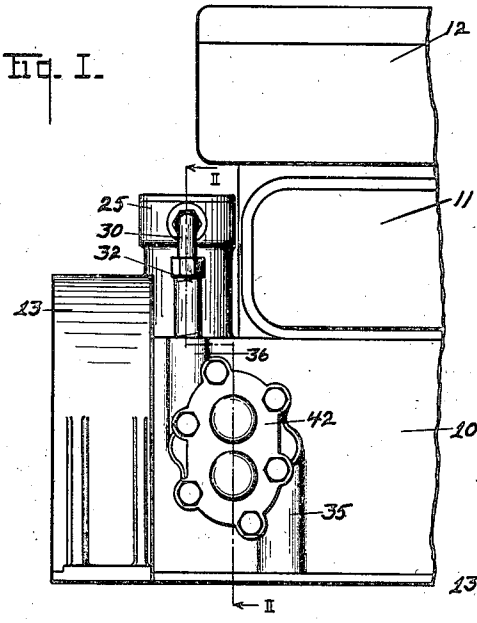
H. E. RHOADS.

OIL PUMP.

APPLICATION FILED SEPT. 16, 1918.

1,421,718. Patented July 4, 1922.

Fig. I.



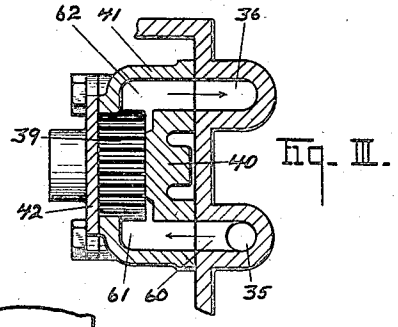


Fig. III.

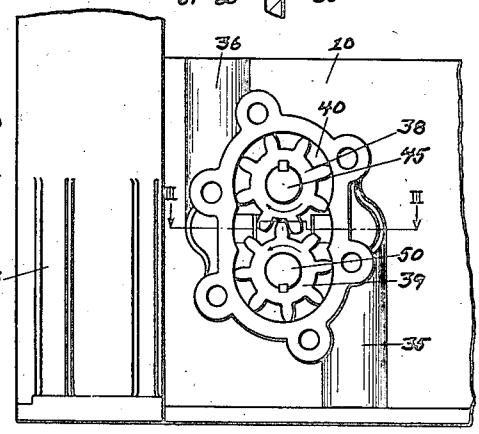


Fig. IV.

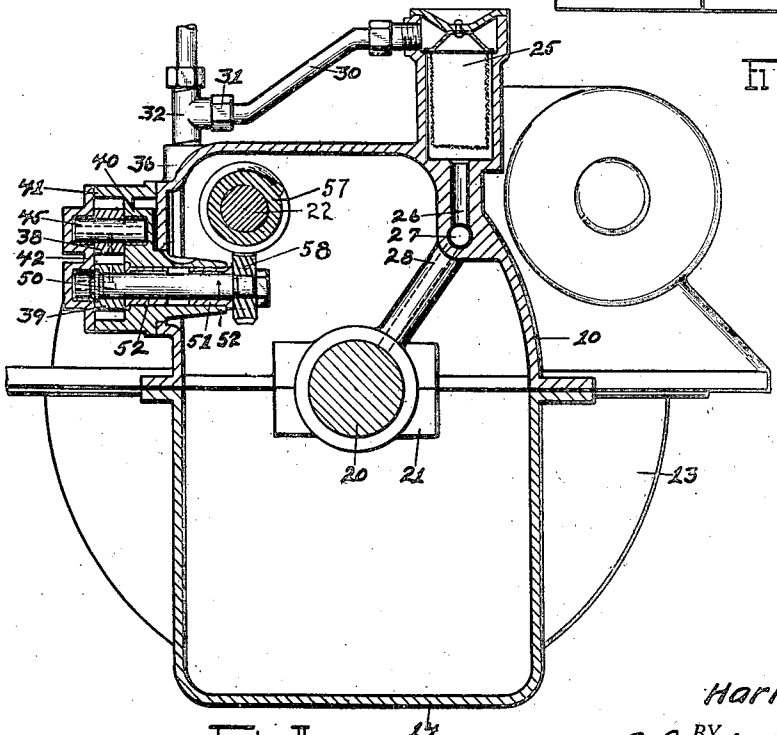


Fig. II.

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OIL PUMP.

1,421,718. Specification of Letters Patent. Patented July 4, 1922.

Application filed September 16, 1918. Serial No. 254,226.

To all whom it may concern:

Be it known that I, HARRY E. RHOADS, a citizen of the United States, residing at Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Oil Pumps, of which I declare the following to be a full, clear, and exact description.

This invention relates to a lubricating system for internal combustion engines, more particularly to the pump construction used and to arrangement thereof relative to the engine casing, as well as the driving means therefor within the engine casing, one of the objects of the invention being to provide an oil pump unit in a lubricating system for internal combustion engines, which may be bodily attached and detached as an entirety from the outside of the crank case to thus facilitate the assembly of the motor as a whole.

Further objects of the invention relate to the construction of the crank casing pumping mechanism, the location of the latter relative to the casing, and the assemblage of parts in a lubricating system for collecting oil from the bottom of the engine casing and delivering the same to an oil receiving receptacle, from which the same is delivered to the engine bearings.

Furthermore, this invention provides various novel details in the arrangement of the particular pump utilized, the driving connections therefor, the arrangement of fluid passages, the particular construction of pump casing and the manner in which the same is attached to the engine casing, as well as other details of construction, as will hereinafter appear from a more complete description of the invention.

It is to be understood that any particular means may be utilized in reducing this invention to practice and that the particular means is not limited to that described herein, but includes broadly any means capable of the use, as indicated, and capable of attaining results accomplished by this invention.

In each of the figures of the drawings herein, the same reference numerals refer to corresponding parts in the several views of the drawing; the sectional views are taken on the sectional lines looking in the direction of the arrow indicated thereon.

Referring to the drawings, it will be seen that Figure I is a side elevation of this invention incorporated with the casing of an internal combustion engine.

Figure II is a cross-sectional view on line II—II of Figure I.

Figure III is a cross-sectional view on line III—III of Figure IV, while

Figure IV is a front elevational view of the pump with the cap removed, showing diagrammatically the lubricating passages thereto and therefrom.

The upper half of the crank case is shown in Figure I and referred to by the numeral 10, supported on which are the engine cylinders cast in the block 11, provided with a head 12, as is a well-known construction. Moreover, the fly wheel casing 13 may also partly be made as a part of the upper half of the casing 10 and completed in its lower half, as will appear from Figure II, from the lower half of the casing 14. The crank shaft 20 of the engine is shown as supported in the bearing 21, while the cam shaft 22 is also illustrated as located in the upper left hand corner of the crank case, as shown in Figure II.

This invention relates to that type of lubricating systems in which the oil is drawn up from the lower part of the crank casing 14 and pumped into a suitable oil receiving reservoir, from which it is distributed to the various bearings requiring lubrication. To this end an oil reservoir is illustrated at 25, having projecting downwardly therefrom a passage 26 which terminates in a longitudinally extending conduit 27. Adjacent the various bearings in the engine, a lubricating conveying pipe 28 is connected to the conduit 27 and extends to the various bearings, as, for example, the bearing for the crank shaft. The oil is received in the receptacle 25 from a pipe 30, which is connected at 31 to an upwardly extending nipple 32 on the upper portion 10 of the crank casing. The nipple 32 is connected with a passage from the bottom of the crank casing with a pump interposed therein, and, if desired, the crank casing may be provided with integral passages 35 and 36 to form the conduit whereby oil may be delivered from the bottom of the crank casing by the unitary novel pump construction and forming a part of this invention to the nipple

32, pipe 30 and into the reservoir 25. It is evident that any other form of conduit extending from the lower portion of the casing 14 to the upper receiving reservoir 25 having interposed therein any type of pump mechanism, may be used with my invention, one suitable type of pump consisting in a plurality of intermeshing cog wheels 38 and 39 having a base plate 40, which may be cast in the proper shape, as will hereinafter appear, to provide the necessary passages desired. The plate 40 is provided with a peripheral upwardly extending wall 41 to which may be secured the pump cap 42, the whole mechanism thus forming a unitary, complete and enclosed pumping element. The gear 38 is secured to a shaft 45, which is somewhat longer than the shaft 45, while the other gear 39 is carried by a shaft 50 and bears at one end in the cap 42 and has for its other end, an extended bearing 51. The plate 40 is provided with a rearwardly extending conical extension 52 for supporting the bearing 51, the extension and bearing being made of such length and size that the same may be inserted laterally into a suitable opening into the upper portion 10 of the crank casing, whereupon the inner end of the shaft 50 will be located adjacent the cam shaft 22 and any type of driving connection between the longitudinal cam shaft 22 and the lateral shaft 50 of the pump may be employed. A suitable construction consists in providing the shaft 22 with a spiral gear 57 and the shaft 50 with a worm gear 58 adapted to be placed in mesh with and driven by the gear 57. In view of the character of drive illustrated herein as one means for driving shaft 50 from the shaft 22, the bearing hub 51 of the shaft 50 may be provided with an overhanging projection 52 and the shaft 50 is countersunk into the gear 39, as shown, to take up any end thrusts which might be caused by the drive used.

Referring to Figure II, it will be seen that the upper end of the passage 35 terminates in an offset projection portion 60 and that the base plate 40 is provided with a recess 61 communicating therewith at one end and at the other terminating adjacent a point where the gears 39 and 38 come out of mesh while the plate 40 is also provided with a passage 62 on the opposite side of the passage 61 to deliver the oil forced through the rotary pump into the upwardly extending passage 36.

The operation of my invention will, it is believed, be understood from the foregoing description taken in connection with the accompanying drawing. The pumping mechanism is bodily attachable and detachable from the side of the crank casing as a unit and may be readily driven from a longitudinally extending shaft 22, such as the cam shaft of the internal combustion engine. The gear 58 on the outer end of the shaft 50, the extension 52 and the bearing 51 being smaller than the opening provided in the casing for the insertion of the unit, the unit may be readily assembled. By being located on the side of the engine rather than on the end thereof, such assembly is facilitated and a material saving of time effected, an important advantage when quantity production is being considered and, moreover, the parts may be readily disassembled when desired to inspect, clean, or repair the same.

It is to be understood that many variations in the details of construction described herein, the relative assembly of the parts, character of driving elements used between the cam shaft 22 and the shaft 50, together with the type of pump employed, may be substituted for the particular arrangement shown herein, and this invention contemplates broadly the idea of providing an insertable and removable pumping unit, which may be located laterally of the casing of the engine and driven nevertheless from one of the usual rotatable parts of an internal combustion engine, such as the cam shaft 22.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a lubricating system for internal combustion engines, an engine casing, an operating shaft rotatably mounted within the casing, a pump housing detachably secured to the side of the casing and having passages leading to and from the pump mechanism from one face of the pump housing, passages formed in the casing and so positioned as to register with the passages in the pump housing when the pump housing is secured to the casing whereby oil is drawn from the casing for distribution through the bearings, and means for operating the pump mechanism from the operating shaft.

2. The combination with one of the operating shafts of an automobile engine and a casing therefor, of an actuating member mounted to rotate with said shaft, a sleeve projecting through said casing, a shaft rotatably journaled in said sleeve, a gear carried by said shaft and adapted to be actuated by said actuating member, said sleeve being provided with an opening inside said casing to permit flow of lubricant around said shaft and said sleeve, and an oil circulating mechanism operated by the last named shaft.

3. The combination with a casing having one of the operating shafts of an automobile mounted therein, of an actuating member mounted to rotate with said shaft, a sleeve projecting through said casing, a second shaft rotatably mounted in said sleeve, a gear carried by said second shaft and adapted to be actuated by said actuating mem-

ber, and an oil transmitting mechanism positioned without the casing and operated by the second shaft.

4. In combination with the operating shaft of an automobile, of a gear carried by said shaft, a housing for said gear and shaft, a sleeve bearing extending through said housing and secured thereto, a second shaft journaled in said bearing sleeve, a gear on the inner end of said second shaft meshing with said first named gear, and oil transmitting mechanism operated by said second shaft.

5. The combination with one of the operating shafts of an engine, of means associated therewith for operating an oil pump, said means comprising a gear carried by said shaft, a housing for said gear, said housing having a lateral entrance leading into the housing cavity, a second shaft journaled in said entrance, and a gear on the inner end of said second shaft connecting with said first named gear.

6. In combination with one of the operating shafts of an automobile engine and a casing therefor, a pump secured to said casing provided with a sleeve projecting into said casing, means in said sleeve actuated by said shaft for operating the pump, and a reservoir integrally formed with the casing, the said pump forcing oil to the reservoir and also from the sleeve to the casing.

7. In combination with the operating shaft of an automobile, of a gear carried by said shaft, a casing for said shaft and gear, a pump provided with a housing detachably connected to the casing, a sleeve on the housing and projecting through the casing, and means in said sleeve operatively connected with the gear and pump for actuating said pump.

8. In a lubricating system for internal combustion engines, an engine casing provided with integrally formed oil passages and an integrally formed reservoir, a pump housing detachably secured to the casing and provided with integrally formed horizontally disposed oil passages aligning with the passages in the casing, and a conduit connecting the aligned passages with the reservoir.

9. In a lubricating system for internal combustion engines, an engine casing provided with integrally formed oil passages, a pump housing detachably secured to said casing and provided with integrally formed passages aligning with the passages in the casing, and a pump disposed between the passages in the pump housing.

10. In a lubricating system for an internal combustion engine, a casing having oil passages formed therein, a rotatable member in said casing, a detachable oil pump having passages formed therein and having a rotatable member adapted to be driven by said first rotatable member, and means for securing said pump to said casing with said two rotatable members in driving engagement with each other and with the passages in the pump communicating with the passages in the casing.

11. In a lubricating system for an internal combustion engine, an engine casing having oil passages formed in a wall thereof and terminating in a side face, a rotatable member in said casing, a detachable oil pump having a casing with oil passages formed therein and terminating in a side face thereof, said pump having a rotatable driving member journaled in said pump casing, and means for securing said pump to said engine casing with said driving member in engagement with said rotatable member and with the side face of said pump casing against the side face of said engine casing and the passages in the pump casing in registry with the passages in the engine casing.

In testimony whereof I affix my signature.

HARRY E. RHOADS.