C. A. F. DUCORRON.

LUBRICATING SYSTEM.

APPLICATION FILED FEB. 12, 1917.

1,270,606. Patented June 25, 1918.

Fig. 1.

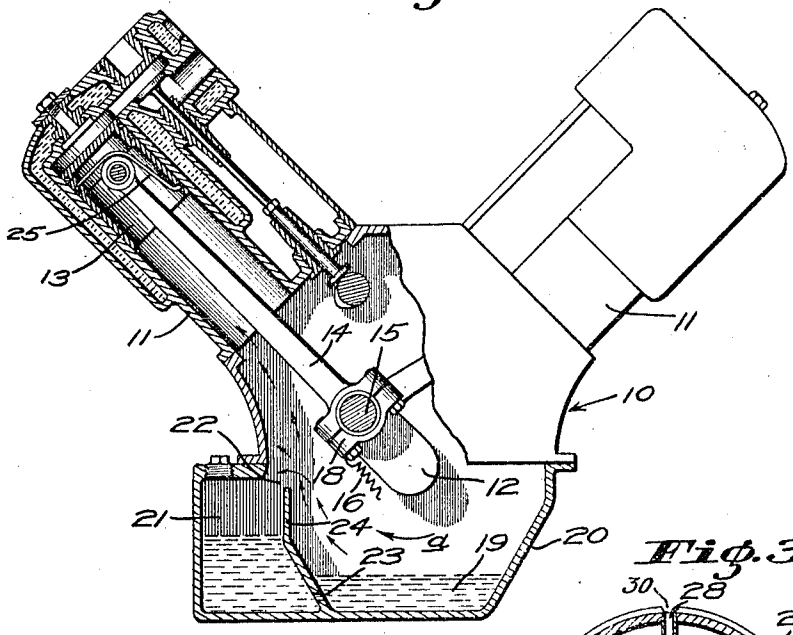


Fig. 3.

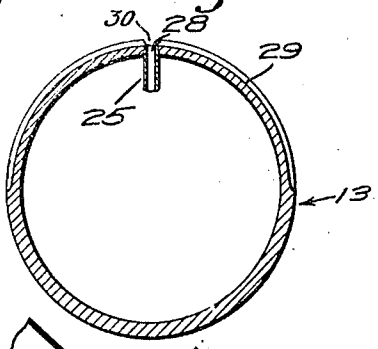
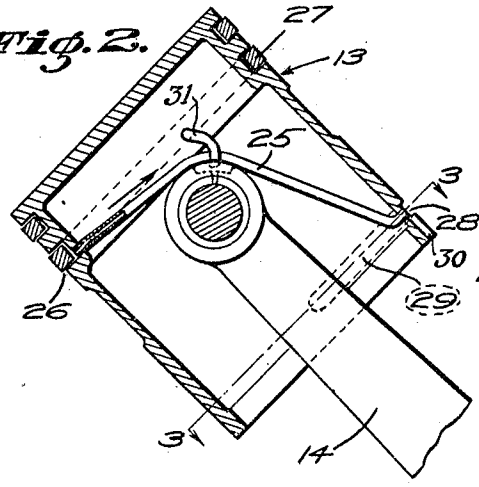


Fig. 2.



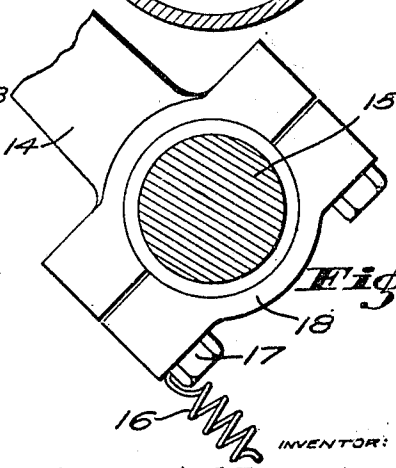


Fig. 4.

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LUBRICATING SYSTEM.

1,270,606. Specification of Letters Patent. Patented June 25, 1918.

Application filed February 12, 1917. Serial No. 148,163.

To all whom it may concern:

Be it known that I, CHARLES A. F. DUCORRON, a citizen of of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Lubricating Systems, of which the following is a specification.

This invention relates to a lubricating system for internal combustion engines and particularly pertains to such a system for use in lubricating an engine of the V-type.

The object of my invention is to provide a lubricating system for the cylinders of an internal combustion engine which embodies simple means for elevating a lubricating oil from the engine crank case into the engine cylinders and which insures the uniform distribution of the oil over the bearing surface of said engine cylinders.

Another object is to provide a simple oil elevating means which effectively throws oil into the engine cylinders and utilizes the centrifugal action of the rotating crank shaft as well as the splash of the parts through the lubricant in so doing.

It is another object to provide means for conducting the lubricant to an inclined cylinder and across and to the uppermost cylindrical face of the piston moving within the cylinder.

It is a further object to provide a lubricating system for an internal combustion engine which utilizes the pressure of the gases within the cylinder head to facilitate the distribution of oil over the surface of the pistons.

Another object is to provide an oil elevating means which will carry a large volume of oil without danger of becoming clogged and from which the oil may be readily thrown.

Another object is to provide means whereby oil may be elevated from the bottom of the crank case and the air within the case thoroughly saturated therewith, so that a uniform amount of the lubricant will be deposited upon the walls of cylinders disposed at different angles around the crank shaft.

Another object is to provide means whereby considerable variation of the level of the oil in the case may be allowed without materially altering the amount of oil elevated therefrom.

It is a further object to provide simple means for draining the oil thrown in excess to the cylinders.

Other objects will appear hereinafter.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a view in partial section through an internal combustion engine of the V-type, and shows my device as applied.

Fig. 2 is a view in section through one of the pistons showing the detail construction thereof.

Fig. 3 is a transverse view in section on the line 3—3 of Fig. 2.

Fig. 4 is a detail view of the lower end of a piston rod showing my conveying means as applied.

Referring to the drawings, 10 indicates an internal combustion engine of the V-type having cylinders 11 oppositely disposed and at an angle to each other and having their longitudinal axes converging at the center of the engine crank shaft 12. Mounted to reciprocate within said cylinders are engine pistons 13 fitted with piston rods 14 connected to the crank pin 15 of the crank shaft 12.

All of the foregoing construction is or may be that embodied within the usual engine design.

The oil conveying and elevating mechanism which comprises a part of my invention, is mounted to operate in conjunction with the piston rods 14 on the crank shaft 12. It consists of a helical spring 16 which is secured at one of its ends only, to a bearing bolt 17 mounted within the end of a connecting rod bearing cap 18. The outer portion of the spring is unsupported and extends free with its longitudinal axis substantially parallel to the axis of the connecting rod and is of sufficient length to pass through a body of oil 19 which lies within a crank case 20. Due to this arrangement the oil will be picked up within the coils of the spring 16 and, on emergence therefrom, thrown into the engine cylinders in the direction as indicated by the arrow —*a*— in Fig. 1 on rotation of the crank shaft. One of these springs is provided for each piston and cylinder of the engine.

To insure that a surplus of oil does not

stand in the crank case at all times, a storage tank 21 is provided and made as a part of the main crank case. This tank has an inlet opening 22 which allows the surplus oil in the splash chamber, when the engine is at rest, to be swept over into this tank by the cranks at the first few revolutions upon starting, and to be entrapped therein. A series of holes 23 within a partition wall 24 allow the oil to slowly flow back to the crank case proper.

It is obvious that the wall 24 and the tank 21 need not be formed integral with the crank case and that the latter may be formed in a semi-cylindrical shape and with small feed holes at or near the bottom communicating with an outer chamber therebeneath and thus performing the function ascribed to the tank 21.

The oil that does not drain back into the crank case 20 lies upon the inclined walls of the engine cylinder and within the path of travel of the piston 13. In this manner the piston is insured lubrication along its lowermost face but is very sparingly supplied with a lubricant for its upper face. In order to convey oil thereto over the entire surface of the piston, a means within the piston has been provided. Said means consists in a duct 25 which is connected at one end in communication with an annular piston ring channel 26 adapted to receive the piston ring 27. The opposite end of the duct 25 terminates within an opening 28 in the upper face and near the lowermost edge of the cylindrical piston walls. This opening communicates with an annular channel 29 which is here shown as extending substantially half way around the circumference of the piston, as indicated in Fig. 3.

In the operation of my lubricating system the engine is started in the usual manner and upon the rotation of the crank shaft the cranks 15 will describe arcs around the center of said shaft thereby sweeping the surplus oil from the crank case into the tank 21. As the cranks pass through their cycle of rotation the conveyer springs will successively be drawn through the remaining body of oil 19. As these springs are of a resilient nature they will yield to the resistance of the body of oil and at the same time allow a large volume of oil to collect between and upon their convolutions. When a conveyer spring is drawn away from the oil the resistance produced by the body of oil is of course relieved, and the force within the spring tending to cause it to assume its normal position, in conjunction with the centrifugal action due to its rotation, will cause the oil collected thereby to be thrown violently in every direction into the space within the crank case producing a substantially uniform mist of oil which supplies each cylinder with lubrication. Here the oil is received by the piston and in the course of its travel will be forced between the piston ring and within the annular channel 26. The force of the gas pressures within the cylinder head will act around said ring and force the lubricant through the duct 25 and into the channel 29. It will at this point be distributed throughout the length of the channel and will insure lubrication to the entire uppermost bearing face of the piston. The greater portion of the surplus oil will return to the crank case by way of the storage tank 21 and through the outlets 23 connecting therewith.

It will thus be seen that I have provided a simple means for conveying and elevating oil from the crank case of an engine, delivering it to an engine cylinder, and insuring that the engine cylinder receive sufficient lubrication throughout its entire bearing surface.

It is manifest that any number of the springs may be employed as occasion may require, and that they may be held in place in any desired manner, the essential feature being to provide a means whereby they will operate to equally distribute lubricant into the cylinders on rotation of the crank shaft, regardless of their angular positions thereabout.

What I claim is:

1. In a lubricating system for internal combustion engines, the combination of a crank case, a crank shaft adapted to rotate within said case, engine cylinders mounted upon and disposed at right angles to the longitudinal axis of said crank shaft and at angles to the vertical, piston rods mounted upon said crank shaft and adapted to reciprocate pistons within the cylinders, resilient means mounted adjacent the lower ends of the piston rods whereby oil may be lifted from the crank case and supplied to the cylinders, and means embodied within the pistons whereby oil is elevated from the lower wall of the piston to the upper wall thereof.

2. In a lubricating system for internal combustion engines, the combination of a crank shaft, a crank case within which said shaft rotates, pistons reciprocally mounted in relation to said shaft, resilient means mounted adjacent the outer ends of the cranks on said shaft whereby oil lying in the crank case will be thrown upwardly into the path of travel of said pistons, and means controlled by the gas pressure against the pistons whereby the oil delivered thereto may be uniformly distributed over the outer cylindrical periphery of the pistons.

3. In a lubricating system for internal combustion engines, the combination with an internal combustion engine, of a resilient

oil elevating means secured adjacent the ends of the crank arms within said engine and adapted to pass through a body of oil and elevate a portion of said oil into an engine cylinder upon leaving the surface thereof, and means within the engine piston whereby the pressure of gas thereagainst will produce a uniform lubrication of said piston.

4. In a lubricating system for engines, the combination with a cylinder, a piston therein, and a rotary member, of a resilient helical oil elevating member adapted to pass through a body of oil on revolving the rotary member to throw the oil upwardly and outwardly and into the cylinder in the path of travel of the piston.

5. In a lubricating system for engines, the combination with a piston having annular piston ring channels therearound, of an oil conduit connecting with one of said channels, a lubricating channel formed upon the opposite side of said piston from said conduit connection and at the other end of said piston, said channel being in communication with the piston ring channel by means of said oil conduit, and automatic means whereby the oil is forced through said channels during the performance of the engine.

6. In an engine, the combination of an engine cylinder, a piston therein having a packing, and a conduit in said piston communicating with the exterior thereof adjacent the head end at a point below the upper end of the piston packing, extending diagonally across said piston and communicating with the exterior thereof adjacent the crank end.

7. In an engine, the combination of an engine cylinder and a piston therein provided with packing ring grooves, and packing rings therein, there being a duct in said piston communicating with the bottom of a groove, extending diagonally across said piston and communicating with the exterior thereof adjacent the crank end.

8. In an engine, the combination of an engine cylinder, a piston therein, there being a lubricant duct in said piston communicating with the exterior thereof adjacent the head end and with the exterior thereof adjacent the crank end, and there being a bleeding duct in said piston communicating with said lubricant duct.

9. In an engine, the combination of an engine cylinder and a piston therein, there being a lubricant duct in said piston communicating with the exterior thereof adjacent the head end, extending diagonally across said piston and communicating with the exterior thereof adjacent the crank end, and there being a bleeding duct in said piston communicating with said lubricant duct adjacent its lower portion.

10. In an engine, the combination of an engine cylinder, a piston therein and a conduit in said piston communicating with the exterior thereof adjacent the head end, extending diagonally across said piston to and communicating with the exterior thereof adjacent the crank end, and there being a bleeding duct in said piston communicating with said conduit adjacent its lower end.

In testimony whereof I have signed my name to this specification.

CHARLES A. F. DUCORRON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."