July 5, 1938. P. POLLACK ET AL 2,122,585

HEATING APPARATUS FOR THE OIL IN THE CRANKCASE AND WATER IN THE COOLING SYSTEM OF INTERNAL COMBUSTION ENGINES

Filed April 27, 1937 2 Sheets-Sheet 1

Fig. 1.

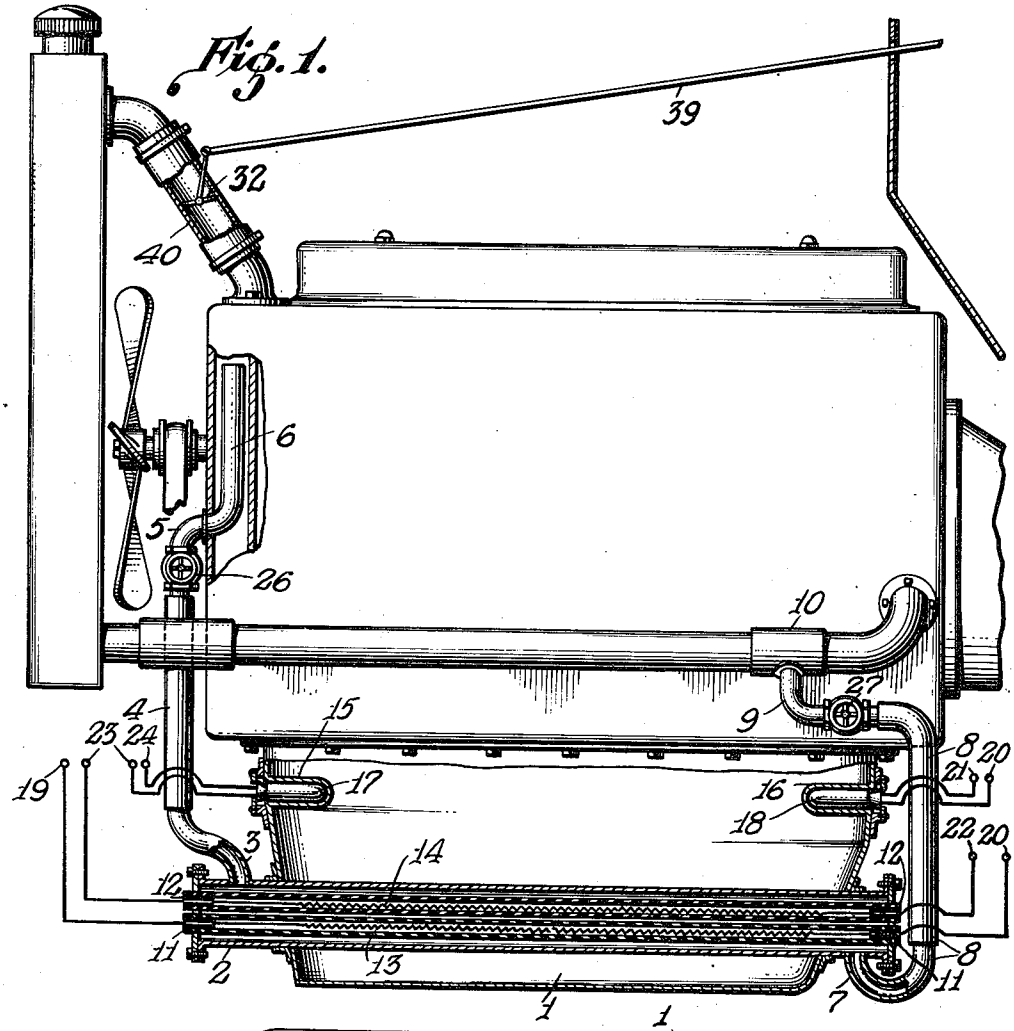
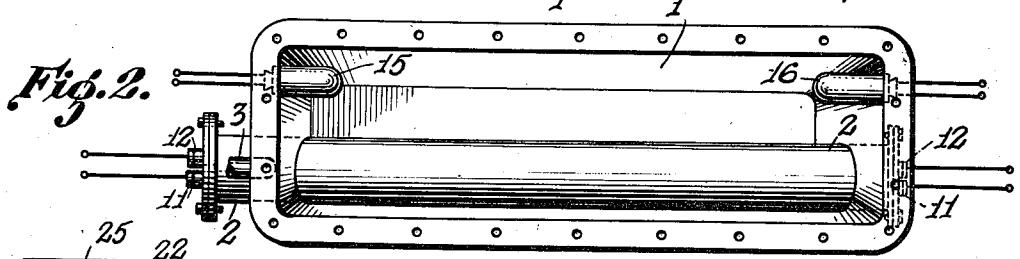


Fig. 2.



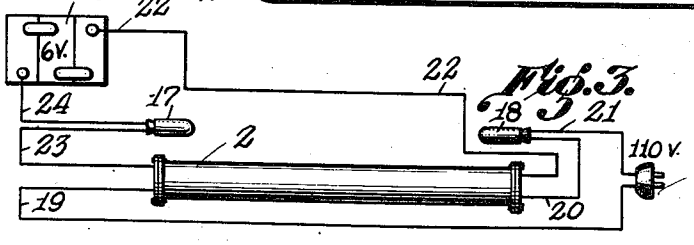


Fig. 3.

Inventors:

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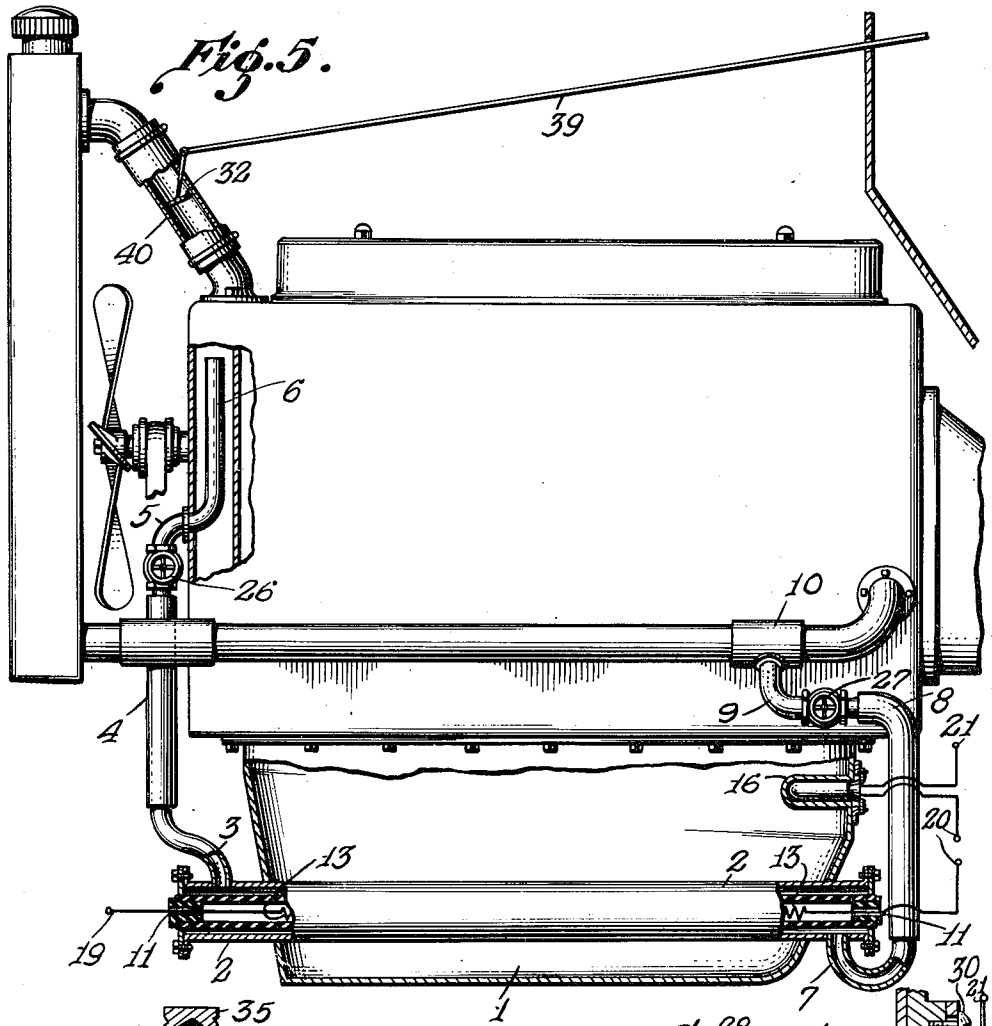
Abraham Solomon

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Fig. 5.



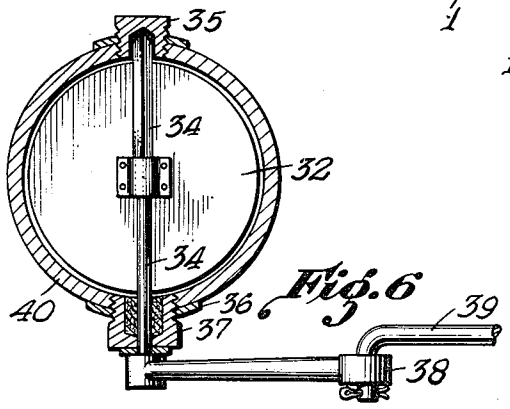


Fig. 6.

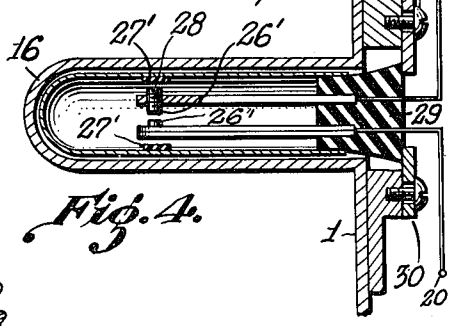


Fig. 4.

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Patented July 5, 1938 2,122,585

UNITED STATES PATENT OFFICE

2,122,585

HEATING APPARATUS FOR THE OIL IN THE CRANKCASE AND WATER IN THE COOLING SYSTEM OF INTERNAL COMBUSTION ENGINES

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Application April 27, 1937, Serial No. 139,306

4 Claims. (Cl. 123—170)

Internal combustion engines are not properly lubricated when the oil is either congealed by cold or thinned by excessive heat. At present when the motor is not in use during cold weather, the oil in the crank case, cylinder walls, etc., congeals causing great difficulty in starting and damage to the motor and battery. On the other hand, while the motor is in operation and generating an intense heat, the oil tends to become too thin and, at present, there is no cooling system provided in the crank case to counteract this tendency.

The invention provides an automatic heating system designed to heat the oil and water and thus keep the motor warm while not in use; and a cooling column in the crank case to keep the oil temperature down while the motor is running.

The objects of the invention are:

To prevent the motor from freezing and to keep it warm; to heat the oil and keep it from congealing when the motor is not in use; to increase or decrease the temperature of the motor by controlling the circulation of the water through the radiator and to cool the oil in the crank case while the motor is running.

One form of the invention is illustrated in the accompanying drawings, in which Figure 1 is a vertical cross-section of the entire invention with double heating units as attached to an internal combustion motor.

Figure 2 is a plan view of the oil pan showing the water cylinder, heaters and thermostats attached to oil pan.

Figure 3 represents the electric circuit connecting one heater and thermostat to regular 110 volt electric current and the other heater and thermostat to storage battery.

Figure 4 represents a detailed view of a part of the invention, to wit, the thermostat and its housing.

Figure 5 is a vertical cross section of the entire invention containing but a single heating unit.

Figure 6 represents a detailed view of a part of the invention, to wit, the water shutter.

The following is a detailed description of the invention:

Running through entire length of oil pan 1, there is inserted a water cylinder 2—2, so that both ends project from pan 1. Water outlet 3 mounted at top of front projecting end of cylinder 2, is connected by means of hose 4 to outlet 5 which leads into the water channel 6 in the engine. Water outlet 7, mounted on bottom of rear projecting end of cylinder 2, is connected by means of hose 8 to outlet 9 which is mounted on rear hose of radiator return pipe 10. Shut off valves 26 and 27 are mounted on outlets 5 and 9. Tubes 11—11 and 12—12 are inserted into, and run through the entire length of cylinder 2—2 projecting somewhat at both ends. Heating elements 13—13 and 14—14 are inserted in tube 11 and 12 with suitable insulation.

Housings 15 and 16 are built into the further ends of pan 1 opposite cylinder 2, each housing having an opening on the outside. Into housings 15 and 16 are inserted thermostats 17 and 18.

The two metal contacts 26'—26' of thermostats 17 and 18 are mounted on bakelite insulation 27'—27' and fitted into insulation tube 31 which fits snugly into housing 15. The double wire coming from the contact prongs 26—26 run through the center of rubber plug 29 which is inserted into the outer open end of housing 15 and held in place by two block screws 30—30. Set screw 28 is threaded into bakelite attached to one of the prongs and is used to regulate the space between the contact points.

Coming from 110 volt line, wire 19 is connected to one end of heating element 13. From the other end of heating element 13 wire 20 is connected to one side of the thermostat 18. From the other side of thermostat 18 wire 21 connects to the other side of 110 volt line as shown in Figure 3. Coming from one pole of the automobile battery, wire 22 is connected to one end of heating element 14. From the other end of heating element 14, wire 23 is connected to one side of thermostat 17. From the other side of thermostat 17, wire 24 connects to other pole of the automobile battery, 25 as shown in Figure 3.

Fitted in between the upper radiator outlet and the outlet of the head of the motor is circular tube 40. Fitted snugly into tube 40 is circular shutter disc 32, in the center of which is mounted a circular sleeve 33. From an opening at the bottom of tube 40 pivot rod 34 is inserted. The upper circular portion of pivot rod 34 is slipped through circular sleeve 33 and thence through sleeve 36 which is mounted on the top of tube 40. Lower pivot nut 35 is then screwed into and sealed against tube 40. Packing nut 37 is screwed into sleeve 36 and packed against pivot rod 34. Elbow 38 is mounted on top of pivot rod 34 and on the ball of elbow 38 is fitted a sleeve of sliding rod 39, which rod extends to the dashboard of the vehicle.

Although the invention as pictured in Figure 1 contains two heating units, one connected to outside current and the other to a storage battery,

it must be understood that the use of two heating units is optional and not absolutely essential and that the purpose of the invention is carried out by the use of a single heating unit connected to outside current as shown in Figure 5. We have found, however, that more complete protection is furnished by the use of two heating units, one of which would operate when connected to ordinary outside current as in a garage, and the other while the car is parked at the curb or other place where such outside current is not available. It is also within the spirit and principle of this invention and will accomplish the same result to use one heating element which is tapped so that the entire element is used when connected to outside current whereas only a portion thereof is used when connected to the storage battery. We have found however that the use of two heating elements is preferable for the heat is then distributed through the entire length of the crank case.

It must be understood that the thermostatic controls may be set at any desired temperature. We have found that when our heating unit is used, best protection is afforded by setting the thermostat at approximately 75 degrees. When two heating units are used, we have found that the best use of the invention will be afforded when the thermostat controlling the heater connected to the outside current is set at approximately 75 degrees while the thermostat controlling the heater connected to the battery is set at approximately 35 degrees.

It should be noted that while any standard make of electric resistance wire may be used in the construction of the heating elements **13—14**, the heating element connected to the outside current has a high electric resistance whereas the one connected to the storage battery has an electric resistance low enough so that the usual six volts of the storage battery will be sufficient.

Heretofore, heaters have been constructed to heat internal combustion motors when not in use but such heaters leave the following practical problems unsolved. To be efficient, it is necessary for the heater to be immersed in the oil in the crank case so as to heat the oil directly without loss of heat energy. By locating the heater in the crank case the heat naturally rises and thereby eliminates the necessity of having any pump-driven circulation. The difficulty has been that the heaters heretofore constructed can not safely be immersed in the oil in the crank case.

The heating systems heretofore constructed, being located on the outside of the crank case, either do not heat the oil in the crank case at all or else heat such oil only indirectly and insufficiently and with great waste of heat energy.

Some of the present heating units are so constructed that the heating element is wrapped around a small portion of a water pipe thus necessarily entailing a great waste of heat energy in the heating of the pipe itself and also by reason of the fact that the heater is exposed to outside temperature. Being located outside of the crank case such systems necessarily employ special water pumps, driven by electric motors. The danger of fire from having exposed heaters as well as electric motors operating in the vicinity of combustible gases and while the motor is unattended is readily appreciated. Moving parts operating while motor is unattended are to be avoided as being undependable and even dangerous.

Our invention is primarily designed to be installed into and operated in the crank case oil reservoir with the utmost safety. Thus our invention heats the oil directly throughout the entire crank case without any loss of heat energy and the heat rises throughout the entire water system without the use of any pumps and motors or other moving parts being required.

This is accomplished by the novel arrangement of the heating element, to wit, its insertion in the inside of a tube and completely surrounded by water in a water jacket connected to the water cooling system, which water jacket is, in turn, immersed and completely and directly covered by the oil in the crank case. The thermostats being located directly in the oil assure a proper temperature of both the oil as well as the water.

Our invention by its efficient use of all the heat energy and elimination of the necessity for any motor driven pump, is operable by a storage battery with only a moderate discharge therefrom.

The heat required may be further considerably reduced by the use of the water shutter **32** which disconnects the radiator from the water cooling system.

If desired, the heat energy required may be still further materially reduced by the operation of the two shut-off valves **26, 27** which will disconnect the water cooling system from the water jacket **2**, and thus localize the heating to the crank case oil.

The operation of shut-off valves **26, 27** in combination with outlets **3** and **7** and hoses **4** and **8** enable the crank case pan **1** to be removed with ease and without draining the water from the water cooling system.

The use of the storage battery for the purpose of this invention becomes even more practical when combined with an apparatus designed to recharge the battery such as is disclosed by our invention of the automatic battery charging combination and circuit, a patent for which we have applied for simultaneously herewith.

It is understood that the heating system herein disclosed may have more than one heating element connected in series or parallel and located not only in the crank case but also in any or all other parts of the water cooling system and the heating element or elements may be tapped at any number of points to increase or reduce the electric resistance; also that the electric heaters may be adapted to any voltage. It is obvious that various other modifications may be made in the construction or arrangement of parts without departing from the principles herein set forth.

We claim:

1. In an internal combustion motor, the combination of two electric heating elements, one being of low voltage and the other of high voltage, each in an insulated tube completely inclosed in a water jacket which is built into the crank case of the motor and which water jacket is connected to the motor water system by a feed and return pipe; the high voltage heating element being connected through a thermostat to the high voltage electric current; the low voltage heating element being connected through a separate thermostat to the storage battery.

2. In an internal combustion motor, the combination of one electric heating element provided with taps so that the electric resistance of the said heating element may be increased or decreased for alternate use with high or low voltage, contained in an insulated tube completely

enclosed in a water jacket which is built into the crank case of the motor and which water jacket is connected to the motor water system by a feed and return pipe and controlled by thermostats.

3. In a combustion motor the combination of an inner tube or housing, water sealed and jacketed by an outer tube or housing which is connected to the water cooling system of the motor, the inner tube or housing containing one or more heating units to heat the water in the outer tube or housing, so placed in the crank case that the outer tube would have direct contact with the oil throughout the entire length of the crank case; means for connecting electric energy to the heating unit or units, and means for connecting the outer tube to the water cooling system of the motor.

4. An oil and water heating apparatus for an internal combustion engine comprising a tube running through the entire length of the crank case, suitably welded to the same, with both ends of said tube projecting out of the crank case; an outlet near each projecting end to receive suitable hose or pipe equipped with petcock, which pipes are connected to the water cooling system; the ends of the aforesaid tube to be sealed around an inner tube which is inserted into and runs through the entire length of the above-described tube, which serves as an outer tube, the ends of the inner tube projecting from both ends of the outer tube, said inner tube being properly sealed or welded into the outer tube; one or more electric heating elements inserted into and running through the entire length of said inner tube, suitable insulation therefor, and packed and capped on both ends with removable caps; electric wire leads leading out from said caps; electric thermostat placed in oil crank case at furthest possible distance from heater; means for connecting thermostat heater and outside electric current.

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