

May 20, 1952

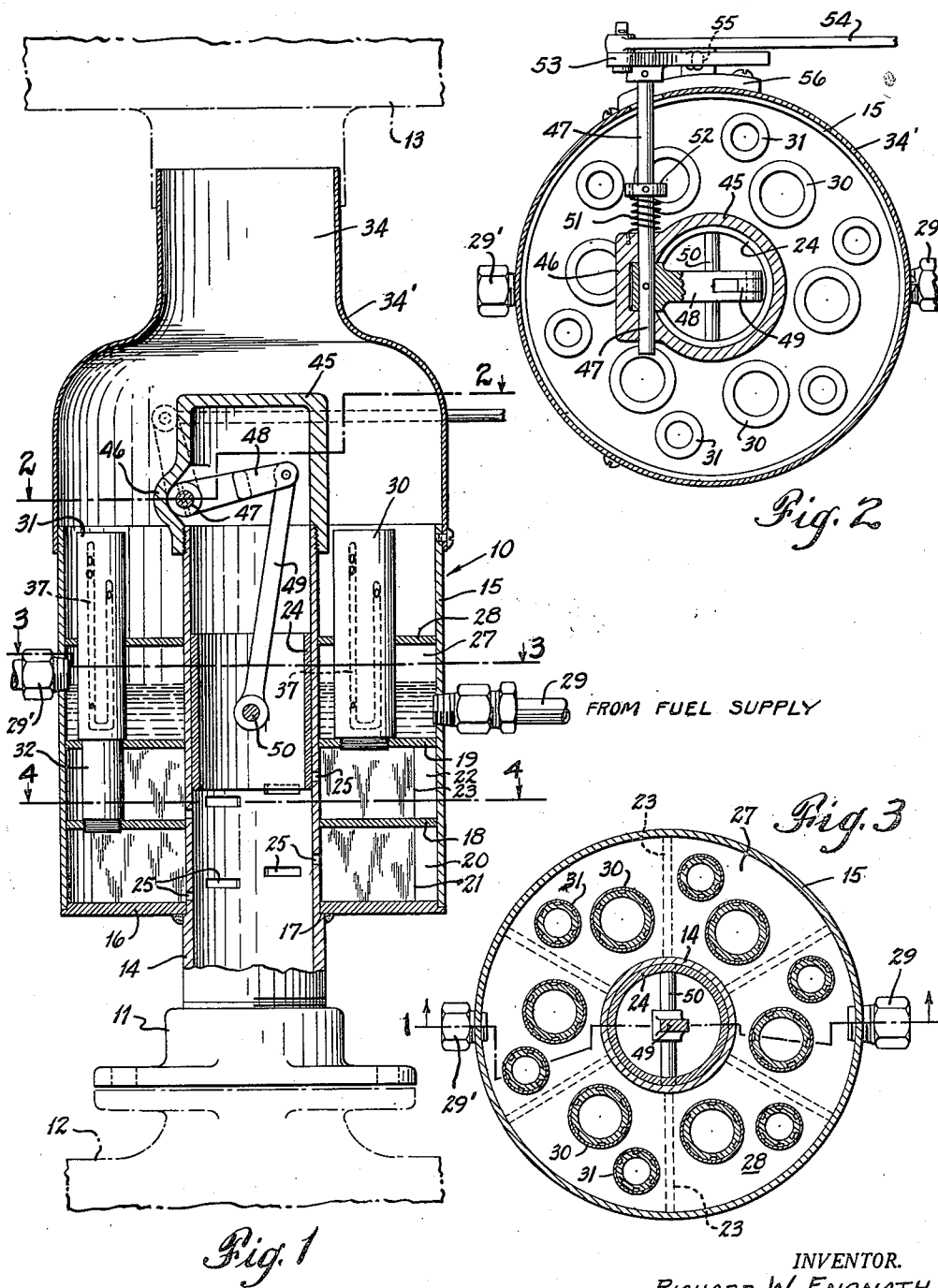
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2,597,780

CARBURETOR

Filed Sept. 11, 1948

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 4

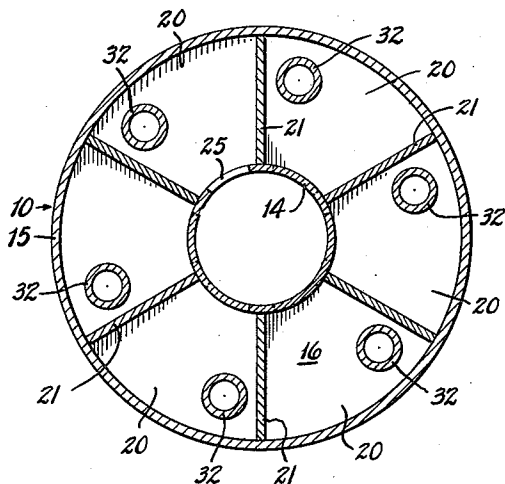


Fig. 5

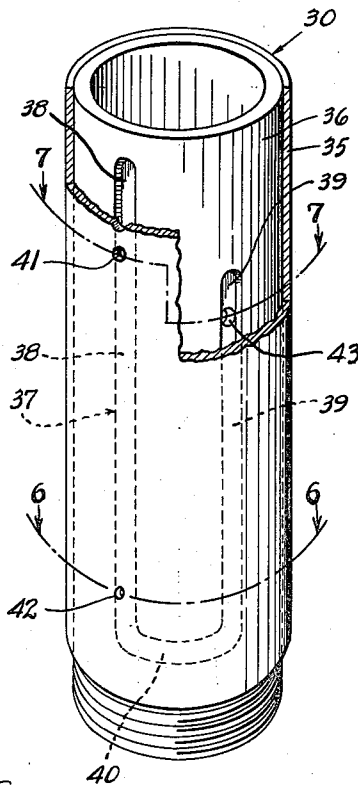
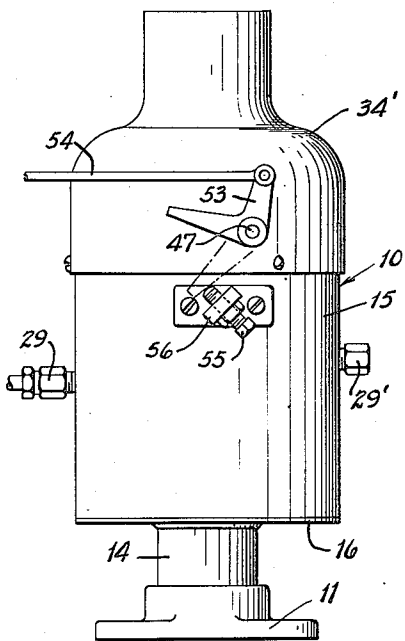


Fig. 8

Fig. 6

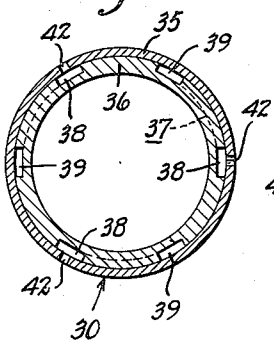
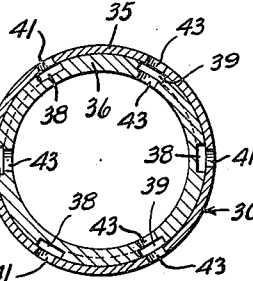


Fig. 7

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UNITED STATES PATENT OFFICE

2,597,780

CARBURETOR

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Application September 11, 1948, Serial No. 48,900

9 Claims. (Cl. 261—23)

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The present invention relates to new and useful improvements in fuel carburetors for internal combustion engines, and more particularly to improved carburetors for volatile liquid fuels for automotive vehicles.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate an embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Fig. 1 is a vertical central cross-sectional view of a typical and illustrative embodiment of the invention;

Fig. 2 is a cross-sectional view taken along line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken along line 4—4 of Fig. 1;

Fig. 5 is a perspective view, with certain portions broken away to better show the construction, of one of the fuel mixing tubes shown in Fig. 1;

Fig. 6 is a cross-sectional view taken along line 6—6 of Fig. 5;

Fig. 7 is a cross-sectional view taken along line 7—7 of Fig. 5; and,

Fig. 8 is a side elevation of the invention as shown in Fig. 1.

The invention has for an object the provision of an improved carburetor for use with liquid fuels in internal combustion engines. Another object is the provision of a carburetor which is inexpensive to make and simple in construction, providing an efficient carburetor having an absolute minimum of working parts and necessary adjustments. The invention further provides a carburetor which contributes to improved engine performance and at the same time results in substantial fuel savings. Still another object is the provision of a carburetor which saves the engine with which it is used as, for instance, by inhibiting the formation of carbon therein, and likewise is of such design that its reliable performance is assured free of excessive wear and maladjustment of parts.

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Referring now in detail to the illustrative embodiments of the invention shown by way of example in the accompanying drawings, and referring first particularly to Fig. 1, the carburetor of the invention is designated generally with the numeral 10 and is shown as mounted by means of flange 11 upon the fuel intake manifold 12 of an internal combustion engine. An air cleaner may if desired be provided at the air intake of the carburetor as indicated at 13 in Fig. 1.

The carburetor 10 comprises a central tubular element 14 which is the conduit for the combustible fuel and air mixture prepared in the carburetor and delivered to the manifold 12, the carburetor being assembled by threadedly engaging the extended lower end of element 14 in the flange 11. The tubular element 14 also cooperates with a sleeve 24 axially slidably positioned within it to form a sleeve valve as the control means for admitting fuel air mixture to the engine, as will hereinafter be more fully described.

The fuel reservoir and mixing portions of the carburetor 10 comprise the external cylindrical jacket 15 closed at the bottom by the annular plate 16 secured thereto, said plate having a central aperture to receive the element 14 and resting on a shoulder 17 of said element whereby the jacket and enclosed parts are supported in the carburetor assembly. The jacket 15 encloses a plurality of superposed chambers formed by the spaced, internal plate members 18 and 19 each of which is provided with a central aperture to receive the tubular element 14, and is firmly secured preferably in air tight relationship with respect both to the jacket 15 and element 14. The two annular chambers thus formed by the plates 16, 18 and 19 are each again divided into a plurality of individual chambers, in the illustrative embodiment shown the lower annular chamber being divided into the six chambers 20 by means of the radially extending walls 21 between the jacket 15, the element 14, and extending axially from plate 16 to plate 18, while the upper annular chamber is similarly divided into six chambers 22 by means of radially extending walls 23. The twelve chambers of the type 20 and 22 serve as mixing chambers and conduits for fuel and air mixture which is to be admitted to the interior of element 14 and thus to the engine manifold, and such admission takes place through apertures 25 in element 14, one of which is provided for each of the twelve chambers described. As shown, the apertures 25 are so distributed radially through the wall of tubular element 14 that they communicate with their individual chamber, and are so distributed axially that they will be progressively uncovered

by the sleeve 24 as it is raised from a lowermost position covering all of the apertures to a progressively higher position within element 14. Such means comprise the valve for increasing the power delivery of the engine by progressively increasing the admission thereto of the predetermined mixture of fuel and air available from each of the several chambers 20 and 22.

A third annular chamber 27 above the other two is formed by the plate 28 spaced above plate 19, and said plate 28 is similarly centrally apertured to receive the central tubular element 14. The chamber 27 serves as a reservoir for liquid fuel available for admixture with air and introduction into the engine, the fuel line 29 communicating with the chamber and a fuel source. An overflow outlet 29' is provided for return of fuel in excess of requirements in the chamber, so that a predetermined and constant level is maintained in the reservoir without the use of float and valve arrangements as conventionally used.

The means for intimately mixing the fuel from reservoir 27 with the air stream passing through the carburetor so as to provide the desired fuel vapor and air mixture comprise a plurality of mixing tubes 30 for supplying the upper chambers 22 and a plurality of other tubes 31 for supplying the lower chambers 20. As shown, a mixing tube 30 is provided for each of the chambers 23, and they are spaced about and threadedly engaged in suitable apertures in plate 19 so as to communicate therewith. The mixing tubes 31 are similarly spaced about plate 19 radially more outwardly than tubes 30 and pass through suitable apertures in the plate, having lower extensions 32 passing downwardly through the chambers 22 and extending to and through suitable apertures in plate 18, being threadedly engaged therein. A tube 31 is provided for each of the lower chambers 20. There is thus provided a direct, individual conduit for air fuel mixture to each of the twelve chambers 20 and 22 and from them to the engine through their individual apertures or port 25 as it is uncovered by sleeve 24. The air stream for admixture with the fuel from reservoir 27 enters through the passage 34 of the annular cap 34' of the carburetor, which is removably secured to the jacket 15 at its upper edge as shown.

The construction and operation of the mixing tubes 30 and 31 are similar except for the extension 32 of the tubes 31, so that a description of the tubes 30 as shown in Figs. 5 to 7 will suffice for both. As there shown said tubes are formed of a pair of sleeves 35 and 36 the former closely encircling the latter as, for instance, with a force fit. Each tube is provided with one or more air and fuel channels designated generally 37, each said channel being formed by relieving the surface of the inner sleeve 36 and covered by the outer sleeve 35, said channels comprising a vertically directed reach 38, a second shorter vertically directed reach 39, and a short reach 40 interconnecting the other reaches at their bottom ends. The reach 38 adjacent its upper end is provided with one or more ports 41 in the outer sleeve 35 which establishes communication for the interior of channel 37 with the air surrounding the tubes 30 and 31, and another port 42 through the exterior sleeve 35 is positioned adjacent the lower end of reach 38, so that it lies below the constant level of fuel in reservoir 27, as shown in Fig. 1, and provides for the supply of fuel to the interior of channel 37. Another port 43 is provided toward the upper

end of channel reach 39, and said port passes through both sleeves 35 and 36, whereby fuel and air mixture rising along reach 39 is further mixed with additional air from around the tubes 30 and 31 and is introduced into the interior thereof.

The means for actuating the sleeve 24 axially within the tubular element 14 comprise a cap member 45 threadedly mounted on the top of element 14 and having an extension 46 on one side thereof wherein the shaft 47 is journaled. The shaft 47 is secured against relative rotation with respect to an arm 48 positioned within the cap member, and a link 49 interconnects the arm and a shaft 50 which seats in the walls of sleeve 24. A coiled spring 51 interconnects stationary extension 46 and a collar 52 fixed to shaft 47, tending to rotate the shaft in a direction to lower sleeve 24 and cover the ports 25. A bent lever 53 is secured to the end of shaft 47 and has pivotally secured thereto the rod 54 whereby the sleeve valve may be opened under the control of the operator of the motor. A set screw 55 in bracket 56 on the exterior of jacket 15 is provided for adjusting the minimum lower position of sleeve 24 and thus the idling speed of the engine.

The operation of the carburetor of the invention will be apparent from the description thereof of which has been made. At idling speed the set screw 55 may be so positioned that sleeve 24 uncovers all or a part of the lowermost port 25, and as the sleeve is progressively raised under the control of the operator, additional of the ports 25 will be uncovered. As each said port is opened intake suction is applied to the chamber 20 or 22 associated therewith, and air communication is thereby established downwardly through the respective tube 30 or 31 and into the manifold. As each tube 30 or 31 is utilized there is an intake of air into its ports 41 traveling downwardly through reach 38 of channel 37, mingling with and picking up fuel standing therein up to the fuel level in reservoir 27, the fuel having access through port 42. The commingled fuel and air thereafter progress up reach 39, where it encounters a further air stream passing through port 43 to the interior of the tube. The air and fuel vapor is then carried downwardly and intimately mixed with the air stream through the tube, into a chamber 22 or 20 and thence to the engine. The channels 37 always carry a standing reserve of fuel providing for immediate acceleration without an acceleration pump or other means often provided. It will be noted that the conventional float arrangement is dispensed with, and the multiple design of the tubes 30 and 31 standing directly in the free reservoir eliminate plugging of fuel passages and much of the jet wear of conventional carburetors. A minimum of moving parts are found in the construction, and the fuel and air mixture at all points of operation is at maximum efficiency.

The chambers 20 and 22 serve principally simply as conduits between the mixing tubes and the interior of element 14, and could be replaced by curved elbows of tubing or otherwise as desired.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom, within the scope of the accompanying claims, without departing from the principles of the in-

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vention and without sacrificing its chief advantages.

What I claim is:

1. In a carburetor for internal combustion engines having an air intake port and an air-fuel mixture outlet port, a plurality of air-fuel mixing devices between said ports, a valve to effect individual communication between said ports through each said device, a fuel reservoir within which said devices are seated, and means for maintaining a substantially constant level of fuel in said reservoir, each said device comprising a vertically disposed tubular member having a cylindrical bore open at both ends and having a duct within the walls thereof, said duct having a pair of vertically extending reaches and a lower reach interconnecting said reaches one of said vertical reaches having a pair of ports therein establishing communication exteriorly of said member said ports being adjacent the upper and lower ends respectively of said member, and the other vertical reach having a port therein establishing communication exteriorly of said member and interiorly of said cylindrical bore.

2. In a carburetor for internal combustion engines having an air inlet port and an air-fuel mixture outlet port, a fuel reservoir, means for maintaining a substantially constant level of fuel in said reservoir, and an air-fuel mixing device seated in said reservoir comprising a vertically arranged tubular element having a vertical cylindrical bore open at both ends and a U-shaped duct within the wall thereof said duct having a port in one vertical reach thereof establishing communication exteriorly of said element above the normal constant level of fuel in said reservoir, another port establishing communication with said duct exteriorly of said element below the normal constant level of fuel in said reservoir, and a third port in the other vertical reach of said duct establishing communication exteriorly of said member and interiorly of said cylindrical bore of said element above the normal constant level of fuel in said reservoir.

3. In a carburetor for internal combustion engines having an air intake port and an air-fuel mixture outlet port, a centrally disposed throttle valve mechanism opening into said outlet port comprising a plurality of valve ports, sleeve means for closing and progressively opening said valve ports and sleeve actuating means positioned within the sleeve for axially moving said sleeve, an annular fuel reservoir surrounding said valve mechanism, a plurality of air-fuel mixing devices symmetrically distributed about said valve mechanism seated in said fuel reservoir and in communication with said intake port, and individual conduit means between each of said devices and respective ones of said valve ports.

4. In a carburetor for internal combustion engines having an air intake port and an air-fuel mixture outlet port, a centrally disposed throttle valve mechanism opening into said outlet port comprising a tubular member having a plurality of valve ports therein, a sleeve for covering said valve ports axially movable to progressively uncover said valve ports and sleeve actuating means positioned within the sleeve for axially moving said sleeve, an annular fuel reservoir surrounding said valve mechanism, a plurality of air-fuel mixing devices symmetrically distributed about said valve mechanism seated in said fuel reservoir and in communication with said intake port, and individual conduit means between each of

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said devices and respective ones of said valve ports.

5. In a carburetor for internal combustion engines having an air intake port and an air-fuel mixture outlet port, a centrally disposed throttle valve mechanism opening into said outlet port comprising a vertically extending tubular member having said outlet port at the bottom thereof, closed at its opposite end, having a plurality of valve ports radially and axially spaced therein, a sleeve axially movable to progressively uncover said valve ports and sleeve actuating means positioned within the sleeve for axially moving said sleeve, an annular fuel reservoir surrounding said valve mechanism, a plurality of air-fuel mixing devices symmetrically distributed about said valve mechanism seated in said fuel reservoir and in communication with said intake port, and individual conduit means between each of said devices and respective ones of said valve ports.

6. In a carburetor for internal combustion engines having an air intake port and an air-fuel mixture outlet port, a centrally disposed throttle valve mechanism opening into said outlet port comprising a plurality of valve ports, sleeve means for closing and progressively opening said valve ports and sleeve actuating means positioned within the sleeve for axially moving said sleeve, an annular fuel reservoir surrounding said valve mechanism, a plurality of air-fuel mixing devices distributed about said valve mechanism seated in said fuel reservoir, each said device comprising a vertically positioned tubular element having a cylindrical bore thereof in communication at its top with said air intake port, and individual conduit means between the cylindrical bores of said tubular elements and respective ones of said valve ports.

7. In a carburetor for internal combustion engines, a centrally vertically disposed tubular element closed at the top and open at the bottom providing an air-fuel mixture outlet port, said element having a plurality of radially and axially spaced valve ports therein, casing means surrounding said tubular element and spaced therefrom open at the upper portion thereof providing an air intake port said casing means having a horizontal annular wall engaging said tubular element forming an annular fuel reservoir surrounding said tubular element, a plurality of air-fuel mixing devices symmetrically distributed about said tubular element each said device comprising a vertically arranged tubular member seated on said horizontal annular wall having a cylindrical bore the upper end of which is in communication with said air intake port and having a U-shaped duct within the walls thereof said duct in one of its reaches opening exteriorly of said tubular member adjacent the upper end thereof and in the other of its reaches opening interiorly and exteriorly of said tubular member adjacent the upper end thereof, and opening exteriorly of said tubular member adjacent the lower end thereof, and individual conduit means between each of said devices at the lower end of the cylindrical bore thereof through said annular plate to respective ones of said valve ports.

8. In a carburetor for internal combustion engines having an air intake port and an air-fuel mixture outlet port, a fuel reservoir, an air-fuel mixing device seated in said reservoir comprising a vertically arranged tubular element having a vertical cylindrical bore open at both ends and a U-shaped duct within the wall thereof said duct having a port in one vertical reach thereof

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establishing communication exteriorly of said element adjacent the upper end thereof, another port establishing communication with said duct exteriorly of said element adjacent the lower end of said element and within said reservoir, and a third port in the other vertical reach of said duct establishing communication exteriorly of said member and interiorly of said cylindrical bore of said element adjacent the upper end thereof, and means for channelling air between said air intake and air-fuel mixture outlet ports through said cylindrical bore of said tubular element.

9. An air fuel mixing device for a carburetor for internal combustion engines comprising a tubular element open at both ends having a cylindrical bore and a U-shaped duct within the wall thereof, said duct having a port in one reach thereof establishing communication exteriorly of said element adjacent one end of said element, another port establishing communication with said duct exteriorly of said element adjacent

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the opposite end of said element, and a third port in the other vertical reach of said duct establishing communication exteriorly of said member and interiorly of said cylindrical bore of said element adjacent the same end thereof as said first mentioned port.

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