March 31, 1936. M. E. CHANDLER 2,035,636

CARBURETOR

Filed April 1, 1935

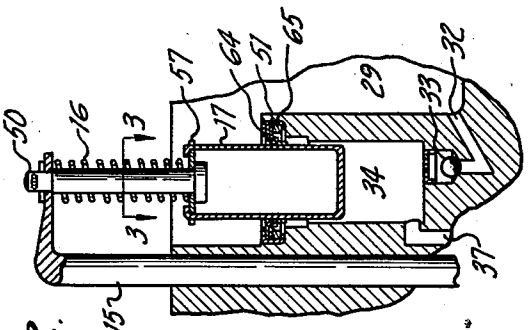


Fig. 2.

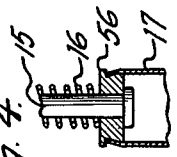


Fig. 4.



Fig. 3.

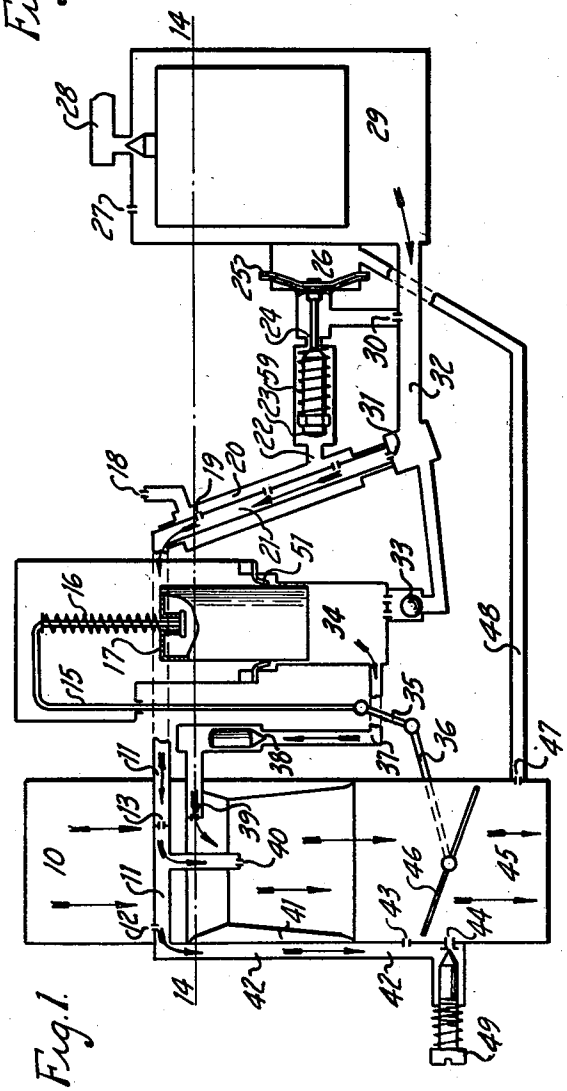


Fig. 1.

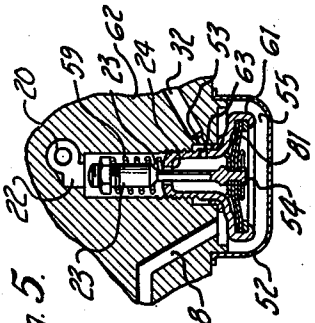


Fig. 5.

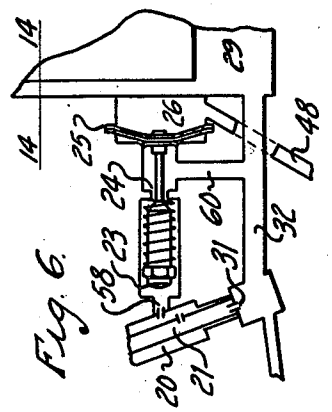


Fig. 6.

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Patented Mar. 31, 1936 2,035,636

UNITED STATES PATENT OFFICE

2,035,636

CARBURETOR

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Application April 1, 1935, Serial No. 14,034

6 Claims. (Cl. 261—34)

This invention relates to improvements in the accelerating means for plain tube carburetors.

The problem to be solved is briefly:—

(a) To provide an accelerating fuel pump which discharges into the main mixing chamber and supplements the main fuel nozzle.

(b) To provide means which will temporarily enrich the gasoline flowing through the main nozzle during the period after the throttle has been opened when the engine depression in the mixture outlet of the carburetor is low and to restore the economical fuel mixture ratio after the air flow has increased to the point where the depression in the mixture outlet has been restored.

Figure 1 shows the layout of the carburetor diagrammatically.

Figure 2 shows the mechanical details of the accelerating pump.

Figure 3 shows the plan view looking down on plane 3—3 of Figure 2.

Figure 4 shows an alternative construction for the pump shown in Figure 2.

Figure 5 shows the means temporarily enrichening the fuel mixture ratio.

Figure 6 shows an alternative method for enrichening the mixture.

In the figures, 10 is the air entrance, 11 is the fuel passage extending tranversely through the air entrance. The passage 11 is provided with a fuel restriction 13 and an air vent 12, both of which are located above the level 14—14 which is maintained by a float in a float chamber 29. This float chamber is vented to the atmosphere through an opening 27 and is provided with a fuel connection 28. The constant level fuel supply chamber 29 is provided with a fuel outlet 32 which supplies fuel through a restriction 31 to an air vented fuel well 22 which is vented to the atmosphere at 18 and is provided with a perforated tube 21, the upper perforation of which, 19, is located just below the level 14—14. The air vent 18 leads into the outer portion of the well 20 so that when fuel is drawn through 11 and the level drops in 20, by reason of the restriction 31, air can flow from 18 through 19 to the passage 11.

A main fuel nozzle 40 is connected to 11 and discharges into the throat of a venturi 41. This venturi 41 forms a mixing chamber which leads to a mixture outlet 45 controlled by a butterfly throttle 46. A low speed fuel passage 42 forms the continuation of the transverse fuel passage 11 which thus discharges into 45 through the two low speed outlets 43—44; 44 being located on the engine side, 42 being located on the atmospheric side of the butterfly throttle 46 when 46 is in the closed position. The fuel outlet 44 is controlled by the needle valve 49. This low speed construction is the orthodox low speed construction now in general use.

A throttle lever 36 is connected to a link 35 to a rod 15 which is bent over 180° and connected through a compression spring 16 to an accelerating fuel piston 17 so that when the throttle 46 is opened suddenly the piston 17 is pushed down by reason of the compression of the spring 16. Fuel is supplied to a cylinder 34 in which the piston 17 reciprocates past a check valve 33. Fuel is discharged from 34 through a passage 37 past a check valve 38 and discharges through an orifice 39 located substantially at the level 14—14 and above the point of discharge of the main fuel nozzle 40 which is located definitely below the level 14—14 and in the throat of the venturi 41. A packing ring 51, shown in greater detail in Figure 2, is provided in the cylinder 34 to prevent the leakage of fuel past the piston 17.

The means for enrichening the mixture through the main fuel nozzle 40 when the depression in the mixture outlet 45 is temporarily destroyed by the sudden opening of the throttle 46, during the period when the engine picks up speed and thereby restores the depression in 45 as is shown in detail in Figures 5 and 6 and also diagrammatically in Figure 1. In Figure 1 a passage 48 connects the mixture outlet 45 through a restriction 47 with a chamber 26. This chamber 26 is provided with a flexible diaphragm numbered 25 in Figure 1 and 81 in Figure 5. This flexible diaphragm controls a shut-off valve 23. This shut-off valve 23 controls the flow of fuel through a passage 24 and is unseated by a spring 59. The depression in 45 thus serves to close the flow of fuel through 24. The passage 24 is connected through a restriction 30 with a main fuel passage 32. A passage 22 admits the fuel from 30 to the air vented well 20 and thereby enriches the mixture during the time that the depression in 45 falls below a certain figure determined by the stiffness of the spring 59 and the area of the flexible diaphragm.

In Figure 6 an alternative form of construction is shown in which a fuel passage 60 is shown in free communication with the passage 32 and a restriction 58 is provided in place of the free communication 32. By this means full atmospheric pressure is applied to the flexible diaphragm 25.

In Figure 5 the actual constructional details are shown comprising a suction passage 48 com-

municating with a chamber 55 which corresponds to 26 in Figure 1. The vacuum admitted through 48 is effective against the diaphragm 51 which is clamped by a washer 54 to the shut-off valve 23. The diaphragm is mounted in a cage 61 which is threaded into a casting 62. 61 carries an opening 24 which opening is controlled by the shut-off valve 23 controlled by the spring 59. Fuel flows through the opening 22 into the air vented well 20. Fuel is supplied to the passage 32 from the float chamber 29 (not shown) through the restricted orifice 53 and so through the opening 24 controlled by the shut-off valve 23. The piece 61 is provided with an opening 63 so that fuel flows from 53 through 63 through the opening 24 and so through 22 to the air vented well 20. In order to make the vacuum admitted through 48 effective against the diaphragm 51 a stamped cup 52 encloses the space 55 in which is located the cage 61 which carries the diaphragm 51. The diaphragm 51 can thus be removed and the compression spring 59 adjusted.

In Figures 2, 3 and 4 the details of the accelerating fuel pump are shown in detail. The rod 50 is provided with a spring 16 and is adapted to slide through the plate 57, which plate is gripped to the cylinder 17. The piston 17 is shown sliding in a cylinder 34 which is located on the side of the float chamber 29 so that any fuel which escapes past the packing 51 is caught in the float chamber 29. This packing 51 is one of the novel features of my invention. It consists of a flexible leather packing in the wall of the cylinder 34 which cheapens the cost of making the piston 17. 51 is retained in a cage 64 and is supported by a packing ring 65.

In Figure 4 the rod 15 is shown sliding in a piece 56 which is provided with a re-entering angle on its surface so that the tube 17 can be spun over and locked to 56.

By providing a restriction 47 between the mixture outlet 45 and the diaphragm chamber 55 (Figure 5) or 26 (Figures 1 and 6) I delay the action of the shut-off valve 23 and thereby prolong the period of rich mixture so that the mixture does not immediately become lean after the throttle is closed nor does the mixture immediately become rich after the throttle is opened. The advantage of this is that the mixture only becomes rich after the accelerating pump has ceased to functior and then only in the event that the engine does not accelerate to the point that the depression in the mixture passage is sufficient to hold the shut-off valve closed.

What I claim is:

1. An enrichening device for a carburetor having a mixture outlet, a mixing chamber and a fuel nozzle discharging therein, comprising a cage mounted on said carburetor, a flexible outer wall therefor, a fuel outlet passage to said cage, a shut off valve in said passage connected to said flexible wall, a fuel entrance leading to said cage, a removable cap adapted to cover the flexible wall of said cage, a suction passage adapted to connect the mixture outlet with the space between said cap and said flexible wall, said cap being adapted to be removed without disturbing said suction passage.

2. A device as set forth in claim 1 having a restriction in said suction passage for the purpose described.

3. An enrichening device for a carburetor having a main body casting, a mixture outlet, a mixing chamber therein, and a fuel nozzle discharging into said mixing chamber comprising a hollow unitary structure adapted to be threaded at one end into said carburetor body and having on its other end a flexible wall, a fuel entrance leading into said hollow structure and a fuel outlet leading therefrom, a shut-off valve controlling the flow from said inlet to said outlet, said valve being operatively connected to said flexible wall, means for applying mixture outlet suction to said flexible wall consisting of a cap, a suction passage leading to the inside of said cap, said cap being adapted to be removed without disturbing said suction passage.

4. An enrichening device for a carburetor having a main body casting, a mixture outlet, a mixing chamber therein and a fuel nozzle discharging into said mixing chamber, comprising a hollow bell shaped structure, its larger end being closed by a flexible wall and its smaller end by a shut-off valve, said smaller end being removably mounted in said carburetor casting, said valve being connected to said flexible wall, said valve extending beyond said structure, a spring mounted on said extension adapted to open said valve, means for adjusting said spring, a removable cap mounted on said carburetor casting and enclosing said flexible wall, means for admitting mixture outlet suction to the inside of said cap, said cap being adapted to be removed without disturbing means.

5. An enrichening device for a carburetor having a main body casting, a mixture outlet, a mixing chamber therein and a fuel nozzle discharging into said mixing chamber, comprising a hollow bell shaped structure removably mounted in said casting and having a fuel entrance into its side and a fuel outlet in its smaller end in communication with said mixing chamber, a shut-off valve located on the outside of said end, a diaphragm mounted on the larger end and connected to said valve, a removable cap enclosing said diaphragm, a passage in said casting connecting the inside of said cap with said mixture outlet, said cap being adapted to be removed without disturbing said passage.

6. An enrichening device for a carburetor having a main body casting, a mixture outlet, a mixing chamber therein and a fuel nozzle discharging into said mixing chamber, comprising an opening in the side of said carburetor casting, a fuel passage in said casting discharging into said opening, a hollow bell shaped structure having its two ends open mounted in said opening to control the flow through said fuel passage, an opening through the side of said structure, a shut-off valve located in the smaller open end of said structure, a diaphragm adapted to close the larger opening of said structure, said diaphragm being connected with said valve, a suction passage through said carburetor casting leading from said mixture outlet and terminating near said diaphragm, a removable cap adapted to enclose both said diaphragm and said suction passage outlet, said cap being adapted to be removed without disturbing said passage.

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