

April 23, 1963

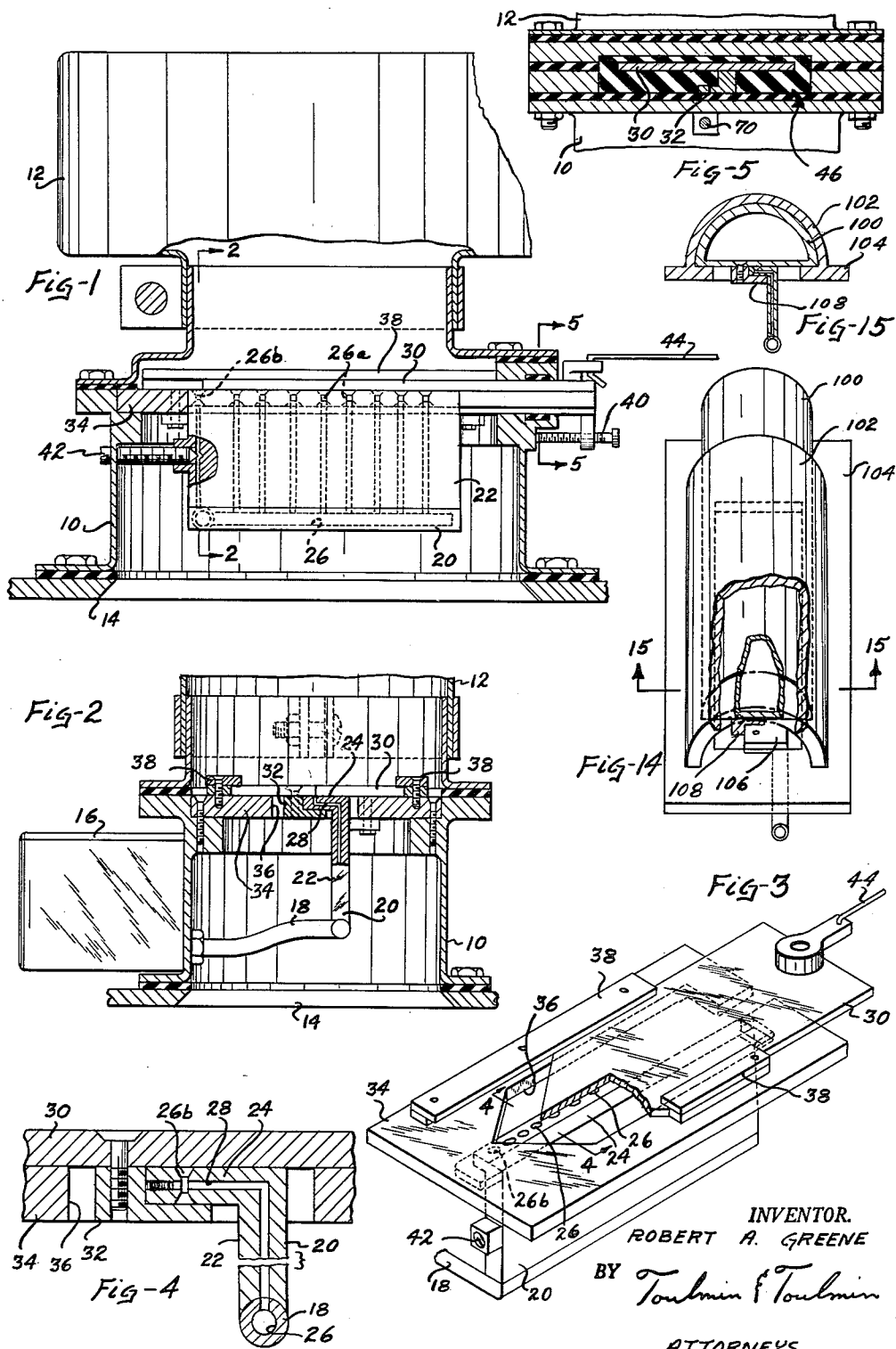
R. A. GREENE

3,086,758

APPARATUS FOR CARBURETION

Filed June 29, 1961

2 Sheets-Sheet 1



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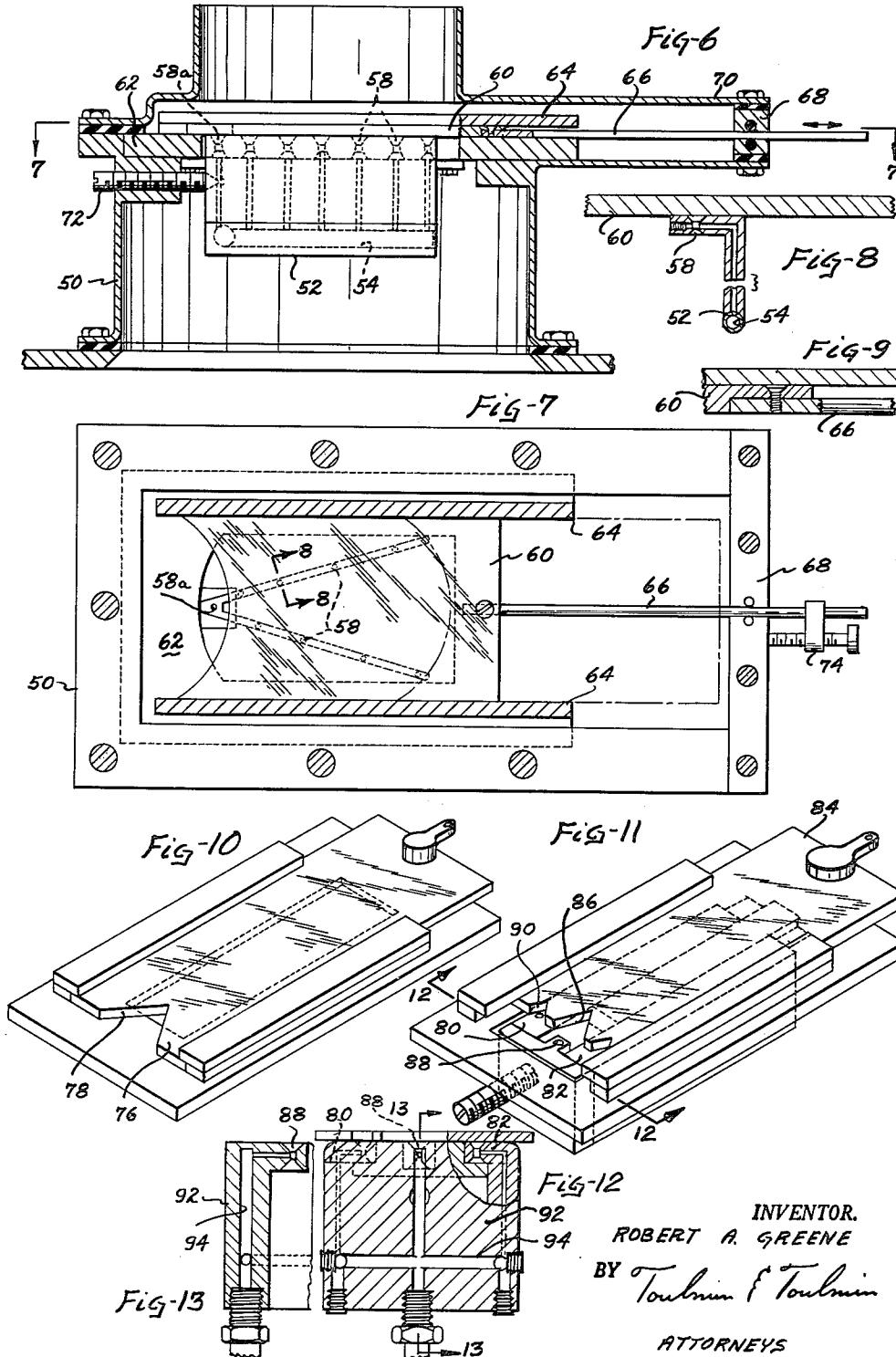
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APPARATUS FOR CARBURETION

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16 Claims. (Cl. 261-44)

This invention relates to apparatus for carburetion and is by way of being a further improvement and development in this field over what is disclosed and claimed in my co-pending United States application, Serial No. 762,369, Method and Apparatus for Carburetion, filed September 22, 1958, now Patent 3,006,619.

In my Patent 3,006,619 I disclose a carburetor having an iris type diaphragm with fuel-supplying jets arranged in association therewith so as to become progressively effective as the diaphragm opens. In the present application somewhat the same principle is employed in that there are a plurality of fuel-supplying jets in the carburetor which become progressively effective as an air supply control member is moved from closed to open position.

A particular object of the present invention is the provision of an improved apparatus for carburetion which will maintain a more uniform ratio of fuel to air throughout the range of operating conditions of the carburetor than has been possible heretofore.

Another object of this invention is the provision of a novel jet arrangement for carburetors with the jets being directly and positively under the control of a movable air supply control member.

Still another object of this invention is the provision of a carburetor arrangement having a plurality of jets in which the jets are gradually positively closed off when the air supply control member of the carburetor moves toward a closed position, and wherein each jet has substantially the same fluid supply as every other jet leading to uniform operating conditions.

These and other objects of the present invention will become more apparent upon reference to the following specification taken in connection with the accompanying drawings in which:

FIGURE 1 is a vertical sectional view through one carburetor arrangement according to my invention;

FIGURE 2 is a vertical sectional view indicated by line 2-2 on FIGURE 1;

FIGURE 3 is a perspective view showing the movable air control member or slide valve and the jets controlled thereby;

FIGURE 4 is a vertical sectional view indicated by line 4-4 on FIGURE 3 showing at somewhat enlarged scale one of the jets of the carburetor;

FIGURE 5 is a sectional view indicated by line 5-5 on FIGURE 1 showing the manner in which the slide valve is sealed at the wall of the carburetor;

FIGURE 6 is a view similar to FIGURE 1, but showing a somewhat different arrangement;

FIGURE 7 is a plan sectional view of the arrangement of FIGURE 6 and is indicated by line 7-7 on FIGURE 6;

FIGURE 8 is a sectional view through one of the jets and is indicated by line 8-8 on FIGURE 7;

FIGURE 9 is a fragmentary view showing the manner in which the rod for adjusting the slide valve of the carburetor is connected to the slide valve;

FIGURE 10 is a perspective view showing a somewhat different slide valve arrangement;

FIGURE 11 is a perspective view like FIGURE 10, but showing still another slide valve arrangement;

FIGURE 12 is a sectional view indicated by line 12-12

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on FIGURE 11 showing the arrangement for supplying fluid fuel to the jets;

FIGURE 13 is a sectional view indicated by line 13-13 on FIGURE 12 showing one of the jets in section and the fuel supply conduit leading thereto;

FIGURE 14 is a perspective view showing still another type of slide valve arrangement; and

FIGURE 15 is a sectional view indicated by line 15-15 on FIGURE 14 showing the slide valve arrangement thereof in cross-section.

Referring to the drawings somewhat more in detail, in FIGURES 1 and 2 there is shown a carburetor arrangement comprising the body part 10 forming a down-draft passage from air cleaner 12 to engine manifold 14. Attached to the side of body part 10 is a fuel supply chamber 16 adapted for being supplied with fuel in any conventional manner, as by a pump, and having conventional means therein such as a float controlled valve for maintaining the liquid level therein at a predetermined fixed point.

Fuel chamber 16 communicates by way of a conduit 18 in body part 10 with a jet block 20 which consists of a generally L-shaped inverted member having the vertical leg part 22 and at the top the laterally extending horizontal leg part 24. Extending along the bottom of vertical leg part 22 is a passage 26 to which conduit 18 is connected for supplying liquid fuel thereto.

In the laterally extending leg part 24 is a plurality of venturi shaped passages 26a which form the jets for the carburetor. Each of these passages has a channel 28 leading from the throat to passage 26 so that each jet has fuel supplied individually thereto from passage 26 so that the fuel supply to all of the jets is uniform at all times.

According to this invention, the jet block 20 extends substantially completely across body part 10 with the jets arranged on about a diameter thereof. The passage of air through the passage in the carburetor is under the control of a slide valve 30 which, as will best be seen in FIGURE 4, rests on top of the transversely extending leg 24 of the assembly block and has an L-shaped member 32 connected therewith that engages the bottom of leg part 24. It will be observed that the jets 26a are closed at both the top and bottom by the slide valve when the valve is positioned to make the jets inoperative.

As will be seen in FIGURE 3, the slide valve 30 is supported on a plate element 34 carried in the upper part of body 10 and which plate has an opening 36 through which air flows downwardly through the body 10. The jet block is located in about the middle of this opening and slideably resting on the plate is the aforementioned slide valve 30. Guide elements 38 are carried by the plate 34 so as to support and guide slide valve 30.

It will be appreciated that when slide valve 30 is moved toward the right as it is viewed in FIGURES 1 and 3, the opening for air is progressively increased while the individual jets of the jet assembly block are made successively effective thereby maintaining a constant ratio of fuel to air in the combustible mixture being drawn from the carburetor and into the intake manifold.

For the purpose of controlling the idling speed of the carburetor, there is a jet 26b at the extreme left end of the jet assembly block as it is viewed in FIGURES 1 and 3 which is always exposed since the slide valve 30 never completely covers this jet. The exact position of the slide valve in its engine idling position is under the control of an abutment screw 40 while the fuel supplied through the idling jet 26b can be regulated by the adjustable needle valve 42. In this manner, engine idling conditions are under complete control, but this control, of course, has no effect on the operation of the carburetor when the slide valve is open.

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Operation of the slide valve can be had by connecting a rod 44 thereto which is under manual control as by being connected with the vehicle accelerator pedal.

The slide valve is sealed to body 10 so that the slide valve can be moved without admitting air from the side thereof by a resilient rubber-like sealing means generally indicated at 46 in FIGURES 1 and 5. Numerous sealing arrangements are possible, and in many cases a close fitting metal to metal seal will be satisfactory, although I prefer to employ a gasket means as illustrated.

In the modification of FIGURES 6 through 9, the body part of the carburetor is indicated at 50 and there is a jet assembly 52 therein having a fuel supply passage 54 and the channels 56 leading from the fuel supply passage to the individual jets 58 arranged in a laterally extending portion of the jet assembly at the top thereof.

In the FIGURES 6 through 9 modification, I obtain distribution of the fuel supplied over substantially the entire area of the air flow passage by arranging the jets in a plurality of rows, for example, in two rows arranged to form a V as in FIGURE 7.

Inasmuch as the jets are arranged to form a V, the slide valve 60 merely engages the top of the jet assembly block 52 and does not close off the under sides of the jets 58. The plate on which the slide valve 60 rests is identified at 62, and this is a member that rests on top of the body 10. The plate carries guide means 64 for the slide valve and there is a valve actuating rod 66 extending sealingly through a wall member 68 formed in an extension 70 that is a part of the valve body.

As in the first modification, idler jet 58a is provided with the fuel supply thereto being under the control of the adjustable needle valve 72. The idling position of the slide valve, which is illustrated at FIGURE 7, can, as in the first modification, be under the control of an abutment screw 74 carried by rod 66.

FIGURE 10 shows a slight modification in the construction of a slide valve member 76 which is so formed as to have notch 78 at the inner end thereof, which provides an opening for the movement of air past the idler jet when the slide valve is closed.

FIGURES 11, 12 and 13 show an arrangement wherein there are two parallel rows of jets as at 80 and 82, which are under the control of a slide valve member 84. Slide valve member 84 has a central notch 86 for exposing idler jet 88 when the slide valve is closed and also has somewhat shorter notches 90 at the sides so that the first opening movement of the slide valve will commence to expose the main jets.

As will be seen in FIGURES 12 and 13, the jets are supported in a block 92 having fuel passage means 94 therein corresponding to the passage means 26 described in connection with the first modification.

FIGURES 14 and 15 show a modified arrangement wherein there is a slide valve 100 semi-circular in cross-section and which slides in an arcuate guide means 102 on a support plate 104. The jet block is indicated at 106 and is constructed about the same as the jet block in the first described modification. As in the first described modification, and as in the modification of FIGURES 11 through 13, slide valve 100 has an L-shaped member 108 attached thereto so that both the tops and bottoms of the jet passages are closed by the slide valve as it moves toward closed position.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions; and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

I claim:

1. In a carburetor; a carburetor body having an air flow passage therethrough, a jet block fixedly mounted in said passage having a plurality of individual jets therein distributed in a plane transverse to said air passage, means for supplying fuel to said jets, and a slide valve in said

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passage movable laterally therein for controlling the flow of air therethrough, said slide valve having a surface coplanar with one end of said jets so as progressively to uncover the jets when moving in the opening direction and progressively to close the jets when moving in the closing direction.

2. In a carburetor; a carburetor body having an air flow passage therethrough, a jet block fixedly mounted in said passage having a plurality of individual jets therein distributed in a plane transverse to said air passage, means for supplying fuel to said jets, and a slide valve in said passage movable laterally therein for controlling the flow of air therethrough, so as progressively to uncover the jets when moving in the opening direction and progressively to close the jets when moving in the closing direction, an idler jet in said passage, and said slide valve being arranged to permit air flow past said idler jet when the slide valve is in its closed position.

3. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block fixedly mounted in said passage having a plurality of jets therein distributed in a lateral direction relative to said air passage, a slide valve in said air passage movable laterally thereof for controlling the flow of air through the passage, said jets having upper open ends, and said slide valve having a surface coplanar with said upper open ends of said jets for engaging and closing said jets progressively when the valve moves in its closing direction.

4. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a plurality of jet means distributed in a lateral plane in said air flow passage in fixed positions therein, each jet means comprising a vertical venturi having open top and bottom ends and fluid supply means connected to the throat thereof, a slide valve in said passage movable laterally thereof for controlling the flow of air therethrough, and said slide valve having a surface coplanar with the upper open ends of said jet means to interrupt the flow of air therethrough when the slide valve is disposed in closing relation thereto.

5. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a plurality of jet means distributed in a lateral plane in said air flow passage in fixed positions therein, each jet means comprising a vertical venturi having open top and bottom ends and fluid supply means connected to the throat thereof, a slide valve in said passage movable laterally thereof for controlling the flow of air therethrough, and said slide valve having a surface coplanar with the upper open ends of said jet means to interrupt the flow of air therethrough when the slide valve is disposed in closing relation thereto, and said jet means being distributed so as to be progressively opened one at a time by said slide valve as it moves in its opening direction and to be progressively closed one at a time by the slide valve as it moves in its closing direction.

6. In a carburetor; a carburetor body having a vertical flow passage therethrough, a plurality of individual jets distributed in a lateral plane in said passage, each jet comprising a vertical venturi passage and fuel supply means connected to the throat thereof, a slide valve carried by said body and movable laterally of said passage controlling the flow of air therethrough, said slide valve having its bottom surface in said plane of the upper ends of said jets so as to progressively open and close said jets during opening and closing movements respectively of said slide valve, and a means carried by said slide valve engaging the lower ends of said jets and being co-extensive with said slide valve in the direction of movement thereof for controlling the lower ends of said jets simultaneously with the controlling of the upper ends thereof.

7. In a carburetor; a carburetor body having a vertical flow passage therethrough, a jet block in said passage, a plurality of jets arranged in the jet block, each comprising a vertical venturi and fuel supply means connected to the

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throat thereof, a slide valve slideable laterally in said body for controlling the flow of air through said passage, said slide valve engaging the upper ends of said jets, said jets being arranged in a row across the block in the direction of movement of the slide valve and an L-shaped member carried by the slide valve extending beneath the jets and controlling the lower ends thereof simultaneously with the controlling of the upper ends thereof.

8. In a carburetor; a carburetor body having a vertical flow passage therethrough, a jet block in said passage, a plurality of jets arranged in the jet block, each comprising a vertical venturi and fuel supply means connected to the throat thereof, a slide valve slideable laterally in said body for controlling the flow of air through said passage, said slide valve engaging the upper ends of said jets, said jets being arranged in a plurality of rows extending parallel to the direction of movement of said slide valve, and means on said slide valve engaging the ends of said jets for controlling the lower ends thereof simultaneously with the control of the upper ends thereof.

9. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block carried by the body and extending across said passage, said block having a laterally offset portion at its upper end, a slide valve movable laterally in said air passage and resting on the top of said laterally offset portion, a member carried by the slide valve engaging the under side of said laterally offset portion, a plurality of jets in said laterally offset portion, each comprising a vertical venturi passage extending through said portion and fuel supply means leading to the throat of each said venturi passage.

10. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block carried by the body and extending across said passage, said block having a laterally offset portion at its upper end, a slide valve movable laterally in said air passage and resting on the top of said laterally offset portion, a member carried by the slide valve engaging the under side of said laterally offset portion, a plurality of jets in said laterally offset portion, each comprising a vertical venturi passage extending through said portion and fuel supply means leading to the throat of each said venturi passage, there being an idler jet adjacent the side of the flow passage toward which the slide valve moves in its closing direction and means pertaining to the slide valve for permitting air flow through the passage in the region of said idler jet when the slide valve is in its closed position.

11. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block carried by the body and extending across said passage, said block having a laterally offset portion at its upper end, a slide valve movable laterally in said air passage and resting on the top of said laterally offset portion, a member carried by the slide valve engaging the under side of said laterally offset portion, a plurality of jets in said laterally offset portion, each comprising a vertical venturi passage extending through said portion and fuel supply means leading to the throat of each said venturi passage, there being an idler jet adjacent the side of the flow passage toward which the slide valve moves in its closing direction and means pertaining to the slide valve for permitting air flow through the passage in the region of said idler jet when the slide valve is in its closed position, there being a main fuel supply passage in said jet block, individual channels leading from said fuel supply to the throat of said venturi passages.

12. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block carried by the body and extending across said passage, said block having a laterally offset portion at its upper end, a slide valve movable laterally in said air passage and resting on the top of said laterally offset portion, a member carried by the slide valve engaging the under side of said laterally offset portion, a plurality of jets in said laterally offset portion, each comprising a vertical venturi passage

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extending through said portion and fuel supply means leading to the throat of each said venturi passage, there being an idler jet adjacent the side of the flow passage toward which the slide valve moves in its closing direction and means pertaining to the slide valve for permitting air flow through the passage in the region of said idler jet when the slide valve is in its closed position, there being a main fuel supply passage in said jet block, individual channels leading from said fuel supply to the throat of said venturi passages, a float controlled fuel supply chamber, and means connecting said chamber with said main fuel supply passage.

13. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block carried by the body and extending across said passage, said block being relatively narrow and having a laterally offset portion at its upper end, a support plate adjacent the upper end of the jet block having an aperture through which air flows in passing through said air passage, a slide valve slideably mounted on said plate and having its one surface coplanar with the upper surface of said offset portion, guide means on said plate guiding and sealing said slide valve so that it can be moved laterally in said air passage to control air flow therethrough, a member carried by the slide valve engaging the under side of the laterally offset portion of said jet block, said member being substantially coextensive with said slide valve, a plurality of jets in said laterally offset portion, each jet comprising a vertical venturi passage extending completely through said offset portion, fuel supply means leading to the throat of each said venturi passage, an idler jet adjacent the side of the air flow passage toward which the slide valve moves in its closing direction, means associated with the slide valve for permitting air flow through the passage in the region of said idler jet when the slide valve is in its closed position, adjustable means for controlling the fuel supply to said idler jet, and adjustable means associated with said slide valve for determining the closed position thereof.

14. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block carried by the body and extending across said passage, said block being relatively narrow and having a laterally offset portion at its upper end, a support plate adjacent the upper end of the jet block having an aperture through which air flows in passing through said air passage, a slide valve slideably mounted on said plate and having its one surface coplanar with the upper surface of said offset portion, guide means on said plate guiding and sealing said slide valve so that it can be moved laterally in said air passage to control air flow therethrough, a member carried by the slide valve engaging the under side of the laterally offset portion of said jet block, said member being substantially coextensive with said slide valve, a plurality of jets in said laterally offset portion, each jet comprising a vertical venturi passage extending completely through said offset portion, fuel supply means leading to the throat of each said venturi passage, an idler jet adjacent the side of the air flow passage toward which the slide valve moves in its closing direction, means associated with the slide valve for permitting air flow through the passage in the region of said idler jet when the slide valve is in its closed position, adjustable means for controlling the fuel supply to said idler jet, and adjustable means associated with said slide valve for determining the closed position thereof, said fuel supply means comprising individual channels leading from the throats of said venturies downwardly to a lower portion of said jet block, a main fuel supply conduit in the lower portion of said jet block into which said channels open, and a float controlled fuel supply chamber connected to said main fuel supply conduit.

15. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a jet block in said passage having a plurality of jets therein distributed in a

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lateral direction relative to said air passage, a slide valve in said air passage, movable laterally thereof for controlling the flow of air through the passage, said jets having upper open ends, and said slide valve being adapted for engaging and closing said jets progressively when the valve moves in its closing direction, an apertured plate on which said slide valve rests and on which the slide valve slides when moving laterally of the air passage, said slide valve being flat on the bottom and arcuate on the top, and arcuate guide means carried by the plate engaging the slide valve for guiding it in its sliding movements.

16. In a carburetor; a carburetor body having a vertical air flow passage therethrough, a plurality of jet means distributed in a lateral plane in said air flow passage, each jet means comprising a vertical venturi and fluid supply

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means connected to the throat thereof, a slide valve in said passage movable laterally thereof for controlling the flow of air therethrough, and said slide valve engaging the upper open ends of said jet means to interrupt the flow of air therethrough when the slide valve is disposed in closing relation thereto, said slide valve being semi-circular in cross-section with the flat side on the bottom, a plate on which the slide valve rests having an aperture controlled by the slide valve, and semi-circular guide means on the plate engaging the top of the slide valve for supporting and guiding the slide valve.

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