent the instrument board 17 of the automobile, or to any similar convenient location where an electrical switch such as the switch 18 may be located. One contact of the switch 18 is connected to the conductor 15 and the other contact of the switch is connected to a conductor 19 leading from and secured to one terminal of a storage battery 20, the other terminal of the storage battery being grounded as by means of the conductor 21.

To install the heater in the crank case of an internal combustion engine, the crank case 4 will be first removed. A small opening 3^a will then be bored in the engine cas-

ing 3 adjacent its lower end and preferably at a point transversely opposite the main central bearing 6 for the crank shaft 5. The opening 3^a will be tapped to receive a hollow coupling member 22, the said coupling member having two exteriorly threaded sleeves projecting from a polygonal portion thereof, which abuts the outer side of the engine casing 3. The upper end of the copper tubing 11, together with conductor 15 and flexible cable 16 will then be bent at right angles as at 23 and the upper portion of the tubing will be inserted from the inside of the engine casing 3 through the coupling member 22, so that the upper end of the tubing 11 projects a short distance beyond the outer sleeve of the coupling member 22. Previous to the insertion of a portion of the flexible cable 15 in tube 11, the flexible cable will have been threaded through a thimble 24 and a hollow nut 25. The nut 25 will now be screwed on to the exterior sleeve of the coupling member 22, thereby forcing the thimble 24 against the outer end of the exterior sleeve of the coupling member 22 and clamping the thimble tightly against the tube 13 to securely hold the tube in position at its upper end. The tubing 23 may be carried around the web at the bottom of the engine case 3 carrying the upper portion of the main bearing member 6, or else an opening may be cut in the web through which the tubing 11 will be extended. The tube may be also carried around the oil pan 9 or extended through any suitable opening therethrough as is illustrated. The tubing 11 will preferably be carried straight downwardly from the point 23 until it is brought to a point 26 spaced a short distance above the normal position of the bottom of the crank case 4, whereupon the tube will be bent inwardly at a right angle for some little distance, to a position approximately directly beneath the center of the crank shaft 5. At this point designated by the numeral 27, the lower end of the tube will be bent diagonally upwardly and toward the inlet portion 8 of the oil pump 7, and the extreme end of the tube will be inserted through an opening in the strainer 10, so that the end of the tube will project within the strainer 10 and closely adjacent the central part of the inlet portion 8. The diagonally inclined portion of the lower end of the tube 11 will encompass most of the heating element 13 and, accordingly, the heating element will be diagonally disposed upwardly toward inlet portion 8 of the pump. The crank case 4 may now again be secured in place, whereupon the heater will be ready for operation, considering the electrical connections to have been already made.

If after the internal combustion engine provided with the heater of the present in-

vention, has been standing in the cold, and it is desired to start the engine, the switch 18 will be first operated to place the conductors 19 and 15 in electrical communication with the storage battery 20. An electrical current will now flow from the storage battery 20 through conductor 19, switch 18, conductor 15 to heating element 12 and from the heating element 12 through the bolt 14 to the tube 11 and thence to a ground through the engine casing 3. The circuit will be complete, inasmuch as the conductor 21 connected to one terminal of the storage battery is grounded. As current flows through the heating element 12, it will be heated up, thereby heating and melting the oil in the crank case 4 around the diagonally disposed portion of the tube 11. A diagonal heated channel of oil will thus be provided and this channel will extend from adjacent the bottom of the crank case to the interior of the strainer 10 adjacent the intake portion 8 of the pump 7. The entire lower portion of the tube 11 will stand in spaced relationship from the walls of the crank case 4, so that no heat will pass by conduction to heat the crank case 4 without first passing through whatever oil there may be in the crank case. Practically all of the heat from the heating element 13 will, therefore, be expended in heating up the oil in the crank case and practically none of the heat will be wasted.

After the heater has been set in operation for a few minutes, the engine can be started. As the engine is started, a supply of liquid oil in warm, free running condition may be drawn from the diagonal channel around the diagonally disposed heating element portion of the tube 11 into the inlet portion 8 of the oil pump, and this warm free running oil may be carried by the pump into the bearings of the engine to properly lubricate the same. As the oil around the diagonally disposed portion of the tube 11 is heated up, it will tend to rise, but rather than rise directly through the heavy viscous and cold oil in the crank case, it will naturally take the easiest path to a higher level, that is, instead of working through the cold oil, it will rise diagonally along the diagonal portion of the tube 11 toward the inlet portion 8 of the pump and thus find its way directly into the pump. The warm oil, therefore, instead of rising to the top of the cold oil where it could not be used for lubricating purposes until all the oil in the crank case is melted, and in free running condition, as is the usual case when crank case oil heaters are used, will be capable of being used as soon as any of the oil is melted. The diagonal disposition of the heating element is, therefore, very important in the functioning of the device.

As the tube 11, conductor 15, flexible cable 130

16 and heating element 13 can all be bent as desired, and the tube will have sufficient rigidity to maintain its shape after being bent, it will be seen that the device can be
5 applied to any type of crank case, and the parts can be bent to conform to the shape of the particular crank case wherein the device is used. Also the tube can be bent to avoid
10 obstructions in the interior of the crank case, so that a special construction will not be necessary for different engines, whereon the device is used.

The parts of the device are few, the construction is simple and the installation may
15 be easily made. The heater has been found to be very efficient in actual practice.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the
20 various parts without departing from the scope of the present invention.

What is claimed is:

1. The combination with a crank case of
25 an internal combustion engine and an oil pump associated therewith, of an electrical heating element mounted in said crank case and extending diagonally upwardly from adjacent the bottom of the crank case to adjacent the inlet portion of said pump, and

means for supplying electrical energy to said electrical heating element.

2. The combination with a crank case of an internal combustion engine and an oil pump associated therewith, of a hollow tube forming an electrical conductor and extending
35 ing through said crank case well above the oil holding portion thereof, said tube projecting downwardly into the lower portion of the crank case to a point adjacent the inlet portion of said pump, said tube being
40 spaced at all points except at its point of admission to said crank case from the walls thereof, a heating element within the lower portion of said hollow tube and connected
45 at one end to the lower end of said tube, an electrical conductor extending through said tube insulated therefrom, and secured to the other end of said heating element, and means for supplying electrical energy
50 to said conductor, whereby oil in said crank case may be heated by said heating element and the heat may be only conducted to the outside of said crank case from said heating element by passage through the oil as a
55 medium.

In testimony whereof I affix my signature.

VICTOR N. ALBERTSON.