

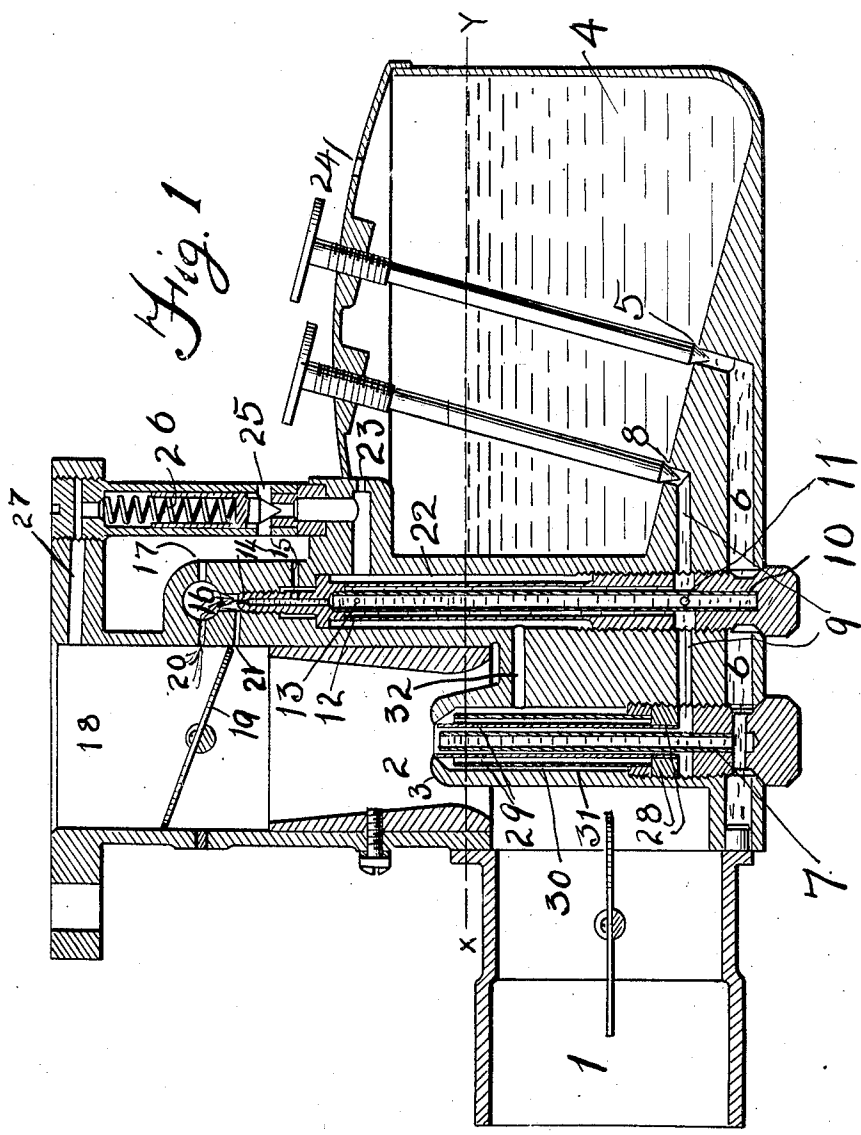
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B. BEARD
CARBURETOR

1,742,376

Filed Dec. 22, 1924

2 Sheets-Sheet 1



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Jan. 7, 1930.

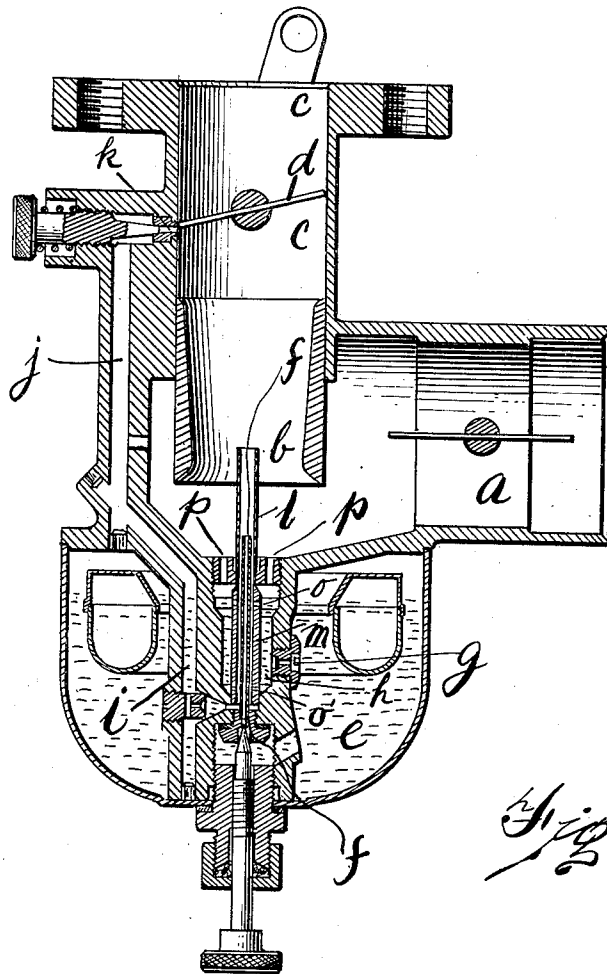
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UNITED STATES PATENT OFFICE

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CARBURETOR

Application filed December 22, 1924. Serial No. 757,302.

The object of this invention is to provide a carburetor for an internal combustion engine in which the fuel is available for acceleration, and after deceleration fuel is available for operating the engine at low speed. The difficulty hertofore experienced has been that the air vented auxiliary reservoirs provided for acceleration purposes were all swept out during acceleration, and therefore no fuel was available for operating the engine after decelerating, and during the interval that the wells were filling up the engine had a tendency to stall, as was indicated by the irregular running which took place under these circumstances.

Figure 1 shows a cross sectional elevation of the preferred form of construction.

Figure 2 shows in cross sectional elevation a cheaper form of construction, adapted for engines having a lesser range of power and speed.

In Figure 1, 1 is the air entrance leading to a mixture chamber 2 of Venturi form, 3 is the fuel nozzle discharging therein and supplied with fuel from 4 (a constant level supply chamber). 5 is a restricted outlet controlling the flow of fuel from 4 to a horizontal passage 6, which leads to the high speed fuel nozzle 7 located concentrically within the nozzle 3. 8 is a restricted fuel outlet from 4 which leads to the horizontal passage 9, which supplies the low speed fuel through a tube 10, which communicates through the orifice 11 with the passage 9.

A second tube 12 is concentrically located around the tube 10, with the upper portion of which it communicates through an orifice 13. An outlet nozzle 14 receives air from the vent 15 so as to deliver highly atomized fuel into a chamber 16 which is also vented to the atmosphere through a passage 17.

This chamber 16 communicates with the mixture outlet 18 adjacent to and in advance of the throttle valve 19 through the two outlets 20 and 21 in a well known manner. Concentric with and surrounding the tubes 10 and 12 is a chamber 22, which is vented to the atmosphere at 23, which is shown for convenience within the float chamber which is vented at 24 directly with the atmosphere.

An additional air vent 25 is provided automatically controlled by the valve 26, which is operated by the depression in the mixture outlet 18 acting through a passage 27. This detail of construction is described in a co-pending application to Don Cole, Serial No. 579,905, filed August 5th, 1922. The passage 9 communicates with an annular passage 28, which is concentric with and surrounding the high speed fuel nozzle 7. The walls of this passage 28 are perforated at 29, slightly below the level X—Y in the float chamber. The tube 30 is arranged concentrically with and around the walls of the passage 28.

This tube 30 is arranged within the passage 31, which communicates through the passage 22 which is vented to the atmosphere through the openings 23 and 24. An auxiliary air vent 25 is provided controlled by the valve 26, which is operated by the depression in the mixture outlet 18, which acts through the passage 27. This latter detail, however, is no part of my invention.

The tube 30 with the passage 9 and the annular space between the low speed tube 10 and the tube 12 constitute an auxiliary air vented reservoir.

In Figure 2, *a* is the air entrance, *b* is the Venturi mixing chamber, *C* is the mixing outlet, and *d* is a throttle valve therein. *e* is a constant level float chamber, *f* is a high speed fuel nozzle controlled by a needle valve. *g* is a calibrated plug controlling the auxiliary fuel supply which is fed into the auxiliary air vented well *h* from the float chamber. This is vented to the air entrance through the opening *p*. A sleeve *m* is provided perforated at *o* and *o'*, and within this sleeve there projects an extension of the high speed fuel nozzle *f*.

A tube *l* forms an extension of the perforated sleeve *m* and projects into the throat of the Venturi tube *b*, hence the fuel that passes the restricted opening *f* and the fuel that flows in at *g* both discharge into *l* and into the mixture chamber at *b*. The low speed fuel supply is obtained from the annulus between *m* and *f* through a passage *i j*, past the needle valve *k*, and discharges

into the mixture outlet *c*, adjacent to and in advance of the throttle valve *d*.

Operation.—In Figure 1, when running at slow speed, fuel is supplied chiefly through the restricted fuel outlet 8, which flows along the passage 9 to the tube 10, entrance to which being obtained through the restricted outlet 11. Fuel flows up 10 to the fuel outlet 14, being aspirated with air entering at 15 and being thus sprayed into the chamber 16 where a further quantity of air is admitted at 17, and hence a rich fuel-air mixture is discharged adjacent to and in advance of the throttle valve 19 through the outlets 20 21.

When fuel flows up 10 it also fills the annular chamber between the tube 10 and the tube 12, because the tube communicates with the annular chamber surrounding it through the opening 13. It will be noticed that the annular passage between the tube 10 and the tube 12 is in open communication with the passage 9.

On opening the throttle the fuel which is held above the level of the float chamber in the annulus between 10 and 12 immediately descends and flows into the passage 9. This fuel flows up the annulus 28 surrounding the high speed fuel nozzle 7, whence it discharges into the mixture chamber 2. (The quantity of this fuel might easily be increased by increasing the diameter of the tube 12.) Meanwhile air is admitted to the high speed fuel nozzle through 23 and 24, down the annular passage 22, across the horizontal passage 32, around the sleeve 30, through the opening 29, and so into the annulus 28 surrounding the high speed fuel nozzle 7.

After running with wide open throttle, if the throttle is closed quickly fuel immediately is available for the passage 10, because the opening 11 is adjacent to the auxiliary fuel outlet 8. As the pipe 10 is of small bore the period of time necessary for fuel to flow up 10 is negligible. The result is that there is practically no delay when decelerating. On reopening the throttle immediately after the deceleration period fuel will be available in the high speed fuel nozzle 7, so that it is almost impossible with any sequence of throttle maneuvers to cause the engine to miss.

In Figure 2 the operation is slightly different as follows:—

Fuel enters the high speed fuel nozzle through *f* and discharges through *l* into the venturi *b*. Low speed fuel is drawn from the inner annulus between *m* and *f* and is delivered to the mixture outlet adjacent to and in advance of the throttle valve *d*. The outer annulus *h* is vented to the air entrance through *p*. The additional fuel supply is regulated through a calibrated plug *g* and the high speed fuel nozzle *f* is controlled by a needle valve.

What I claim is:—

1. A carburetor, comprising a Venturi mixing chamber, a mixture outlet, a throttle valve therein, a constant level fuel supply chamber, an auxiliary reservoir communicating therewith, a fuel outlet from the lower portion of said reservoir communicating with the mixture outlet adjacent to and in advance of the throttle valve, a perforated tube forming a second outlet from said auxiliary reservoir and discharging into the throat of said Venturi tube, and forming within the walls of said reservoir an annular chamber, a passage connecting the upper portion of said annular chamber with the atmosphere, said perforations being located below the fuel level in said supply chamber but above the fuel outlet from the lower portion of said reservoir, a high speed fuel nozzle located concentrically within said perforated tube having an independent connection with said fuel supply chamber, and discharging into the throat of said Venturi mixing chamber.

2. A carburetor, comprising an air entrance leading to a mixing chamber of Venturi form, a mixture outlet, a throttle valve therein, a constant level fuel supply chamber, an auxiliary fuel reservoir communicating with the atmosphere at its upper end and at its lower portion with said fuel supply chamber at a point considerably below the fuel level therein, a low speed fuel outlet from said reservoir located in the lower portion thereof and connected with the mixture outlet at a point adjacent to but in advance of the throttle valve, a perforated tube within said reservoir communicating at its upper end with the throat of said Venturi mixing chamber and at its lower end depending below the level of the fuel in said reservoir, the perforations being located below the said level in said supply chamber, a high speed fuel nozzle located concentrically with said perforated tube and independently connected to said fuel supply chamber, the upper end of said high speed fuel nozzle discharging into the throat of said Venturi mixing chamber.

In testimony whereof I affix my signature.
BERT BEARD.