Jan. 12, 1932. E. H. SHEPARD ET AL 1,840,471

ACCELERATING MEANS FOR AUTOMOTIVE CARBURETORS

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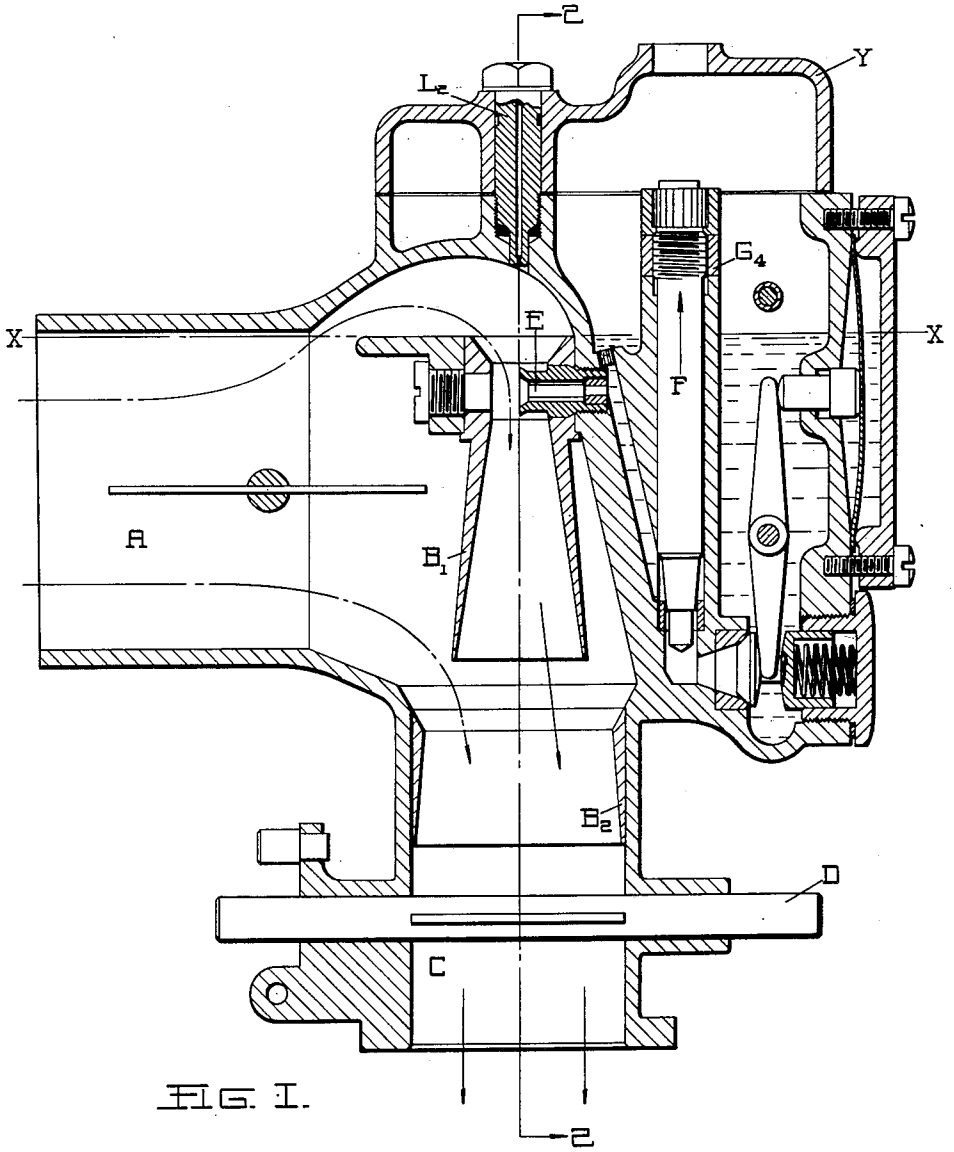


FIG. I.

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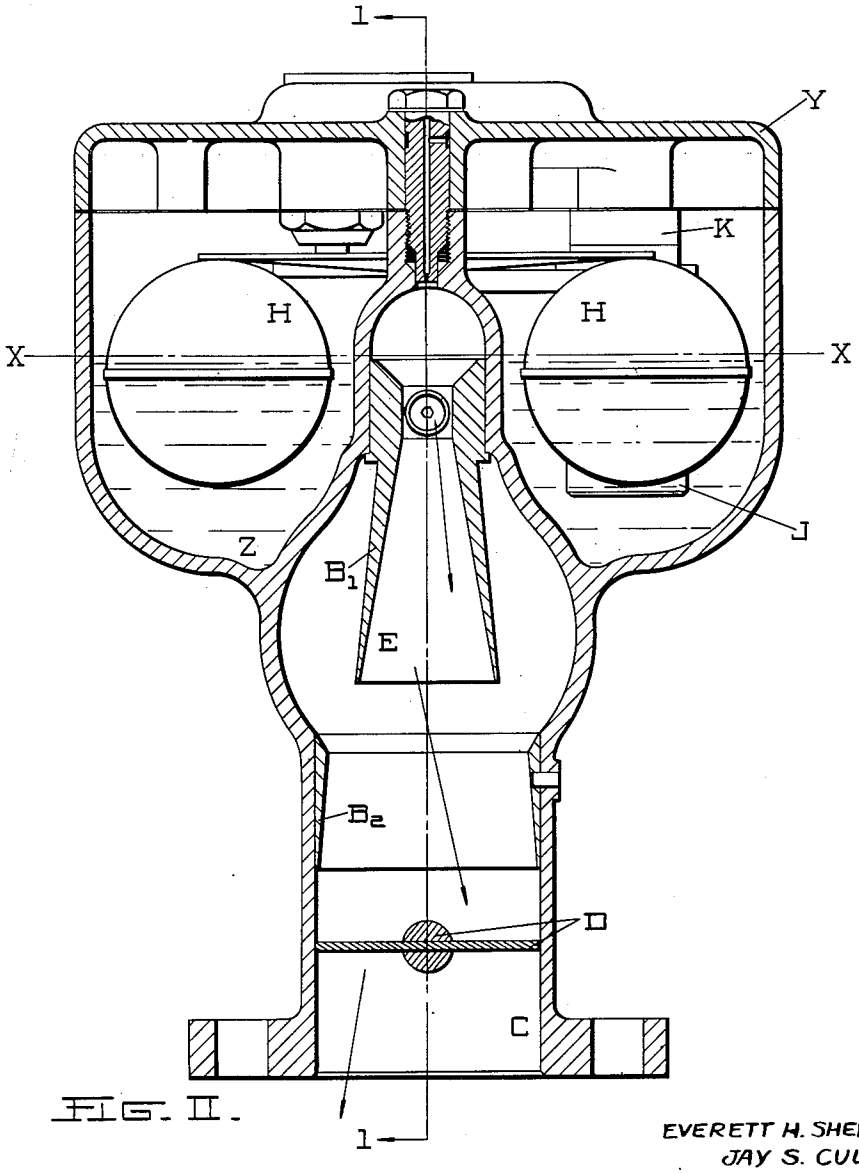


FIG. II.

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ACCELERATING MEANS FOR AUTOMOTIVE CARBURETORS

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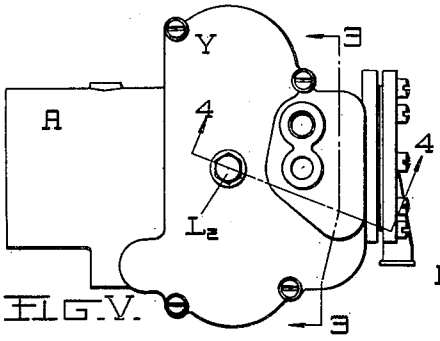


FIG. V.

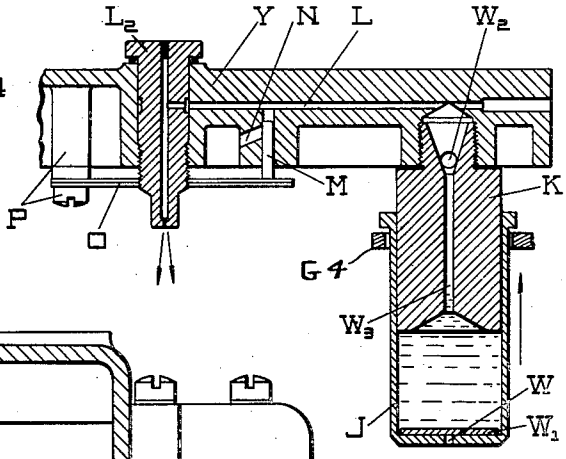


FIG. IV.

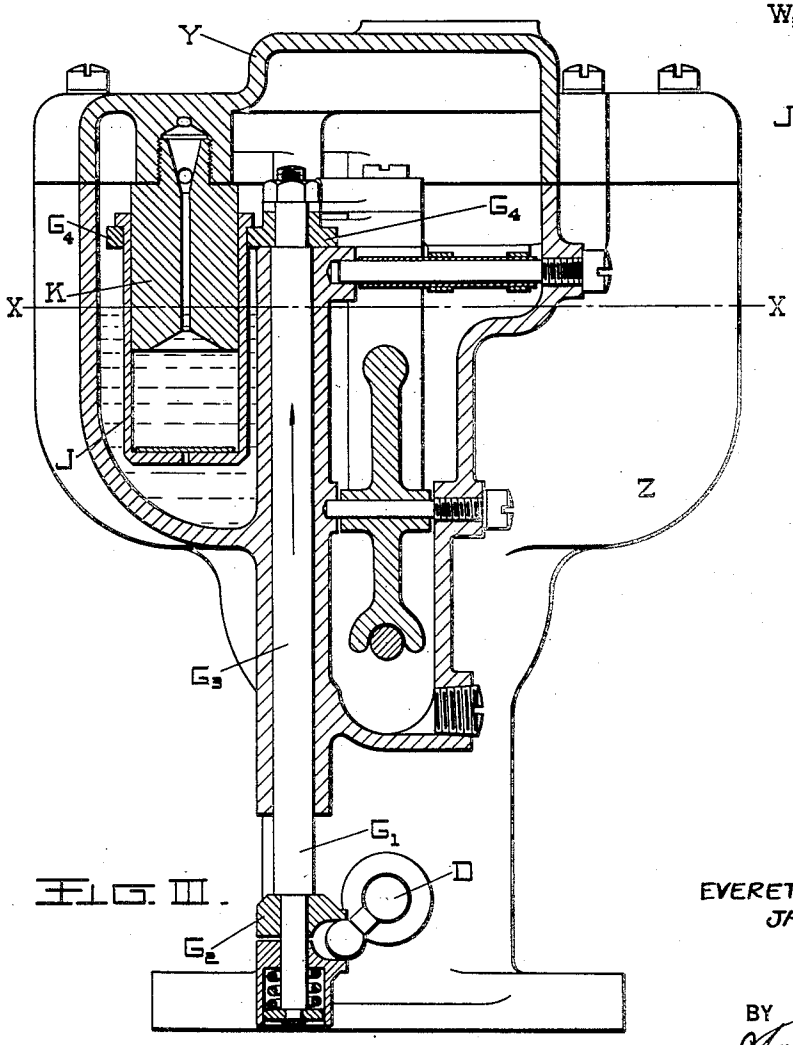


FIG. III.

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UNITED STATES PATENT OFFICE

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ACCELERATING MEANS FOR AUTOMOTIVE CARBURETORS

Application filed February 13, 1929. Serial No. 339,509.

The object of this invention is to provide improved means for supplying the extra fuel needed when the throttle is suddenly opened.

The specific application is shown applied to a down draft carburetor of the type described in the co-pending application #295,396, E. H. Shepard, filed July 26, 1928.

Figure I shows a cross sectional elevation on plane 1—1 of Figure II.

Figure II shows a cross sectional elevation on plane 2—2 of Figure I.

Figure III shows a cross sectional elevation on plane 3—3 of Figure V.

Figure IV shows a partial section (upper portion) on plane 4—4 of Figure V.

Figure V shows a plan view looking down showing the location of sections 4—4 and 3—3.

In the figures, A is the air entrance, B1 is the primary mixing chamber, B2 is the secondary or main mixing chamber, C is the mixture outlet, the flow of mixture through which is controlled by the throttle valve D. E (Figures I and II) is the main fuel nozzle, the flow of fuel through which is controlled by the needle valve F (Figure I). This needle valve is operated by the throttle by means of the linkage G1, G2, G3 and G4 (Figure III). H is the float mechanism which maintains a constant level in the constant level fuel supply chamber Z (Figure II). (The details of the float mechanism are not fully disclosed as this is quite well known). The arm G4 of the link mechanism connecting the throttle D with the needle F (Figure III), extends over and engages the cylinder J which slides up and down on the piston K which is suspended from the float chamber cover Y (Figure IV). A fuel entrance W to the cylinder J is protected by the check valve W1 and a ball check valve W2 prevents the fuel returning through the outlet W3 so that the device J—K will function as a pump. A fuel passage L1 connects this fuel pump J—K with the atomizing nozzle L2 which discharges downwardly right into the throat of the primary mixing chamber B1 (Figures I and II). A thermostatically controlled by-pass valve M is also shown in Figure IV which prevents an excessive amount of fuel being supplied during hot weather. This valve controls the by-pass N through which the fuel pumped in J—K is returned to the float chamber Z. This valve M is located on the end of the thermostat O which comprises two metals of dissimilar coefficients of expansion welded together in a well-known manner. This thermostatic element O is mounted on the projection P extending down from the float chamber cover Y so that it responds to the temperature inside the float chamber Z. The diaphragm shown to the right of the mixing chamber in Figure I is no part of this specific invention, its function being to permit the use of an overflowing nozzle without relying on a manually operated shut-off valve. The fuel is maintained at the level XX located above the main nozzle E and below the accelerating nozzle L2 so that the nozzle L2 only responds to throttle movements.

Operation

On opening the throttle quickly (assuming the engine to have been started and firing regularly) the arm G4 of the 20 valve needle linkage (Figure III) engages with the cylinder J which is full of gasoline which enters through the orifice W past the check valve W1. The fuel contained in J is thus ejected through L2 discharging down into the mixing chamber B1 which acts as a fuel spreader. As the engine warms up, the carburetor body gets warmer and the thermostate O moves the valve M which opens N and allows the fuel to escape and thus return to the float chamber Z. It is to be noted that L2 is not only located one-half inch above the fuel level XX, but it is also located in the air entrance where the depression will rarely exceed ½ inch so that for all ordinary driving, no fuel is drawn from L2 and fuel only passes therefrom in response to the movement of the throttle D.

It will be noted that as shown in Figures III and IV, the arm G4 does not positively engage with the cylinder J, but merely raises the cylinder, the descent being governed by gravity, the cylinder falling by its own weight. The important result of this simple

precaution is that if the throttle is repeatedly opened and closed, the cylinder does not pump each time the throttle is opened as the rate of descent of the cylinder J is slower than the rate at which the throttle is closed so that on the opening of the throttle only a partial stroke is given the fuel pump.

It will also be noted that when the fuel issues from the passage L2 it is not subject to the depression in the throats of the venturis B1 and B2, but nevertheless it is discharged as a steady stream being directed through the throat of B1 and so to the throat of B2 from which it is discharged upon the butterfly throttle valve D located in the mixture outlet C and which acts as a fuel spreader.

What we claim is:—

1. Accelerating means for a carburetor comprising a mixing chamber, a mixture outlet, a throttle valve therein, a constant level fuel supply chamber, a cover therefor, a stationary piston depending therefrom having a fuel outlet therethrough, a cylinder slidable upon said piston, throttle controlled mechanism for raising the cylinder, a check valve in the bottom of said cylinder, a check valve in the fuel outlet, a fuel nozzle connected therewith and located so as to discharge fuel through said mixing chamber upon said throttle valve.

2. Accelerating means for a carburetor comprising a mixing chamber, a zone of depression therein, a mixture outlet, a throttle valve therein, a constant level fuel supply chamber, a cover therefor, a stationary piston depending therefrom having a fuel outlet therethrough, a cylinder slidable upon said piston, throttle controlled mechanism for raising the cylinder, a check valve in the bottom of said cylinder, a check valve in the fuel outlet, a fuel nozzle connected therewith, and located out of the zone of depression but so as to discharge fuel through said mixing chamber upon said throttle valve.

3. Accelerating means for an automotive carburetor comprising a mixing chamber, a mixture outlet, a throttle valve therein, a constant level fuel supply chamber, a cover therefor, fuel pumping means depending from said cover into said supply chamber, throttle controlled mechanism for operating said pump, a fuel nozzle fed from said pump and discharging into said mixing chamber, a fuel by-pass leading from said pump back to said supply chamber, a valve in said by-pass, thermostatic means for controlling said valve.

4. In a downdraft carburetor, a downwardly directed mixture passage, a zone of depression therein, a mixture outlet, a throttle valve therein, accelerating means comprising a fuel pump operatively connected to said throttle valve, means for discharging fuel from said pump into said mixture passage above said zone of depression whereby the fuel discharged from the pump first falls by gravity and is then accelerated by the air flow through the zone of depression and finally strikes the throttle valve.

5. In a down draft carburetor, a downwardly directed mixture passage, a zone of depression therein, a mixture outlet, a throttle valve therein, accelerating means comprising a fuel pump operatively connected with the throttle valve, means for discharging the fuel at a point out of the suction zone above the throttle whereby the fuel falls thereon by gravity.

6. In a down draft carburetor, a downwardly directed mixture passage, a zone of depression therein, a mixture outlet, a throttle valve therein, accelerating means comprising a fuel pump having an automatic suction stroke, operatively connected with the throttle valve on its discharge stroke, means for discharging the fuel at a point out of suction zone above the throttle whereby the fuel falls thereon by gravity.

7. In a downdraft carburetor, a mixture passage, a mixture outlet, a throttle valve therein, accelerating means comprising a fuel pump whose suction stroke is controlled by gravity and which is operatively connected with the throttle valve on its discharge stroke, means for discharging the fuel into the mixture chamber at a point out of the suction zone for the purpose described.

In testimony whereof we affix our signatures.

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JAY S. CULP.