

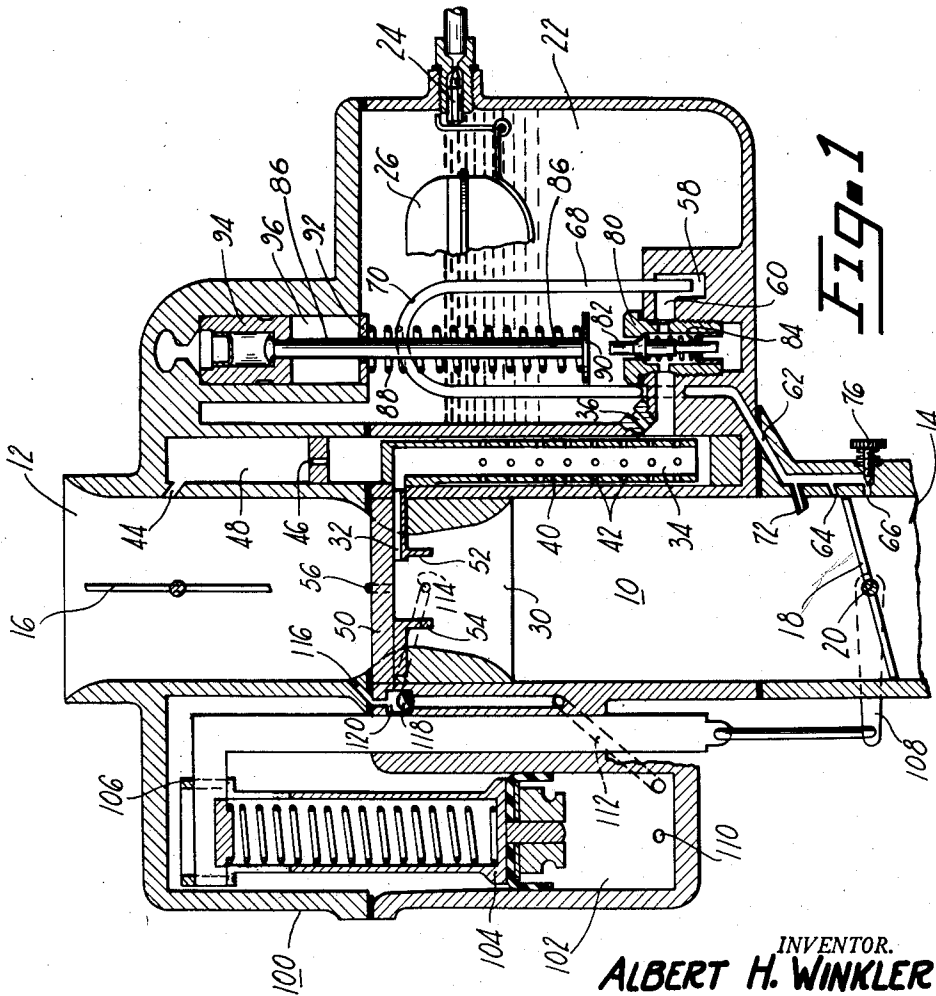
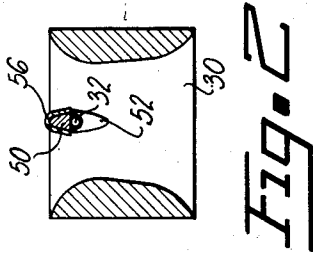
Oct. 28, 1952

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2,615,696

CARBURETOR

Filed Feb. 17, 1948



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UNITED STATES PATENT OFFICE

2,615,696

CARBURETOR

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Application February 17, 1948, Serial No. 8,951

10 Claims. (Cl. 261—41)

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The present invention relates to carburetors for internal combustion engines and more particularly to the main fuel and idle systems for said carburetors.

One of the principal objects of the present invention is to provide a compact and efficient main fuel system in a carburetor for an internal combustion engine.

Another object of the invention is to provide a simplified fuel discharge nozzle which can be easily produced and readily assembled in a carburetor and which gives good fuel distribution in the induction passage of a carburetor.

A further object is to provide a means for minimizing percolation of the fuel in the idling system.

Additional objects and advantages of the present invention will be apparent from the following description and accompanying drawings, in which:

Figure 1 is a vertical cross-section of a carburetor, wherein some of the elements have been rearranged to more clearly show their functional relationship to one another; and

Figure 2 is a vertical cross-section through the venturi and the main discharge jet of the carburetor shown in Figure 1.

Referring more specifically to the drawings wherein one embodiment of my invention is shown, numeral 10 designates an induction passage of the carburetor, 12 the air inlet, 14 the mixture outlet, 16 a choke valve, and 18 a throttle valve, said throttle valve being mounted on a throttle valve shaft 20 journaled in the throttle body of the carburetor. A conventional fuel bowl 22 is formed integrally with the main body of the carburetor and is provided with a fuel inlet valve 24 and a float mechanism 26 for controlling the flow of fuel through inlet valve 24. The fuel is discharged into the induction passage at the throat of the venturi 30 through a discharge nozzle 32 which communicates with the fuel bowl through a well 34 and a main fuel metering jet 36 located along one side of well 34. A sleeve 40, having several small holes 42 in the wall thereof, is disposed in said well and is spaced from the internal wall thereof to permit air and fuel to surround the sleeve and pass through holes 42 into the internal portion of said sleeve. The air entering well 34 and sleeve 40 is admitted from the air intake end 12 of the induction passage through a port 44 and is metered at orifice 46 as it passes downwardly through passage 48 to the annular space between sleeve 40 and the side wall of well 34. In this construction, the fuel

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flows from bowl 22 through metering orifice 36 into well 34 and into the lower end of sleeve 40 and passes upwardly through said sleeve where it forms an emulsion with the air admitted through the holes 42. The fuel-air emulsion so formed is discharged through nozzle 32 into the throat of the venturi 30.

The fuel nozzle 32 is arranged to discharge fuel adjacent the under side of a horizontal bar 50 and is provided near the discharge end thereof with a downwardly tapering ear 52 to prevent fuel from flowing along the under side of said nozzle to the venturi and thence down the side wall of the induction passage. A similar ear 54 is disposed on the opposite side of the venturi under bar 50. A bead 56 disposed on the top side of bar 50 near the central portion thereof, as shown in Figure 2, concentrates the discharge of fuel in the central portion of the induction passage, and, together with the venturi, provides good distribution of the fuel in the air flowing through the induction passage. Other irregularities may be provided on bar 50, such as one or more grooves or ribs on the sides or bottom thereof, to obtain the desired distribution of the fuel in the induction passage.

The idle system of the carburetor includes an anti-percolating well 58, a horizontal passage 60 connecting said well with the lower portion of well 34, and a discharge conduit 62 connecting well 58 with the induction passage at ports 64 and 66 above and below the throttle valve 18, respectively. The discharge conduit consists in part of a U-shaped tube 68 disposed in the fuel bowl and surrounded by fuel so that the idling fuel passing therethrough is maintained at a relatively low temperature to minimize percolation of the fuel therein. The uppermost curved portion of the tube is above the fuel level and contains a port 70 for bleeding air into the idle discharge conduit to form a fuel-air emulsion. Tube 68 extends into the lower portion of well 58 so that any fuel vapors passing through conduit 60 into said well accumulate in the top portion thereof, above the entrance to tube 68, and do not pass through said tube. When the throttle valve is in closed or nearly closed position, the fuel flows from well 34 through horizontal conduit 60 to well 58 and then passes through tube 68 where it mixes with the air admitted through port 70 to form the fuel-air emulsion which is discharged through port 66 into the induction passage on the engine side of the throttle valve. Additional air is bled into the idle air system at port 72 throughout the entire operation of the

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idle system and also at port 64 when the edge of the throttle valve 18 is below said port. As the throttle valve is opened and the edge thereof passes above port 64, fuel is discharged through both ports 64 and 66, thus providing additional fuel for the increased flow of air through the induction passage. An idle adjustment valve 76 controls the quantity of fuel-air emulsion discharged through port 66.

A power enrichment jet 80 connects the fuel bowl with conduit 60 and is controlled by a valve 82 urged to its closed position by a spring 84. Valve 82 is operated by a reciprocable rod 86 which is urged in the direction to open said valve by a spring 88 reacting between a plate 90 secured to the lower end of said rod and a disc-like plate 92 secured to the fuel bowl cover. The rod 86 is secured to and actuated by a piston 94 mounted in cylinder 96 which is connected at its upper end by a conduit, not shown, with the induction passage on the engine side of the throttle valve. During high power output when manifold vacuum is low, spring 88 urges plate 90 against the stem of valve 82 and opens the valve to permit additional fuel to flow through conduit 60 into well 34 to supply an enriched fuel-air mixture. The power enrichment jet is always maintained in open position when the engine is not running, and the vapors that collect in the top portion of well 58 pass through conduit 60 to the power enrichment jet and thence into the fuel bowl.

A manually actuated accelerating pump generally shown at 100 consists of a cylinder 102, a piston 104 and a lever 106 connecting the upper portion of said piston with the throttle valve actuating mechanism 108 mounted on one end of shaft 20, as shown in Figure 1. When piston 104 is raised, fuel flows from the fuel bowl into the lower portion of cylinder 102 through a check valve controlled conduit 110, and as the piston is moved downwardly on the opening movement of the throttle valve, the fuel is discharged from the lower end of cylinder 102 through conduit 112 and discharge orifice 114 disposed near the throat of venturi 30. An air duct 116 connects the upper end of conduit 112 with the induction passage 10 above venturi 30 to break the effect of Venturi vacuum on the fuel in conduit 112. A ball check valve 118 is disposed in an enlarged portion 120 of conduit 112 and is adapted to seat over the fuel inlet of the enlarged portion when the accelerating pump is not in operation and to seat over the air inlet, i. e. the lower end of duct 116 when the fuel is being discharged from the accelerating pump. This ball check valve thus permits air to bleed through the pump discharge orifice when the pump is not in operation and prevents the suction in the throat of the venturi from drawing fuel from the pump cylinder.

It is contemplated that other arrangements of elements than those shown in the accompanying drawings may be provided without departing from the scope of the present invention. Further, other elements may be incorporated in the carburetor and additional modifications of the main fuel and idle systems may be made to satisfy requirements.

I claim:

1. In an engine carburetor, an induction passage having an air inlet and a mixture outlet with a throttle valve therein, a venturi in said induction passage, a bar extending across said venturi near the throat thereof, a pair of ears spaced from one another and from the Venturi

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walls on the downstream side of said bar, a fuel well, a conduit connecting said well with the induction passage between said ears, and an idle system having a conduit connecting said well with the induction passage on the engine side of said throttle valve.

2. In an engine carburetor, an induction passage having an air inlet and a mixture outlet with a throttle valve therein, a venturi in said induction passage, a bar tapering toward the air inlet and extending across said venturi near the throat thereof, a pair of ears tapered toward the mixture outlet and spaced from one another and from the Venturi walls on the downstream side of said bar, a fuel well, a perforated sleeve in said well spaced from the side walls thereof, a fuel inlet near the bottom of said well, an air inlet near the top of said well, a conduit connecting said sleeve near the top thereof with the induction passage between said ears, and an idle system having a conduit connecting said well with the induction passage on the engine side of the throttle valve.

3. In an engine carburetor, an induction passage having an air inlet and a mixture outlet, a venturi in said induction passage, a bar extending across said venturi near the throat thereof, a pair of ears spaced from one another on the downstream side of said bar, a fuel well, a conduit connecting said well with the induction passage between said ears, an idle system having a conduit connecting said well with the induction passage, an antipercolating well in said idle conduit, a fuel inlet near the top thereof, a fuel outlet conduit extending downwardly into the well to a point near the bottom thereof, a power enrichment jet connecting a source of fuel with said idle conduit anterior to said last mentioned well, a valve for said jet, and an actuating means for said valve so constructed and arranged that said valve remains open while the engine is not running to provide communication between said antipercolating well and the source of fuel.

4. In an engine carburetor, an induction passage having an air inlet and a mixture outlet with a throttle valve therein, a venturi in said induction passage, a bar tapering toward the air inlet and extending across said venturi near the throat thereof, a pair of ears tapering toward the mixture outlet and spaced from one another on the downstream side of said bar, a fuel well, a perforated sleeve in said well spaced from the side walls thereof, a fuel inlet near the bottom of said well connecting the well with a fuel bowl, an air inlet near the top of said well, a conduit connecting said sleeve near the top thereof with the induction passage between said ears, an idle system having a conduit connecting said well with the induction passage on the engine side of the throttle valve, an antipercolating well in said idle conduit, a fuel inlet near the top thereof, a fuel outlet conduit extending downwardly in the well to a point near the bottom thereof, a power enrichment jet connecting said bowl with said idle conduit anterior to said last mentioned well, a valve for said jet, an actuating means for said valve so constructed and arranged that said valve remains open when the engine is not running to provide communication between said antipercolating well and the fuel bowl, and a tube forming a section of the idle conduit disposed in the fuel bowl and adapted to be at least partially surrounded by fuel.

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5. In a carburetor, an induction passage having an air inlet and a mixture outlet, a venturi in said induction passage, a bar extending across said venturi near the throat thereof, a pair of ears spaced from one another and from the Venturi walls on the downstream side of said bar, and a conduit for connecting a source of fuel with the induction passage between said ears.

6. In a carburetor, an induction passage having an air inlet and a mixture outlet, a venturi in said induction passage, a bar tapering toward the air inlet and extending across said venturi near the throat thereof, a pair of ears tapering toward the mixture outlet and spaced from one another and from the Venturi walls on the downstream side of said bar, and a conduit for connecting a source of fuel with the induction passage between said ears.

7. In a carburetor having an induction passage: an idle system comprising an antipercolating well, a passageway connecting said well near the top thereof with a source of fuel, a conduit including a tube extending downwardly into said well to a point near the bottom thereof for connecting said well with the induction passage, a valve in said passageway, and an actuating means for said valve so constructed and arranged that said valve remains open while the engine is not running.

8. In a carburetor having a fuel bowl and an induction passage: an idle system comprising an antipercolating well, a passageway connecting said well near the top thereof with said fuel bowl, a conduit connecting said well with the induction passage and including a tube extending downwardly into said well to a point near the bottom thereof and having an inverted U-shaped portion disposed in said bowl, a valve in said passageway, and an actuating means for said

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valve so constructed and arranged that said valve remains open while the engine is not running.

9. In a carburetor having a fuel bowl, a main discharge system, and an induction passage: an idle system comprising an antipercolating well, a passageway connecting said well near the top thereof with the main discharge system, a conduit including a tube extending downwardly into said well to a point near the bottom thereof for connecting said well with the induction passage, a passage connecting said passageway with said bowl, a valve in said passage, and a vacuum-actuated spring loaded means for holding said valve open while the engine is not running.

10. In a carburetor, a fuel bowl, an induction passage, and an idling system including a fuel passageway communicating with the fuel bowl and terminating in said induction passage, an inverted U-shaped tube forming a segment of said passageway and arranged to have both legs submerged in fuel, and a port in said tube near the upper portion thereof.

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