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FUEL PUMP

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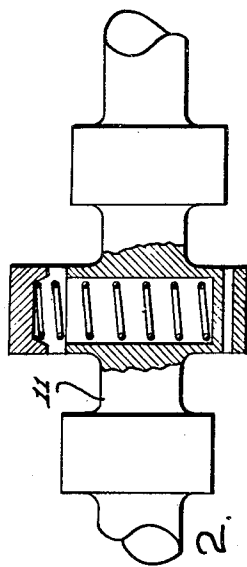
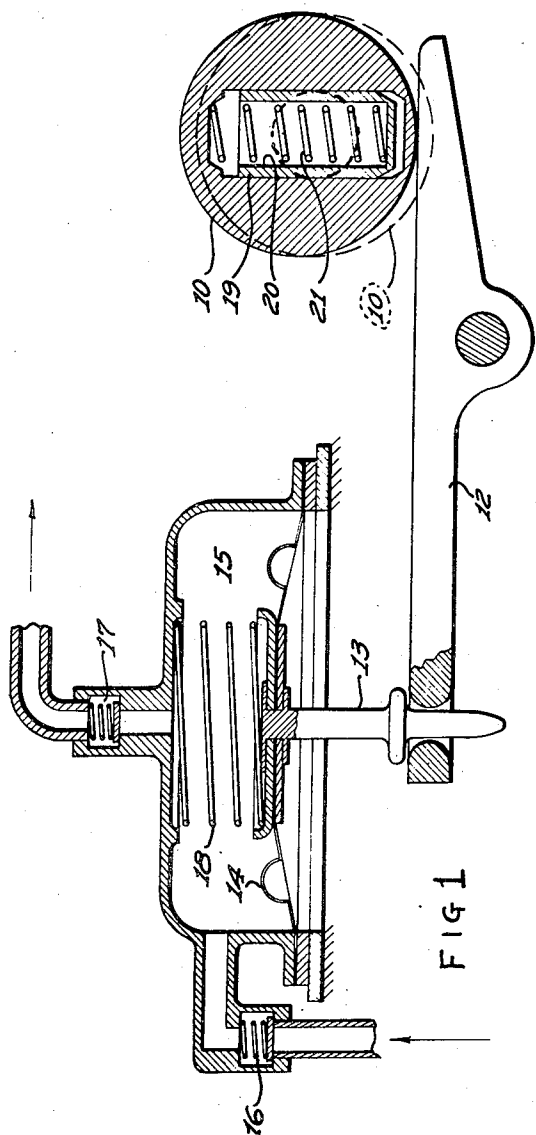


FIG 2.

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FUEL PUMP

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2 Claims. (Cl. 103—38)

The object of this invention is to devise an improved fuel pump for automotive purposes, specifically, to improve the regulation of the ordinary diaphragm pump in common use. These pumps develop their maximum pressure at the lowest engine speeds, that is, at the idling speeds when two pounds per square inch is usually generated. At maximum engine speed this pressure falls to below one pound per square inch. The level in the float chamber thus falls at maximum engine speed. When idling, after running at maximum speed and load, the level is low enough to cause irregular running.

Fig. 1 shows the general arrangement of my invention.

Fig. 2 shows a partial cross-sectional view of the novel operating means.

In Fig. 1, an eccentric 10 mounted on a camshaft 11 engages with a lever 12 which in its turn engages with a rod 13 which is connected to a diaphragm 14. The diaphragm 14 constitutes the lower wall of the chamber 15. Chamber 15 is provided with a fuel entrance 16 and a fuel exit 17. There is a check valve in the fuel entrance 16 and a check valve in the fuel exit 17 so that fuel enters at 16 and issues at 17 in a well known manner. The spring 18 causes the element 13 to engage with the lever 12.

So far, the elements are old and well known in the pump art. The novel feature consists of the element 19 which is integral with camshaft 11 and which is machined as a rectangular projection from the camshaft. A circular hole 20 is drilled in this projection 19. A compression spring 21 is arranged between the element 19 and the eccentric 10 so that by means of the expansion of the spring 21 the eccentric 10 is thrown into its eccentric operating position when starting and until a pressure has been built up cam 10 acts as though it were integral with camshaft 11. When the pump pressure in the chamber 15 exceeds a certain figure, approximately two pounds per square inch, the spring 21 yields and the eccentric assumes the position shown in the broken lines in Fig. 2. In this position there is no eccentricity so that the eccentric cam 10 ceases to function as it becomes concentric with shaft 11. Thereupon the lever 12 ceases to pump. As the engine takes fuel, the pressure in chamber 15 falls, the lever 12 rotates clockwise, the spring 21 reasserts itself and the eccentric 10 moves back to its operating position and pumping is resumed.

Thus a substantially constant fuel pressure is maintained. The camshaft 11 revolves at from 200 R. P. M. to 2,000 R. P. M. Hence the spring

21 has insufficient time during the short interval that the camshaft 11 is in the position shown in Fig. 1 to move the cam 10 more than a few thousandths of an inch during one revolution.

For this reason the eccentricity varies gradually in response to the work done.

In the operation of the ordinary diaphragm pump, the characteristic defect is that when it is set to deliver a given pressure at low engine speed the pressure delivered in the float chamber decreases with speed and, of course, the level in a float chamber varies with the pressure on the float needle. For this reason the level in the float chamber decreases as the speed of the engine increases, especially at wide open throttle when large quantities of fuel are being removed from the float chamber. When the throttle is closed after running at high speed with wide open throttle, the level is at the lowest level it ever reaches and, of course, the engine idles poorly and in fact, the engine sometimes stalls.

In the operation of this invention, the centrifugal force tends to assist the spring and increases the pressure developed by the pump so that the tendency of high speeds to create a low fuel pressure at the entrance to the float needle in the float chamber is reduced by the centrifugal effect which tends to increase the eccentricity of the cam so as to partially maintain constant pressure at the float needle during high speed operation.

What I claim is:

1. A reciprocating fuel pump comprising a fuel chamber, a moving wall therefrom, a spring adapted to move said wall so as to enlarge said chamber, a rotating cam shaft having a hollow rectangular portion integral therewith and symmetrically located thereon, a loose cam mounted thereon and having a rectangular opening adapted to engage with and to be slidably mounted on the rectangular portion of said cam shaft, a second spring located in said hollow rectangular portion and adapted to engage with both the cam and the cam shaft so as to give the cam a variable lift, an oscillating lever, one end of which is adapted to engage with said moving wall so as to move the wall to reduce the volume of said chamber, the other end being adapted to engage with said yieldable cam.

2. A device as set forth in claim 1 in which centrifugal force acting on said yieldable cam is adapted to assist said second spring means to increase the cam lift whereby the pressure generated by said pump is prevented from falling at high speed.

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