Sept. 30, 1941 J. F. SLADKY 2,257,707

OIL PUMP

Filed Aug. 19, 1940

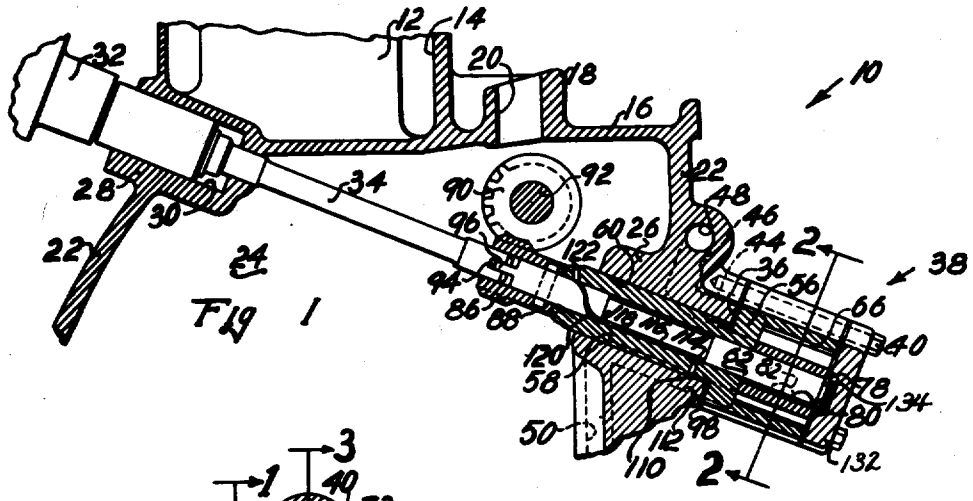


Fig 1

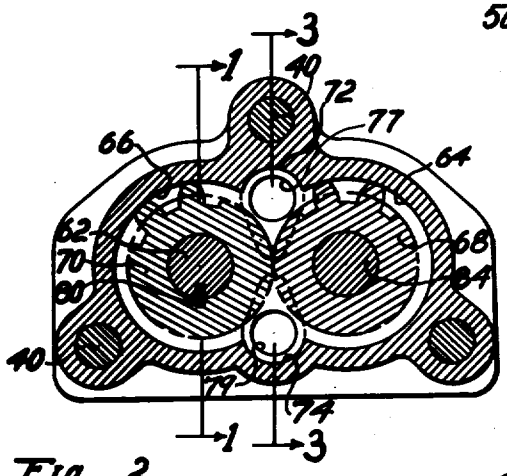


Fig 2

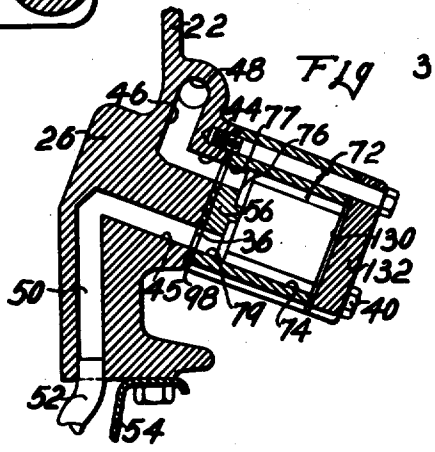


Fig 3

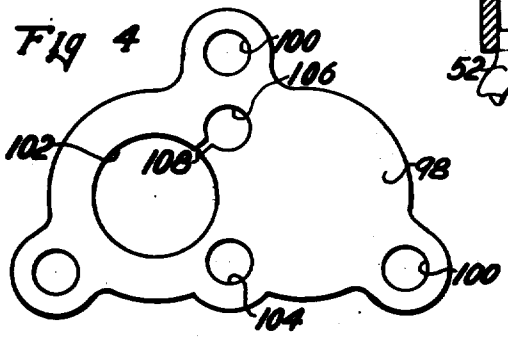


Fig 4

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OIL PUMP

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8 Claims. (Cl. 184—6)

This invention relates to oil pumps and has particular reference to an oil pump adapted to be used on an internal combustion engine.

It is an object of this invention to provide novel means for lubricating an oil pump shaft and gears.

It is another object of this invention to provide novel means for providing a relief passage from an oil pump.

Other objects and advantages of this invention will be apparent from a consideration of the following description and claims and the attached drawing of which there is one sheet and in which—

Figure 1 represents a transverse sectional view through an internal combustion engine and oil pump;

Figure 2 represents a sectional view taken along a plane indicated by the line 2—2 of Figure 1 and looking in the direction of the arrows;

Figure 3 represents a sectional view taken along a plane indicated by the line 3—3 in Figure 2 and looking in the direction of the arrows; and

Figure 4 represents a bottom plan view of a gasket which fits between the motor block and the oil pump.

Shown in Figure 1 is a portion of an internal combustion engine indicated generally at 10 and having cylinders 12 surrounded by a cooling water jacket 14. Extending from one side of the cylinders 12 is a generally horizontal wall 16 in which are formed bosses 18 which are apertured at 20 to form guides for valve push rods (not shown). Below the cylinders 12 and horizontal wall 16 are formed the walls 22 of the crank case 24 of the engine which are cast along with the block. One of the walls 22 is thickened as at 26 for a purpose which will be described later. The other wall 22 (the left wall as viewed in Figure 1) is provided with a boss 28 apertured at 30 to receive the end of a distributor 32 and pass the distributor shaft 34.

The thickened portion of the right wall 22 (see Figures 1 and 3) is machined into a sloping surface 36 to which the oil pump, generally indicated at 38, is secured by means of screws 40. The sloping surface 36 is normal to the distributor shaft 34 and is provided with two holes 44 and 45 which extend upwardly and parallel to the distributor shaft 34. The upper hole 44 connects with a hole 46 leading to an oil manifold or header 48 for delivering oil to the various parts of the engine. The lower hole 45 connects with a downwardly opening hole 50 which forms the suction line of the pump 38. Secured in the lower end of hole 50 is a tube 52 which extends downwardly to a screened intake (not shown) in the oil pan 54.

The oil pump 38 consists of a casting having a base 56 from which extends the cylindrical boss 58 (see Figure 1). The boss 58 fits into a hole 60 formed in the thickened portion 26 of the crank case wall 22, forwardly of the holes 44 and 45. The boss 58 is bored to receive the shaft 62 which drives the pump 38. Below the base 56 the casting is bored in two parallel intersecting cylindrical holes 64 and 66 within which fit the mating gears 68 and 70. The casting is cut away at 72 where the two cylindrical spaces intersect to form a discharge chamber and at 74 to form an intake chamber. The base 56 is cut away at 76 at the ends of the discharge and intake chambers to form pockets which are uncovered by each tooth of the gears 68 and 70 as the gears revolve. The upper hole 44 in the thickened portion 26 of the engine connects with a hole 77 in the base 56 which opens into the pocket 76 at the end of discharge chamber 72 and the lower hole 45 connects with a hole 78 in the base 56 which opens into the pocket 76 in the end of the intake chamber 74.

The gear 70 is retained on the lower end of the shaft 62 by means of a snap ring 78 fitted in a groove in the end of the shaft 62 (see Figure 3) and is fixed to rotate with the shaft by a key 80 engaged in the keyway 82 cut in the gear 70. The gear 68 is driven by the gear 70 and turns on an idler shaft 84 (see Figure 2) fixed in the base 56 of the pump casting.

The upper end of shaft 62 carries the gear 86 which is fixed on the shaft by means of the pin 88. The hub of gear 86 bears on the upper surface of the cylindrical boss 58 and keeps the shaft 62 from sliding lengthwise of the bore 60. The gear 86 mates with a spiral gear 90 cut in the cam shaft 92 so that the oil pump is driven by the cam shaft.

The distributor shaft 34 is slotted at its lower end at 94 and fits within the gear 86 where the upper end of the pump shaft 62 is provided with a tongue 96 which fits into the slot 94 and drives the distributor shaft 34.

A gasket 98 is positioned between the sloping surface 36 on the engine and the base 56 of the pump 38. Gasket 98 (see Figure 4) has formed therein holes 100 which pass the screws 40 and the hole 102 which passes the cylindrical boss 58 of the pump 38. Hole 104 permits oil flow between the intake chamber 74 and the lower passage 45 in the engine block, and hole

106 allows communication between the discharge chamber 72 and the upper passage 44 in the engine block. It will be noted that a small slot 108 is cut in the gasket 98 between the holes 106 and 102. When the gasket is in place between the pump and motor block, the slot 108 forms a metering passage through which oil is bled from the discharge passage 44 to the annular space 110 formed by reducing the diameter of the cylindrical boss 58 at 112. From the annular space 110 oil flows through a hole 114 in the boss 58 to a second annular space 116 formed by reducing the diameter of the shaft 62 at 118. Oil from the annular space 116 creeps along the shaft 62 to lubricate the shaft and also passes up the spiral groove 120 cut in the shaft 62.

As the shaft 62 revolves, the spiral groove 120 uncovers or communicates with the hole 122 drilled in the upper end of the cylindrical boss 58. Hole 122 directs a jet of oil upwardly against the cam shaft gear 90 and acts as a relief hole to return a portion of the oil in the annular space 116 to the oil pan 54. Gears 86 and 90 are thus positively lubricated at every revolution of the shaft 62.

The lower face of the pump 38 is machined flat at 130 and is closed by a plate 132 which is secured to the pump by the screws 40. Plate 132 is recessed at 134 (see Figure 1) to clear the end of the shaft 62.

The construction of the pump assures adequate lubrication of the pump shaft and the gears 86 and 90. The oil is constantly circulated under pump pressure and the amount circulated is automatically regulated according to the pump speed by the metering slot 108 in the gasket 98.

While I have described my invention in some detail, I intend this description to be an example only and not as a limitation of my invention to which I make the following claims:

1. In combination with an internal combustion engine having a wall defining an aperture, a pump body having a hollow cylindrical boss extending therefrom and extending through said aperture, a pump shaft journaled in said boss, a gear secured to said shaft and bearing on the end of said boss, means for conducting oil from the discharge side of said pump along said shaft to within said boss, a groove cut in said shaft, the end of said boss defining an aperture arranged to communicate with said groove at each revolution of said shaft, and a driving gear arranged to drive the gear on said shaft, the aperture in the end of said boss being arranged to direct a jet of oil against said driving gear.

2. In combination with an internal combustion engine having a wall defining an aperture, a pump body having a hollow cylindrical boss formed on one side thereof, said boss extending through said aperture, a shaft for said pump journaled in said boss, said shaft and said boss defining an annular space around said shaft and within said boss, means for conducting oil from the discharge passage of said pump to said annular space, the end of said boss defining an aperture between the surface of said boss and said shaft, a groove cut in said shaft and arranged to communicate between said annular space and the aperture in the end of said boss at each revolution of said shaft, and gears for driving said shaft, said aperture in the end of said boss being arranged to direct a jet of oil against said gears.

3. In combination with an internal combustion engine having a wall defining an aperture, a pump body having a hollow cylindrical boss formed on one side thereof, said boss extending through said aperture, a shaft for said pump journaled in said boss, said shaft and said boss defining an annular space around said shaft and within said boss, means for conducting oil from the discharge passage of said pump to said annular space, the end of said boss defining a pair of apertures between the surface of said boss and said shaft, a groove cut in said shaft and arranged to communicate between said annular space and the apertures in the end of said boss at each revolution of said shaft, and gears for driving said shaft, said apertures being arranged to direct jets of oil against said gears and into the crank case of the engine.

4. In combination with an internal combustion engine having a wall defining an aperture, a pump body having a hollow cylindrical boss formed thereon and extending through said aperture, a shaft for driving said pump journaled in said hollow boss, said shaft having a portion of its length within said boss reduced in diameter so as to form an annular space, means for conducting oil from said pump to said annular space, a spiral groove cut in said shaft and communicating with said annular space, the end of said boss defining apertures arranged to be successively uncovered by said groove as said shaft is rotated, and gears for driving said shaft, said gears being positioned so as to be in the path of oil discharged through one of the apertures in the end of said boss.

5. In combination with an internal combustion engine having a wall defining an aperture, an oil pump having a body with a hollow cylindrical boss formed on one face thereof and extending through said aperture, a hollow annular space formed around said shaft and within said boss, means for conducting oil from said pump to said annular space, and means formed in said shaft and the end of said boss for directing a jet of oil from said annular space alternately into the crank case of said engine and against gears arranged to drive said shaft.

6. In combination with an internal combustion engine having a wall defining an aperture, an oil pump having a body with a hollow cylindrical boss formed on one side thereof and extending through said aperture, intake and discharge passages for said pump formed in said wall, a gasket positioned between said wall and the body of said pump, said gasket defining a metering slot between the discharge passage of said pump and the space between said wall and said boss, a shaft journaled in said boss, a passage formed between the inside of said boss and said shaft, said passage communicating with the space between said wall and said boss, gears for driving said shaft, and jets formed in the end of said boss and arranged to direct a jet of oil against said gears.

7. In combination with an internal combustion engine having a wall defining an aperture, a pump body having a hollow cylindrical boss extending through said aperture, a pump shaft journaled in said boss, a gear secured to said shaft and bearing on the end of said boss, means for conducting oil from the discharge side of said pump along said wall to within said boss, a spiral groove cut in said shaft, the end of said boss defining an aperture arranged to communicate with said groove at each revolution of said shaft, and a driving gear arranged to drive the gear on said shaft, the aperture in the end of said boss

being arranged to direct a jet of oil against said driving gear.

8. In combination with an internal combustion engine, an oil pump supported on said engine, a shaft for driving said pump journaled in a portion of said pump, said last mentioned portion extending through a wall of said engine, said shaft having a portion of its length reduced in diameter within said journal to form an annular space, means for delivering oil from said pump to said annular space, a groove cut in said shaft within said journal and connecting with said annular space, the end of said journal defining apertures arranged to be uncovered by said groove as said shaft revolves, and gears arranged to drive said shaft, one of said apertures being arranged to direct a jet of oil against said gears.

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