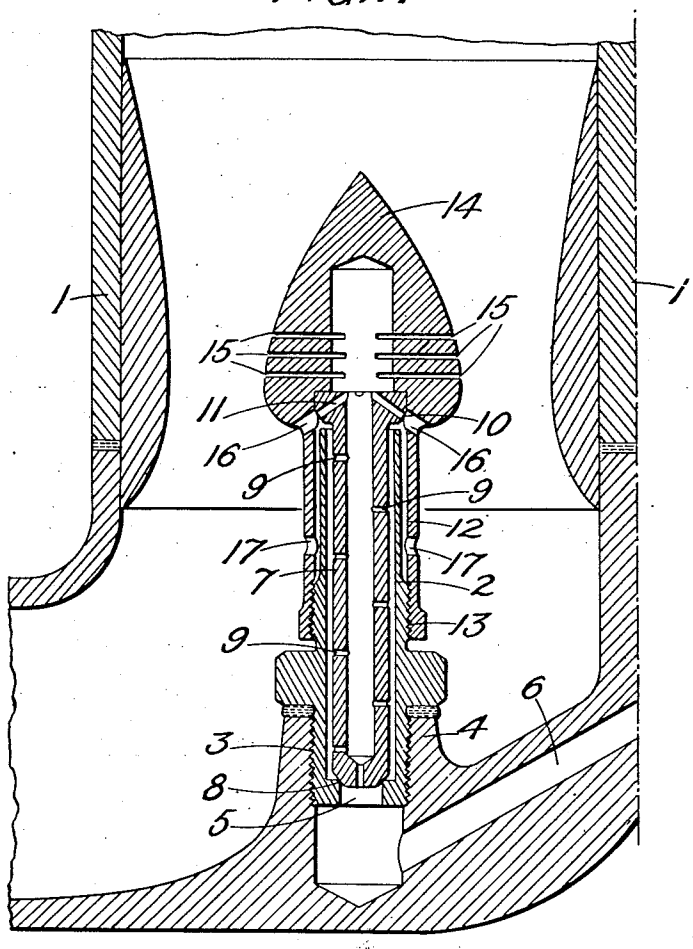
July 28, 1931. W. A. WHATMOUGH ET AL 1,816,756

SPRAY CARBURETOR

Filed March 29, 1929 2 Sheets-Sheet 1

FIG. 1.



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SPRAY CARBURETOR

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FIG. 2.

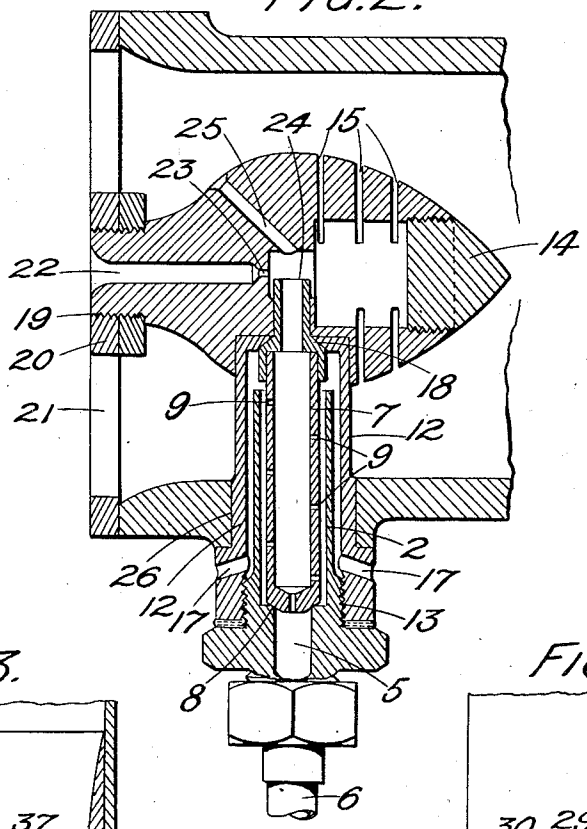


FIG. 3.

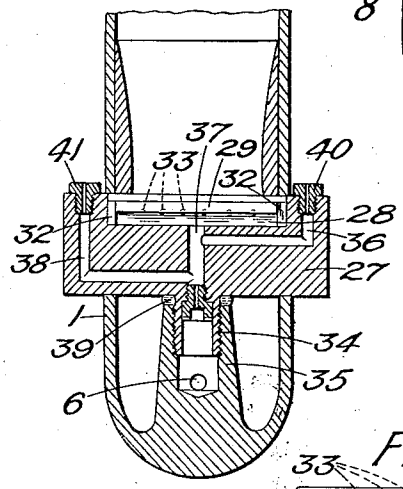


FIG. 4.

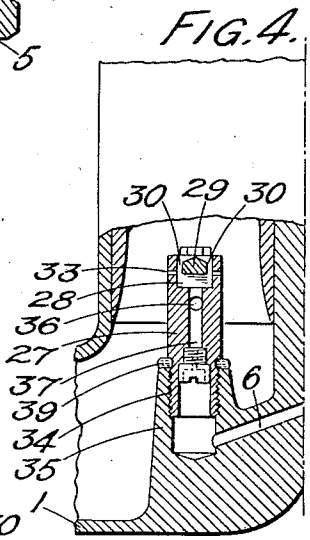
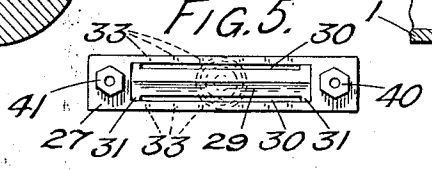


FIG. 5.



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UNITED STATES PATENT OFFICE

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SPRAY CARBURETOR

Application filed March 29, 1929, Serial No. 351,046, and in Great Britain April 2, 1928.

This invention relates to spray carburetors and it has for object improvements by which certain advantages shall be obtained, including more satisfactory proportioning of fuel and air and its atomization while at the same time maintaining or increasing volumetric efficiency of the engine.

The present invention comprises a spray carburetor having a diffuser jet tube with an enlargement at or towards its upper end and one or more extra air ports through said enlargement directed either at right angles to or towards the direction of flow of the fuel.

The jet tube enlargement may be of various shapes; thus it may be of inverted conical shape or it may be of bulbous stream line form of smaller area at the end than at a point just short of the end. Or it may be in the form of an elongated box-like member mounted at the upper end of the jet tube and extending across the main air intake tube.

The orifice within the jet tube enlargement may increase in area towards the upper end and be, for example, of conical form and said orifice may be restricted as by a cover or plug to produce turbulence. Or the enlargement may be of closed bulbous form with narrow outlet passages and preferably terminate in a point.

According to a further feature of the invention a jet tube for a spray carburetor comprises in combination a first tubular member to be connected at its lower end with the float chamber, a diffuser tube within the first tubular member, spaced therefrom and seated at its lower end therein, and an outer tubular member spaced from the first tubular member and having an enlargement at its upper end of closed bulbous form with narrow outlet passages and an air port or ports through the lower part of the enlargement.

A still further feature of the invention consists in the provision of an air supply from the exterior of the main air intake tube to the jet tube at or towards its upper end. Such air may be applied to the jet tube enlargement and a second air supply from the exterior of the main air intake tube may be provided into the jet tube at a lower point.

The invention will now be described with reference to the accompanying drawings wherein:—

Fig. 1 shows a sectional elevation of the main air intake tube of one form of spray carburetor,

Fig. 2 a sectional elevation of part of a horizontal form,

Fig. 3 a sectional elevation, and

Fig. 4 a sectional elevation at right angles to Fig. 3, of a third modification, and

Fig. 5 a plan view of the jet tube shown in Figs. 3 and 4.

Like references indicate like parts throughout the drawings.

Referring to Fig. 1, 1 is the main air intake tube, 2 is a first tubular member threaded at its lower end 3 into a part 4 extending inwards from the wall of the main air intake tube 1. Said first tubular member has an orifice 5 at its lower end which communicates through the passage 6 with the float chamber of the carburetor. The diffuser tube 7 is arranged within and spaced from the first tubular member 2, being seated at its lower end on the constriction 8. The diffuser tube has a number of apertures or ports 9 at various heights and an enlarged upper end with a conical wall as shown at 10. A series of inlet ports 11 are formed through said conical wall. An outer tubular member 12 is internally threaded at its lower end at 13 and screwed on to a threaded boss on the first tubular member 2, the arrangement being such that the outer tubular member 12 is spaced from the tubular member 2. The outer tubular member 12 has an enlargement 14 at its upper end of closed bulbous form terminating in a point with narrow outlet passages 15 on opposite sides. Air ports 16, 16 constituting the extra air ports are provided through the lower part of the enlargement 14 of the outer tubular member and are directed thereinto at an angle to the direction of flow of the fuel and they are opposite to the ports 11 through the conical upper end 10 of the diffuser tube. The transverse outlet passages 15 through the wall of the enlargement 14 are constituted by narrow horizontal slits. The outer tubular member is, internally, of such shape as to engage the

top of the diffuser tube 7 and clamp it in position in the first tubular member 2. Air ports 17 are provided through the lower part of the wall of the outer tubular member 12.

When the engine is not running fuel rises through the diffuser jet tube and passes through the ports 9 into the first tubular member 2, eventually standing with its level near the top of said first tubular member. When the engine is running air is drawn in through the ports 17 upwards through the outer tubular member to the top of the first tubular member 2, whence it flows downwards, mixes with the fuel and passes through the ports 9 into the diffuser tube 7. The rich mixture passes up through the tube 7 until it reaches the enlarged end where it meets and is mixed with air drawn in through the ports 16 and 11 and is eventually discharged through the passages 15 in the enlargement 14.

Fig. 2 shows a form of horizontal carburetor embodying the features of the present invention. The enlargement 14 at the upper end of the outer tubular member 12 is disposed horizontally in the horizontal main air intake tube 1. 7 is the diffuser tube which is provided with a cap 18 to extend into the enlargement 14. The enlargement 14 is threaded at its end as shown at 19 into a plate 20 carried on a transverse member 21 in the main air intake tube 1. An axial hole 22 through the threaded end of the enlargement 14 terminates, preferably, in a constricted part 23 adjacent the end 24 of the diffuser tube cap 18 and constitutes the extra air port. Further air ports 25, of which only one is shown, are directed to blow across the diffuser tube cap 24 and preferably across its further edge. The other parts of the jet tube are similar to the arrangements shown in Fig. 1; the outer tubular member 12 is a push fit as shown at 26 into the wall of the main air intake tube 1. The air ports 17 through the outer tubular member are shown outside the main air intake tube 1, but it will be understood that they may be inside said tube if so desired.

The operation of the jet tube is exactly similar to the operation of the form described with reference to Fig. 1. The fuel and primary air mixture enters the enlargement 14 where it meets secondary air drawn through the port 22 and tertiary air drawn through the ports 25, the fuel and air mixture eventually issuing through the narrow slits 15.

Referring now to Figs. 3, 4 and 5, the jet tube enlargement comprises a box-like or channeled member 27, 28 being a channel cut in its upper surface. A member 29, for example, of the section illustrated in Fig. 4 is arranged in said channel 28 so that its side walls are spaced from the walls of the channel to form narrow slits 30, 30. For this purpose the ends 31 of the member 29 are wider than the middle part and are of just sufficient width to engage the side walls of the channel. Similarly the ends constitute legs 32, 32 to raise the member 29 from the bottom of the channel. A series of ports 33 are formed through each side wall into the channel 28 opposite or partly opposite to the walls of the member 29. The box-like member 27 is secured by an extension 34 which engages a part 35 extending from the wall 1 of the main air intake tube. The box-like member is of such a size as to extend diametrally through the wall 1 of the main air intake tube. A port 36 extends from outside the wall 1 through the member 27 into the vertical passage 37 which corresponds to the diffuser tube. The port 36 enters the vertical passage 37 near the top and a second port 38 extends through the member 27 from outside the wall 1 to a lower point in the passage 37. 39 is the metering orifice which is formed by a plug screwed into the bottom of the box-like member 27 and it will be noted that the passage 38 opens into the jet tube at a point above said metering orifice. The external orifices 40, 41 of the ports 36 and 38 respectively are above the petrol level in the jet tube when the engine is not running.

In operation the fuel is drawn through the metering orifice 39 into the diffuser tube 37 and is mixed with air entering through the port 38. A further supply of air is added by the port 36. Further air enters from the main air intake tube through the ports 33 into the channel 28 where it mixes with the rich mixture.

The two air supplies from the outside of the main air intake tube described in connection with the form of the invention illustrated in Figs. 3, 4 and 5 may be applied to other forms of the invention, for example, that illustrated in Fig. 1 or Fig. 2.

It is a feature of the present invention that the usual form of choke or Venturi tube may be dispensed with but it will be understood that in some circumstances such choke or Venturi tube may be employed.

The air port or ports into the upper end of the jet tube may be of any shape convenient, for example, circular or narrow slots, or they may be Venturi form tubes.

The carburetor according to the present invention having an air supply from the exterior of the main air inlet is particularly satisfactory when used in combination with apparatus for controlling air intake temperatures or with air filters.

What we claim is:—

1. A spray carburetor comprising a diffuser jet tube, an enlargement at the upper end of the diffuser tube constituted by an elongated box-like member extending across the main air intake tube having outlet passages for the atomized fuel directed out of the axis

of the jet tube and an air port therethrough directed into the fuel air stream, an air supply from the exterior of the main air intake tube to the jet tube towards its upper end, and a second air supply from the exterior of the main air intake tube at a lower point.

2. A carburetor comprising in combination a channeled member having air ports through the channel walls, a vertical diffuser jet passage leading into the channel and connected at its lower end through a submerged metering orifice with the float chamber, two diffuser ports extending from outside the main air intake tube into the vertical passage, one near the top and the other at a lower point, and a member disposed in the channel opposite the ports through the channel walls to form two narrow parallel fuel-air outlet slots.

3. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube having an outlet passage for the atomized fuel directed out of the axis of the jet tube, and an air port to the enlargement directed into the fuel air stream.

4. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube, a baffle at the end of the enlargement over the center of said tube to form outlet passages for the atomized fuel directed out of the axis of the jet tube, and an air port to the enlargement directed into the fuel air stream.

5. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube having an outlet passage for the atomized fuel directed out of the axis of the jet tube, and an air port to the enlargement directed into the fuel air stream at right angles thereto.

6. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel air mixture; with an enlargement at the upper end of the diffuser jet tube, a baffle at the end of the enlargement over the center of said tube to form outlet passages for the atomized fuel directed out of the axis of the jet tube, and an air port to the enlargement directed into the fuel air stream at right angles thereto.

7. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube having an outlet passage for the atomized fuel directed out of the axis of the jet tube fanwise into the main air stream, and an air port to the enlargement directed into the fuel air stream.

8. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube, a baffle at the end of the enlargement over the center of said tube to form outlet passages for the atomized fuel directed out of the axis of the jet tube and fanwise into the main air stream, and an air port to the enlargement directed into the air stream.

9. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube having an outlet passage for the atomized fuel directed out of the axis of the jet tube and fanwise into the main air stream, and an air port to the enlargement directed into the fuel-air stream at right angles thereto.

10. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube, a baffle at the end of the enlargement over the center of said tube to form outlet passages for the atomized fuel, directed out of the axis of the jet tube fanwise into the main air stream, and an air port to the enlargement directed into the fuel air stream at right angles thereto.

11. A spray carburetor comprising the combination of a diffuser jet tube consisting of a passage with a submerged fuel jet

at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper end outlet for fuel-air mixture; with an enlargement at the upper end of the diffuser jet tube having an outlet passage for the atomized fuel directed out of the axis of the jet tube, an air port to the enlargement directed into the fuel-air stream, and an air supply from the exterior of the main air intake tube to the jet tube toward its upper end.

12. A spray carburetor including a main air intake tube, a diffuser jet tube in said main tube, said diffuser jet tube consisting of a passage with a submerged fuel jet at its lower end, at least two diffuser orifices at different levels in the walls of said passage whereby air may enter the latter, and an upper end outlet from the tube to the main intake tube for fuel-air mixture; an enlargement at the upper end of the diffuser jet tube, a baffle at the end of the enlargement over the center of said tube to form outlet passages for the atomized fuel directed out of the axis of the jet tube, an air port to the enlargement directed into the fuel-air stream, and an air supply from the exterior of the main air intake tube to the jet tube toward its upper end.

13. A spray carbureter including a main air intake tube and comprising the combination of a diffuser jet tube in the main air intake tube having a passage with a submerged fuel jet at its lower end, the walls of said passage having at least two diffuser orifices therethrough at different levels whereby air may enter the passage, and an upper end fuel-air mixture outlet from the tube; with an enlargement at the upper end of the diffuser tube constituted by an elongated box-like member extending across the main air intake tube and having passages for the atomized fuel directed out of the axis of the jet tube and an air port thereto directed into the fuel-air stream.

14. A spray carburetor including a main air intake tube, a diffuser jet tube extending into the main air tube, said diffuser tube having a passage with a submerged fuel jet at its lower end, the walls of said passage having at least two diffuser orifices at different levels therethrough whereby air may enter said passage, and an upper outlet from the tube for fuel-air mixture; an enlargement at the upper end of the diffuser tube constituted by an elongated box-like member extending across the main air-intake tube having outlet passages for the atomized fuel directed out of the axis of the jet tube and an air supply from the exterior of the main air intake tube to the jet tube towards its upper end.

15. In a spray carbureter including a main air intake tube, a diffuser jet tube extending into the main air intake tube substantially axially thereof and consisting of a first tubular member adapted to be connected with a liquid fuel supply at its lower end, a diffuser tube within the first tubular member concentric therewith, spaced therefrom and seated at its lower end therein, an outer tubular member spaced from and concentric with the first tubular member and terminating in an enlargement at its upper end of closed bulbous form over and into which the diffuser tube discharges, said enlargement formed with narrow outlet passages therethrough for discharge of fuel air mixture into the main air intake tube, the lower part of the enlargement provided with an air port therethrough, and the upper end of the diffuser tube formed with an air port therethrough alined with the air port at the lower part of the enlargement.

16. In a spray carburetor including a horizontally disposed main air intake tube, a diffuser jet tube extending radially into the main air intake tube and comprising a first tubular member adapted to be connected at its lower end with a liquid fuel supply, a diffuser tube within the first tubular member spaced therefrom, concentric therewith and seated at its lower end therein, an outer tubular member having an air port therethrough spaced from the first tubular member and terminating at its upper end in a closed enlargement of bulbous form into which the diffuser tube discharges, said enlargement disposed axially of the main air intake tube in the direction of air flow therethrough and having an air passage axially therethrough from one end directed across the open end of the diffuser tube into the enlargement, and the enlargement formed with outlet openings therefrom for discharge of fuel-air mixture into the main air intake tube.

Dated this 14th day of March, 1929.

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