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PATENT



SPECIFICATION

Application Date, Jan. 9, 1917. No. 437/17.

Complete Accepted, Mar. 15, 1917.

COMPLETE SPECIFICATION.

Improvements in or relating to the Lubrication of Internal Combustion Engines.

I, LEON DUFOUR, 109, route de Lyon, Geneva, in the Republic of Switzerland, Engineer, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 Automatic lubricating installations hitherto used for internal combustion engines have not in all cases satisfied the desired conditions both as regards the lubrication strictly so called and as regards reserve and inspection.

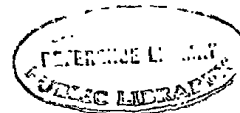
10 From the point of view of the lubrication it is known that the lubricating power of the oil, starting from a certain degree of heat, decreases with an increase in its temperature. Now the oil that is passed into the engine while it is working becomes heated more rapidly according as the amount passed in becomes less and its temperature at entrance higher. The temperature at entrance will be high when the lubricant comes directly from a reservoir situated in a position where it is exposed to the heat liberated by the engine, the bottom of the gear-
15 case for instance, and the smaller the capacity of the reservoir the higher the temperature will be. It will therefore be seen that it is advantageous in this connection to have a large volume of oil, a strong circulation and effective cooling. Moreover a large oil reserve enables longer journeys to be taken without obtaining fresh supplies.

20 On the other hand the space occupied by a large reservoir when applied to automobile engines does not always permit of it being placed under the direct observation of the chauffeur, on the dash-board of the vehicle for instance. Now it is of the utmost importance that the chauffeur should be constantly aware of the quantity of oil at his disposal, especially in the case of an unexpected
25 leakage of oil.

These conditions of safety and efficiency are completely fulfilled in the automatic lubricating installation for internal combustion engines forming the subject-matter of the present invention.

30 The present lubricating installation, described with reference to its application to engines for automobiles and in which two reservoirs are combined with two pumps and a cooling coil, enables an intense circulation of cooled oil under pressure, to be maintained in the elements of the engine while working and maintains a considerable reserve, and allows of the chauffeur being aware constantly as to the quantity of oil at his disposal. One of the reservoirs is placed in sight of the
35 chauffeur, on the dash-board of the engine for instance, and serves for inspection and filling purposes. The other serves as a reserve, and is located lower than

[Price 6d.]



the first reservoir, with which it is connected, so as always to remain full so long as the first still contains any oil. One of the pumps serves to force the oil under pressure into the various elements of the engine, while the function of the other is to force back the oil collected from the bottom of the gear-case into the filling reservoir. This oil, which leaves the engine at a high temperature, is cooled 5 in the coil, which may for instance be exposed to the air currents produced by the motion of the car.

I will describe with reference to the accompanying drawing an arrangement in accordance with this invention but I do not limit myself to the precise arrangement described and illustrated, nor to the application of the lubricating system 10 to engines for automobiles.

Referring to the drawing from the reservoir r^1 , containing about twelve litres for instance, which is situated on the dash-board of the motor, the oil flows into the reserve reservoir r^2 , of about the same capacity as the reservoir r^1 the reservoir r^2 being situated under the gear-case. From there the oil is drawn by the 15 pump a and forced under pressure into the various elements of the engine. After being used, the oil, which ought not to remain at the bottom of the gear case, in order to avoid being heated and splashing the connecting-rods, flows over an inclined plane k to be filtered at l and to be immediately drawn in at f by the pump b which forces the oil into the reservoir r^1 through the cooling coil s placed 20 under the gear-case and exposed to air-currents.

It is to be observed that the reservoir r^2 , which is hermetically sealed, can only become empty when the reservoir r^1 , which has an air inlet, becomes empty. In order to ascertain the quantity of oil available, it will therefore be seen that all that is required is to ascertain the contents of the reservoir r^1 which may 25 be done by means of a float to which an indicating rod m is fixed which shows on a graduated scale the height of the level of oil. The inspection can also be made, for instance, by observation through a suitably glazed opening.

In the event of the complete emptying of the reservoir r^1 , there would still, in the example selected, be a reserve of oil amounting to about 10 litres. 30

The oil under pressure is passed into the elements of the engine through the passage d in the crank shaft, by means of distributing passages of sufficiently large diameter to cause only a slight fall of pressure and to maintain an adequate pressure of oil even at the last bearing. From this central duct the oil is distributed from the passages m^1 , n and i to the various elements such as bearings, 35 crank-pins and gudgeon pins by small radial openings j . With a view to distributing the lubrication uniformly in spite of the fall of pressure, the sections of the openings j gradually increase from the first of these organs to the last. The oil enters by the end journal which is conical in shape and over which the distributor e is fitted, contact being maintained by the spring h , in such a way as to form a fluidtight joint in spite of wear. The distributor e may also serve 40 as a safety valve in the event of the pressure becoming excessive.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:— 45

1. An automatic lubricating installation for internal combustion engines comprising in combination two oil reservoirs, two pumps and a cooling coil, one of the reservoirs, which is intended for inspection filling and supply purposes, being placed in sight of the chauffeur, and the other, which serves as a reserve, being placed at a lower level than the first reservoir, the oil being drawn in from 50 the second reservoir by one of the pumps and forced by the same pump under pressure into the elements of the engine, to be subsequently returned, after use,

by the other pump, from the bottom of the gear-case into the filling reservoir, through the cooling coil.

2. An automatic lubricating installation according to Claim 1, in which the oil under pressure is distributed to the bearings and pins by small openings communicating with a distributing passage formed inside the crank shaft and having a sufficiently large diameter to keep the loss of pressure quite small and to obtain an adequate pressure of oil even at the last bearing, the entrance of the oil being effected by a distributor constantly pressed against the conical end of the crank shaft in such a way as to form a fluidtight joint, in spite of wear, and capable of serving as a safety valve in the event of the pressure becoming excessive.

3. An automatic lubricating installation according to Claim 1 in which radial openings are provided which openings lead from the main distributing passages and distribute the oil to the bearings and pins the cross-section of the openings gradually increasing from the first element fed with oil to the last, reckoning in the direction of flow of the oil.

4. An automatic lubricating installation for automobile engines substantially as hereinbefore described and illustrated with reference to the accompanying drawing.

Dated this 9th day of January, 1917.

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[This Drawing is a reproduction of the Original on a reduced scale.]

