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PUMP MECHANISM

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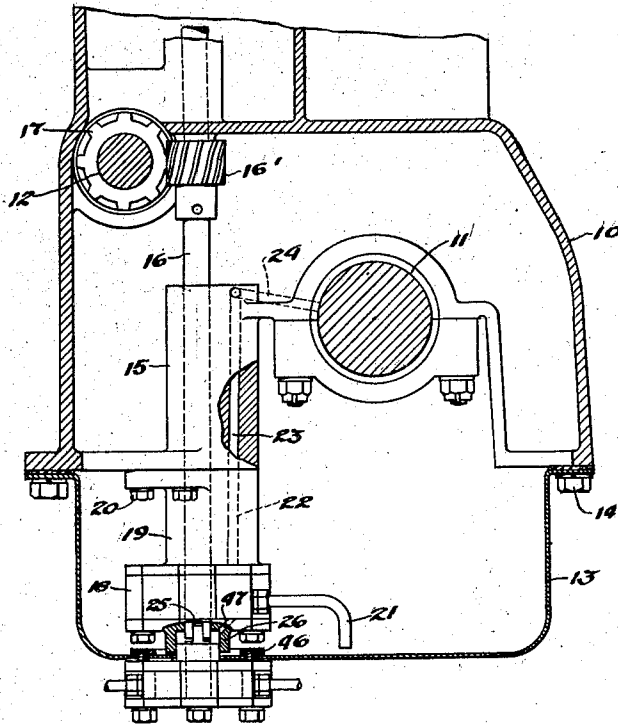


Fig. 1

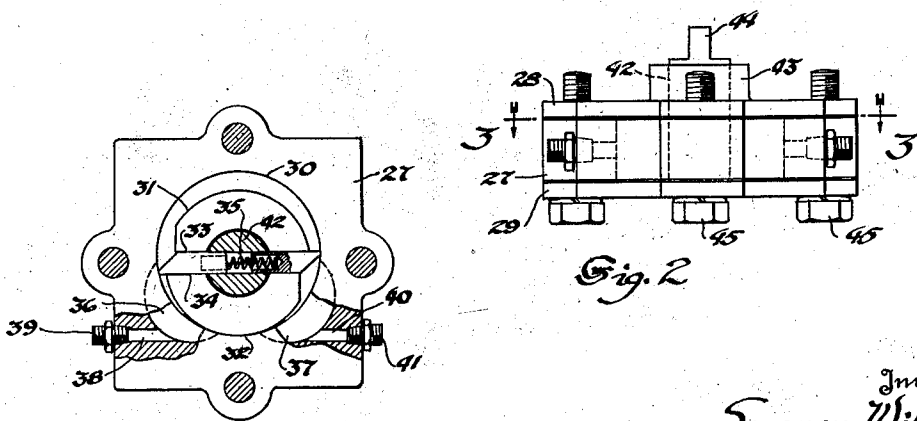


Fig. 2

Fig. 3

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PUMP MECHANISM.

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This invention relates to pumping mechanism for internal combustion engines and particularly to the oil and fuel pumps thereof, the principal object being the provision of a simple and economical means for driving the fuel pump.

Another object is to provide in combination with an internal combustion engine provided with an oil pump in the oil pan thereof, of means for supporting a fuel pump on the exterior of the oil pan in driven relationship with respect to the oil pump.

A further object is to provide in combination with an internal combustion engine provided with an oil pump positioned within and adjacent the bottom of the oil pan and provided with a drive shaft extending through the same, a guiding part on the oil pump and an opening in the oil pan, a fuel pump being secured to the oil pan over the opening and being provided with a projecting part engaging the guiding part of the oil pump to insure proper alignment of the two pumps, and further provided with a shaft detachably engaging the oil pump shaft, the fuel pump being positioned exteriorly of the oil pan and being removable from the oil pan or from the engine with the oil pan independently of the oil pump.

The above being among the objects of the present invention, the same consists in certain features of construction and combinations to parts to be hereinafter described with reference to the accompanying drawing, and then claimed, having the above and other objects in view.

In the accompanying drawing,—

Fig. 1 is a fragmentary vertical sectional view taken transversely of an internal combustion engine.

Fig. 2 is an enlarged side view of the fuel pump shown in connection with the engine in Fig. 1.

Fig. 3 is a view taken on line 3—3 of Fig. 2.

In the accompanying drawing, an internal combustion engine of generally conventional construction is shown comprising a crankcase 10 in which is suitably supported a crankshaft 11 and camshaft 12. An oil pan 13 is secured to the lower face of the crankcase 10 by screws such as 14. A bracket member 15 is formed integral with the crankcase 10 and rotatably supports the shaft 16 provided with a spiral gear 16' which meshes with the

spiral gear 17 on the camshaft 12 so as to be driven thereby.

An oil pump 18 which may be of conventional construction, having a supporting bracket 19, is secured to the lower face of the bracket 15 by screws 20 or other suitable means. The construction of the oil pump 18 may be of any of the conventional constructions such as are now in common use, with the exception of the differences to be hereinafter pointed out, and its position adjacent the bottom of the oil pan 13 is in accord with conventional practice. The oil pump 18 may be provided with an inlet pipe 21 terminating adjacent the bottom of the oil pan 13, and may be provided with an outlet passage 22 extending upwardly through the bracket portion 19 and matching with a similar opening 23 in the bracket 15 which connects with suitable passages such as 24 extending to the various bearing surfaces of the engine. The shaft 16, in conventional constructions, normally projects into the oil pump 18 where it is connected to the same to impart driving movement thereto,—but in accordance with the present invention I extend the shaft 16 through the lower face of the pump 18 and provide the lower end thereof with a slot 25. I also form on the lower face of the pump 18 a downwardly extending collar 26. I then provide a fuel pump which may be of any suitable mechanical type but which, for the purpose of illustration, is shown as comprising a body portion 27, an upper cap 28 and lower cap 29, the body portion 27 being provided with a central recess 30 in which is rotatably received a rotor 31 positioned eccentric to the recess 30 and bearing against the side thereof at one point, such as 32. The rotor 31 is provided with a transverse slot 33 in which a pair of blades 34 are slidably received and constantly urged outwardly of the rotor 31 by the coil spring 35 held under compression between them. The casing 27 is provided with a pair of ports 36 and 37 lying on opposite sides of the point 32, the port 36 being connected by a passage 38 and pipe 39 to a suitable source of fuel supply, and the port 37 being connected by the passage 40 and pipe 41 to the carburetor or other fuel consuming device employed by the engine.

The rotor 31 is driven by a shaft 42 suitably secured thereto in concentric relationship and

extending upwardly through the upper cap 28 which is provided with an upstanding boss 43 in which the shaft 42 has suitable bearing. The upper end of the shaft 42 which projects above the upper surface of the boss 43 is formed to provide a tongue 44 of a size to be slidably received within the groove 25 of the oil pump shaft 16. The oil pan 13 is provided with an opening in the bottom thereof concentric with the collar 26 and through which the boss 43 is adapted to project and to be relatively closely but slidably received within the collar 26 in which position the tongue 44 engages the slot 25. Bolts 45 which extend upwardly through the cover 29, body 27 and cover 28 of the fuel pump project through the bottom of the oil pan and are threaded into a ring 46 on the upper face of the lower wall of the oil pan 13, thereby not only serving to secure the caps 28 and 29, and body portion 27 together, but also serving to secure the fuel pump to the oil pan.

The boss 43 in engaging the collar 26 locates the fuel pump in proper alignment with respect to the drive shaft 16 of the oil pump so that the shafts 42 and 16 are at all times maintained in concentric relationship. The collar 26 and the slot 25 in the shaft 16 are made of ample depth so as not only to insure proper engagement with the cooperating parts on the fuel pump, but also to take care of any possible variations in the vertical dimensions of the oil pan and the connection between the same and the crankcase.

In order to prevent possible leakage of fuel from the oil pump into the interior of the oil pan and to provide lubrication of the shaft 42 I provide a passage 47 extending from the discharge side of the oil pump to the space within the collar 26 above the boss 43 thus maintaining such space under the outlet pressure of the oil and effectively sealing leakage of fuel from the fuel pump around the shaft 42 into the oil pan.

From the above it will be apparent that the construction disclosed provides an exceedingly simple and economical means for driving the fuel pump of an internal combustion engine, and that the fuel pump may be removed without disturbing either the oil pump or the oil pan 13, and yet it permits the removal of the oil pan 13 without removal of the fuel pump therefrom. Although but one form of construction of the fuel pump is indicated in the drawing and explained, it will be apparent that any suitable form of mechanical fuel pump may be employed in place of the one shown, and secured in place for driving movement from the oil pump in a similar manner, and this and other formal changes may be made in the specific embodiment of the invention described without departing from the spirit and substance of the broad invention, the scope of which is commensurate with the appended claims.

What I claim is: -

1. In combination with an internal combustion engine, an oil pump positioned in the oil pan thereof, and a fuel pump positioned exteriorly of said oil pan and driven from said oil pump.

2. In combination with an internal combustion engine, an oil pump positioned in the oil pan thereof, a fuel pump secured to the exterior of said oil pan, and driving means connecting said pumps.

3. In combination with an internal combustion engine, an oil pump positioned within the oil pan thereof, a fuel pump secured to an exterior face of said oil pan, and a shaft extending through said oil pan connecting said fuel pump to said oil pump for driving movement therefrom.

4. In combination with an internal combustion engine, an oil pump secured within the oil pan thereof, said oil pump being provided with a shaft extending through the same, a fuel pump secured to the exterior of said oil pan, and a drive shaft for said fuel pump extending through said oil pan and detachably engaging the first mentioned shaft for driving movement therefrom.

5. In combination with an internal combustion engine, an oil pump positioned within the oil pan thereof, a fuel pump secured to an exterior face of said oil pan, a part on said oil pump and a part on said fuel pump engaging each other in sleeved relationship, and a shaft for driving said fuel pump from said oil pump extending through said parts.

6. In combination with an internal combustion engine, an oil pump positioned within the oil pan thereof, a fuel pump secured to an exterior face of said oil pan, a part on said oil pump and a part on said fuel pump engaging each other in sleeved relationship, a shaft for driving said fuel pump from said oil pump extending through said parts, and means for introducing oil under pressure to the joint between said parts.

7. In combination with an internal combustion engine, an oil pump positioned within the oil pan thereof, a fuel pump supported on the exterior of said oil pan, inter-engaging aligning parts on said pumps, and a passage connecting the outlet side of said oil pump with the joint between said parts.

8. In combination with an internal combustion engine, an oil pump positioned within said engine, means for driving said pump including a shaft, a fuel pump supported on an exterior wall of said engine and provided with a shaft in alignment with the first mentioned shaft, the second mentioned shaft projecting through said wall and being connected to said first mentioned shaft, and means for conducting oil under pressure from said oil pump to said second mentioned shaft to seal the same against leakage of fuel into the interior of said engine.

9. In combination with an internal combustion engine, an oil pump supported from the crankcase thereof extending into spaced but adjacent relationship with respect to the lower wall of the oil pan, said oil pump being provided with a shaft and a downwardly extending collar, a fuel pump secured to said oil pan and provided with an upwardly extending boss projecting through said oil pan and received within said collar, said fuel pump being provided with a shaft extending through said boss and detachably engaging the first mentioned shaft for driving movement therefrom, and an oil passage connecting the outlet side of said oil pump with the interior of said collar.

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