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METHOD OF AND APPARATUS FOR HEATING INTERNAL
COMBUSTION ENGINES TO FACILITATE STARTING
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Fig-1

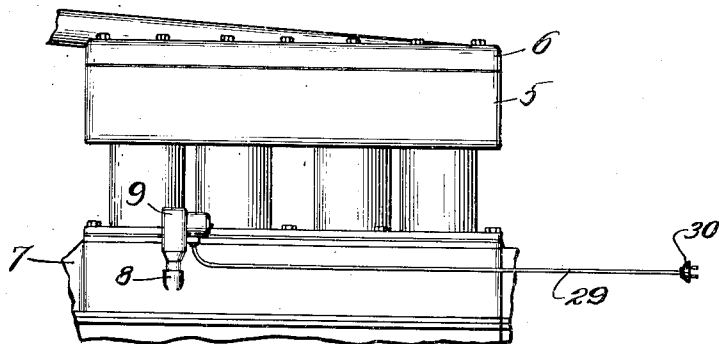
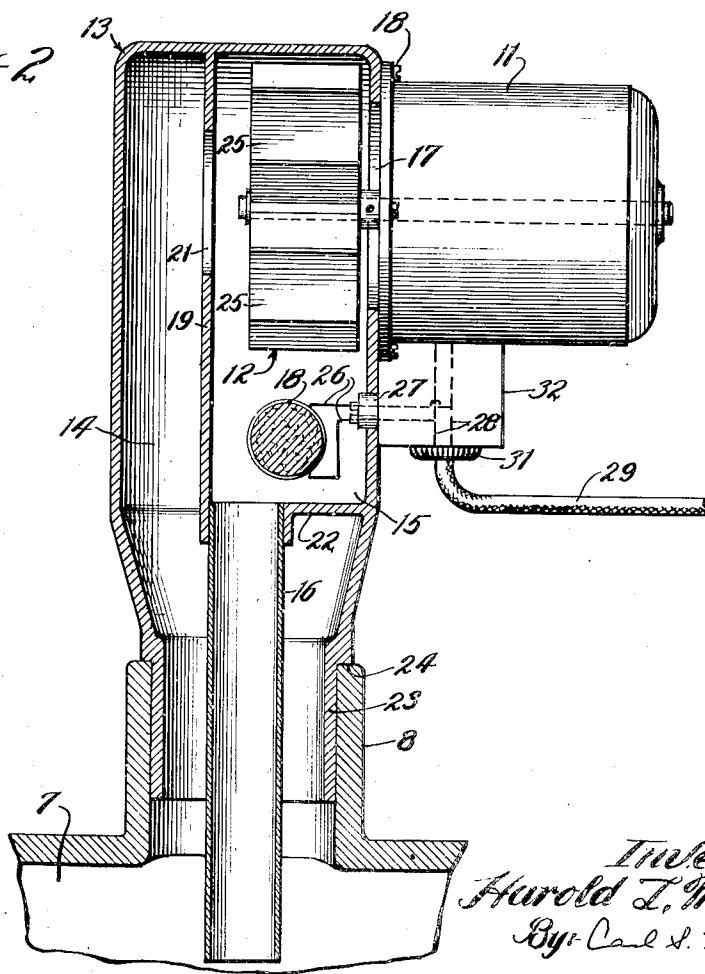


Fig-2



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METHOD OF APPARATUS FOR HEATING
INTERNAL COMBUSTION ENGINES TO
FACILITATE STARTING

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This invention relates to an improved method of heating an internal combustion engine to promote easy starting in cold weather. The invention also contemplates the provision of apparatus for carrying out the novel method.

In cold weather it is often difficult to start an internal combustion engine, such, for example, as the ordinary type of automobile engine, because of the tendency of the oil to congeal in the main bearings, connecting rod and wrist pin bearings, and between the piston and cylinder walls. The additional friction produced by reason of the congealed condition of the oil between the moving surfaces throws a very heavy load on the starting motor and battery. As a result of this condition, in starting, the motor can only be turned over very slowly, and there is often an insufficient rush of air through the carburetor to properly vaporize the fuel to give the cylinders a proper explosive mixture. Furthermore in the case of the automobile motor, in which the ignition is ordinarily supplied from the same battery which operates the starter, the excessive load on the battery reduces the terminal voltage to such an extent that it is often impossible to obtain a sufficiently hot spark to ignite the gas in the explosion chambers. The result of this condition, in addition to the difficulty in starting, is that there is a likelihood of improper lubrication of the parts of the motor. Before the motor warms up sufficiently to take the stiffness out of the oil there is great likelihood of burned out bearings and scored pistons.

The object of my invention is to overcome the difficulty in starting a motor of this type by displacing the cool air in the motor by a body of heated air to bring the oil to its proper degree of viscosity and lubricating quality.

The invention will be understood from the following detailed description which, taken in conjunction with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Fig. 1 is an elevational view of an internal combustion engine provided with a heater for warming the air in the crank case; and

Fig. 2 is an enlarged elevational view, partly in section, through the heater and breather tube of the engine.

The engine illustrated in the drawing includes a cylinder block 5, a cylinder head 6, and a crank case 7 provided with a breather tube 8 through which oil may be introduced.

According to my invention, I employ a heater 9 for introducing a stream of hot air through the breather tube 8 into the crank case 7. The heater is preferably designed to be used as a detachable unit which may be inserted in the breather tube 8 when it is desired to heat the engine and then

removed after the oil has been brought to the proper temperature.

In the embodiment shown the heater comprises: a motor-operated blower, including a motor 11, and a fan 12 carried by the armature shaft of the motor; a fan housing 13, including an intake chamber 14 and a discharge chamber 15; an exhaust tube 16; and a resistor heating element 18 supported in the discharge chamber 15 in the path of circulation of the air.

The fan housing 13 may be made of cast metal, the outer wall on one side being provided with an opening 17 for receiving the armature shaft of motor 11. The motor is bolted directly to the fan housing by bolts 18. A vertical partition wall 19, provided opposite the fan 12 with an opening 21, separates the intake chamber 14 from the discharge chamber 15. The upper end of the exhaust tube 16 is secured in a lower wall 22 of the discharge chamber 15. This tube may be made either flexible or rigid and is somewhat longer than the breather tube 8 so as to project into the crank case 7. The lower end of the fan housing terminates in a neck portion 23 which fits into the breather tube 8 of the engine. The neck 23 is reduced to provide a shoulder 24 which seats on the upper end of the breather tube 8.

The fan 12 is provided with a series of blades 25 which project radially from the hub portion of the fan. The heater 18 consists of an ordinary wire wound resistor element, current being supplied thereto by a pair of leads 26, which pass through an insulating collar 27 to connect with wires 28, which in turn connect through a cord 29 to a source of current supply. Current to the motor 11 is also supplied through the wires 28. The cord 29 is provided with a plug 31 which is arranged to be inserted in a terminal block 32 to provide the necessary electrical connections with the wires 28. The other end of the cord is provided with a plug 30 for connecting with a suitable source of current supply such as the garage lighting circuit.

When the motor is started and the heater is placed on the breather tube 8 in the manner illustrated in Fig. 2, the fan 12 sucks the cold air from the crank case 7 up through the intake chamber 14 to the opening 21 and then forces it downwardly over the heating element 18 into the exhaust tube 16. The heated air passes through the tube 16 back into the crank case 7 to complete the path of circulation.

The warm air thus introduced quickly raises the temperature of the oil to bring it to its proper degree of viscosity. The heating action is exceedingly effective inasmuch as the air is brought directly into contact with the bearings, connecting rods, crank shaft and pistons, which are the moving parts of the engine and are the parts around which the oil tends to congeal to make starting

difficult. A more rapid heating is obtained in this manner than would be obtained as, for example, by trying to warm up the motor by first heating the oil in the bottom of the crank case or by warming up the water in the cooling system. The specific heat of air is quite low as compared to that for oil and water and a very large volume may be heated with a comparatively small amount of heat. The air serves as a carrier for directly transferring the heat to the point at which its application is most effective. The warming of the motor in this manner, in addition to facilitating easy starting, also will prevent dilution of the oil by evaporating any condensed fuel which forms on the cold surfaces of the piston and cylinder walls.

In the embodiment shown the circulating system for the air is closed, the air from the crank case being drawn through the heater and forced back to its original source. This is considered a preferred form inasmuch as the recirculation of the air will give more rapid results and greater efficiency from the standpoint of current consumption than could be obtained by displacing the cool air in the crank case with heated air from an external source. In the form shown the intake chamber 14 and the exhaust tube 16 are arranged concentrically so as to both fit into the breather tube of the engine. It will be apparent that the same principle of heating could be used by providing a separate intake and outlet from the crank case or from the motor block. Also the particular type of fan and motor may be varied without departing from the principle of operation of the invention. Modifications of this nature are to be viewed as fully within the scope of the invention.

While I have particularly emphasized the application of the invention to the starting of motors in cold weather, its utility is not necessarily restricted to this use alone. The heater could be left in operation more or less continuously, as, for example, when a car is in an unheated garage, to keep the entire motor warm to prevent freezing of the liquid in the motor cooling system.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new and desire to secure by Letters Patent is:

1. The method of warming an internal combustion engine to promote easy starting which consists in introducing a stream of warmed air into the interior of the motor to bring the oil to the proper degree of viscosity.
2. The method of warming an internal combustion engine to promote easy starting which comprises circulating a stream of heated air through the crank case to bring the oil to the proper degree of viscosity.
3. The method of warming an internal combustion engine to promote easy starting which consists in withdrawing the cool air from the crank case of the motor and replacing it with a body of warmed air.
4. A heater for warming the oil in the crank case and bearings of an internal combustion engine to promote easy starting comprising, a motor-operated blower, a resistor heating element positioned in the path of a stream of air circulating from the blower, and means for conducting

the stream of heated air into the interior of the engine.

5. A heater for warming the oil in the crank case and bearings of an internal combustion engine to promote easy starting comprising, a motor-operated blower, a resistor heating element positioned in the path of a stream of air circulating from the blower, means for conducting the stream of heated air into the interior of the engine, and means for returning displaced cool air from the engine to the blower for circulation over the heating element.

6. A heater for warming the oil in the crank case and bearings of an internal combustion engine to promote easy starting comprising, a motor-operated fan, a fan housing, an exhaust tube connecting with the fan housing and adapted for insertion in the breather tube of the engine, and a resistor heating element positioned in the path of a stream of air circulating from the fan.

7. A heater for warming the oil in the crank case and bearings of an internal combustion engine to promote easy starting comprising, a motor-operated fan, a fan housing, an exhaust tube connecting with the fan housing and adapted for insertion in the breather tube of the engine, a resistor heating element positioned in the path of a stream of air circulating from the fan, and a return duct for conducting displaced cool air from the engine to the fan for circulation over the heating element.

8. A heater for warming the oil in the crank case and bearings of an internal combustion engine to promote easy starting comprising, a motor-operated fan, a fan housing, an exhaust tube connecting with the fan housing and adapted for insertion in the breather tube of the engine, a resistor heating element positioned in the path of a stream of air circulating from the fan, and a return duct for conducting displaced cool air from the engine to the fan for circulation over the heating element, said duct being in the form of a housing surrounding said exhaust tube from the fan and shaped to fit over the breather tube of the engine.

9. The combination with an internal combustion engine of a heater provided with means for introducing a stream of heated air into the interior of the engine to promote easy starting.

10. The combination with an internal combustion engine of a heater for warming the oil in the crank case and bearings to promote easy starting, said heater comprising a motor-operated blower, a resistor heating element positioned in the path of a stream of air circulating from the blower, and means for conducting the stream of heated air into the interior of the engine.

11. The combination with an internal combustion engine of a heater for warming the oil in the crank case and bearings to promote easy starting, said heater comprising a motor-operated blower, a resistor heating element positioned in the path of a stream of air circulating from the blower, means for conducting the stream of heated air into the interior of the engine, and means for returning the displaced cool air from the engine to the blower for circulation over the heating element.

12. The method of warming an internal combustion engine which consists in circulating a stream of preheated air through the crank case of the engine.

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