May 15, 1923. 1,455,628

J. LEROY

FUEL PUMP FOR INTERNAL COMBUSTION ENGINES

Original Filed July 10, 1920

Fig. 1

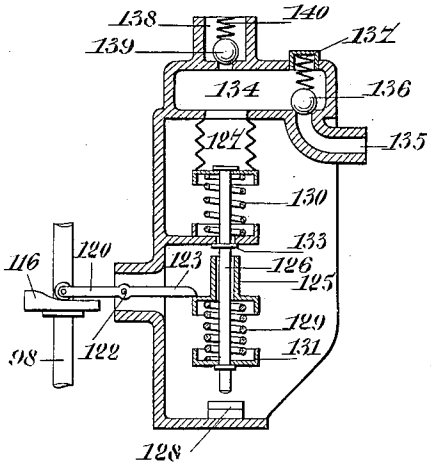


Fig. 2

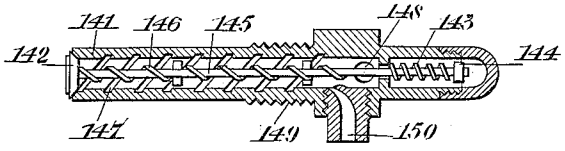
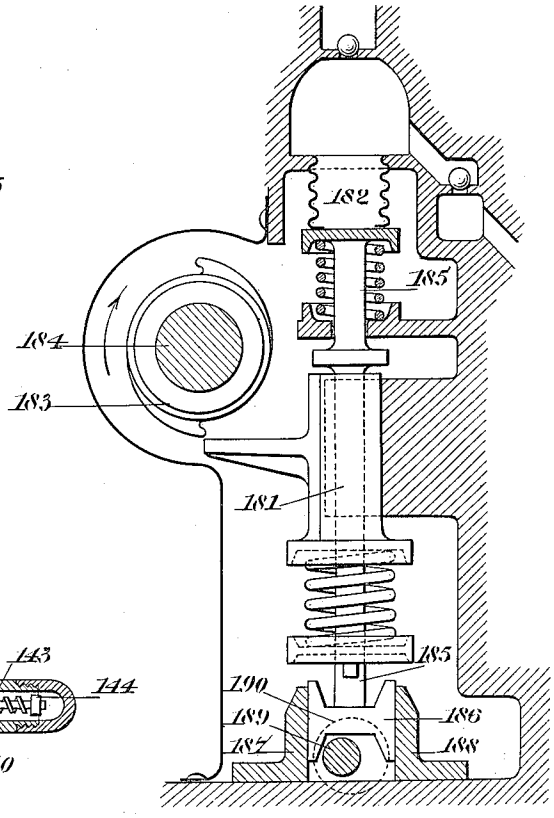


Fig. 3



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Patented May 15, 1923. 1,455,628

UNITED STATES PATENT OFFICE.

JULES LEROY, OF PARIS, FRANCE.

FUEL PUMP FOR INTERNAL-COMBUSTION ENGINES.

Original application filed July 10, 1920, Serial No. 395,338. Divided and this application filed January 9, 1922. Serial No. 528,116.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, JULES LEROY, citizen of the Republic of France, and residing at Paris, France, 12 rue Jouffroy, have invented an Improved Fuel Pump for Internal-Combustion Engines.

The invention is illustrated in the accompanying drawings as follows:

Fig. 1 shows a sectional elevation of the arrangement for the distribution of the fuel by injection.

Fig. 2 shows a longitudinal section of the fuel nozzle.

Fig. 3 shows a sectional elevation of a modification of the distributor for the fuel.

The improved apparatus is constructed as follows:

The cam 116 operates a bell crank motion including a lever 120 pivoted upon the axle 122 and presenting a projection 123. When the cam rocks the aforesaid lever 120 the same by means of its projection 123 presses upon the part 125 mounted loosely upon the rod 126 of the pulsator 127; consequently it forces the rod in question to sink down and to come in contact with the projection 128 by means of a spring 129 which is stronger than the spring 130 of the pulsator and pressing upon a plate 131 keyed upon the rod.

The rod 126 of the pulsator above mentioned remains in contact with the projection 128 until the slope of the lever 120 is sufficient to cause the projection 123 to slip off the part 125; at this moment the whole construction moves rapidly backwards and returns to its original position under the action of the springs 129 and 130. The stop 133 then retains it in a suitable position on this action backwards.

The construction above described has the advantage that one can vary at will the effect of the pulsator by causing to vary, for this purpose, the course of the rod 126 and adjusting the projections 128 in a manner corresponding to this variation. Further it should be pointed out that whatever the stroke may be the projection 123 will always escape at the same moment. Of course the system possesses as many elements as there are compression chambers.

The arrangement above described operates as follows:

The pulsator as the volume increases draws combustible into the chamber 134 through the inlet 135 which is normally closed by a ball 136 under the pressure of a spring 137. The pulsator 127 then returns to its original position under the action of the spring 130 when the lever 120 has released the part 125; on resuming this original position, the pulsator occasions a diminution of the volume of the reservoir 134 which forces a portion of the combustible which it contains to pass through the tube 138 into the motor cylinder, raising for this purpose a ball valve 139 against the action of a spring 140.

It is obvious that by increasing or diminishing the stroke of the pulsator one may increase or diminish the quantity of combustible admitted into the cylinder on each stroke.

The injection of the fuel into the interior of the cylinder is effected by means of a special arrangement illustrated in detail in figure 2 of the accompanying drawing.

This arrangement comprises a part 141 entirely closed at one end and having at its other end a valve 142 which is normally supported upon its seat by means of the spring 143 acting on the end 144 of the rod 145 of the valve.

This rod has a right hand screw 146 whereas the body of the valve is grooved to the left as at 147 so as to give to the air which passes in through the opening 148 a certain rotary motion. The part 141 is also provided with an external thread 149 whereby it can be fixed upon the motor.

The combustible which comes from the distributor or pulsator described passes into the jet through an orifice 150 conveniently connected to the orifice of the aforedescribed distributor. The air which penetrates into the injector through the inlet 148 comes from the gear box. It is distributed by means of a box with valves (not shown on

the drawing) arranged on the side of the cam shaft 98 and the valves of which are controlled by the cams 115.

In Figure 3 of the drawings, improvements in the arrangement for the distribution of the fuel are shown and are as follows.

The sliding rod 181 controlling the pulsator 182 is directly operated by the cam 183 fixed upon the shaft 184; this slide piece bears a suitably placed stop so that it cannot come in contact with the cylindrical part of the cam 183. The rod 185 in one piece with the part 182 rests upon a flat mobile foot 186 suitably guided and sliding vertically between the supports 187, 188. Part 186 itself rests upon a cylindrical rod 189 fixed at each end to one of a pair of eccentrics 190; these two eccentrics enable the operator to shorten the stroke of the rod 185 and consequently that of the part 182, causing the movable foot 186 to rise or sink by means of the cylindrical rod 189 which is itself raised or lowered by means of the eccentrics 190.

In the case of a motor with several cylinders it is advisable to arrange the cam shaft 184 horizontally, whereas in the case of a motor with a single cylinder the same shaft is preferably arranged vertically in the like manner as the cam shaft 98 of Fig. 1. In this latter case the cam is then placed in the horizontal plane so that the parts 182 always possess a vertical position which ensures their proper action and prevents the formation of air pockets. Finally, these elements are preferably arranged side by side in number equal to that of the compression chambers of the motor.

This application is a division of my copending application Serial Number 395,338, filed July 10, 1920.

Having now particularly described the nature of my said invention, and in what manner the same is to be performed, what I claim is:

1. An improved pulsator pump for internal combustion engines for insuring by injection the delivery of the fuel, comprising a flexible wall and a sliding rod for actuating said flexible wall, means for imparting to said rod its suction stroke, comprising a cam acting upon said rod through the intermediary of a spring, and means for varying the length of the said suction stroke of said rod whereby to control the quantity of fuel injected.

2. An improved pulsator pump for internal combustion engines for insuring by injection the delivery of the fuel, comprising a flexible wall and a sliding rod for actuating said flexible wall, means for imparting to said rod its suction stroke, comprising a cam acting upon said rod through the intermediary of a strong spring, and a weaker spring for imparting to said rod its exhaust stroke with a constant force independent of the operating conditions of the motor, in combination with an injector pipe for receiving the fuel from said pump and having provision for mixing it with the air necessary to form the proper fuel mixture.

3. An improved pulsator pump as set forth in claim 1, comprising a sleeve slidably mounted upon said rod and actuated in one direction by said cam and in the opposite direction by said spring, the means for varying the length of the suction stroke of said rod comprising a vertically slidable foot forming an abutment for the free end of said rod, and a rod upon which said foot rests and having its ends fixed to eccentrics, whereby to adjust at will the position of said last-mentioned rod and thereby the position of said foot.

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

JULES LEROY.