May 25, 1954 E. RECTOR 2,679,388

CARBURETOR

Filed March 6, 1953

2 Sheets-Sheet 1

Fig. 1.

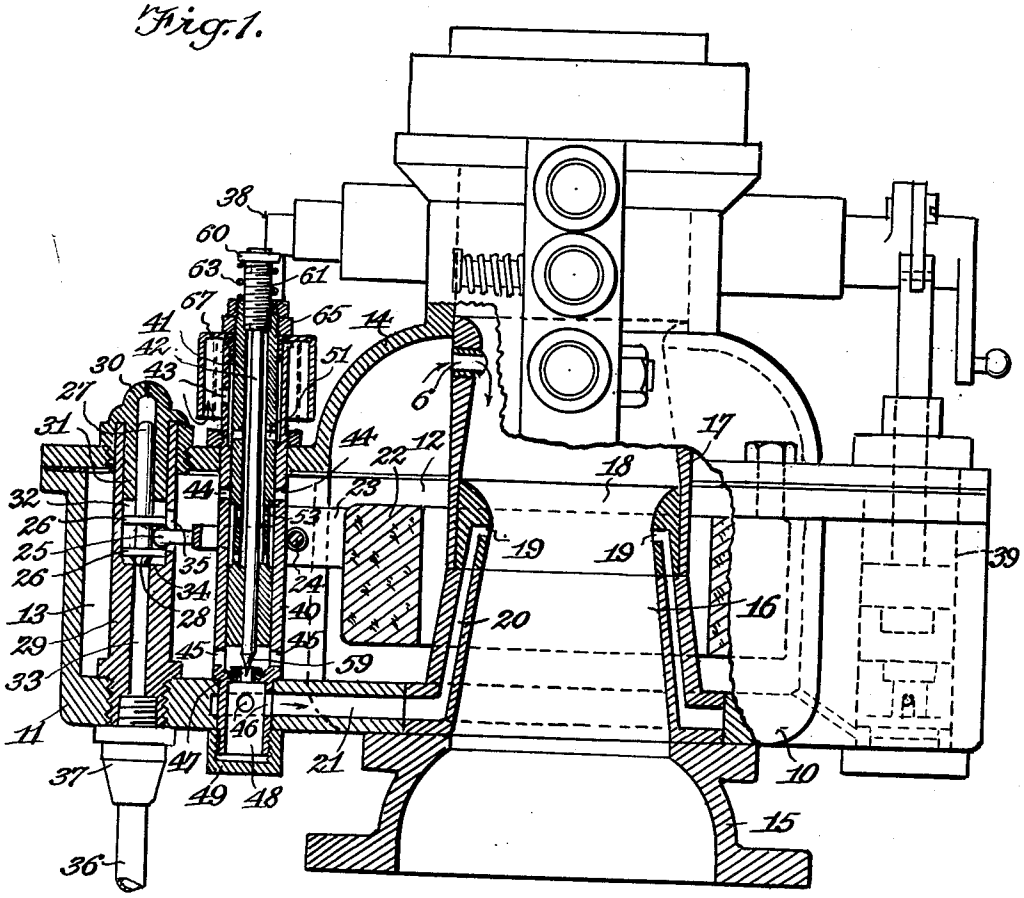


Fig. 2.

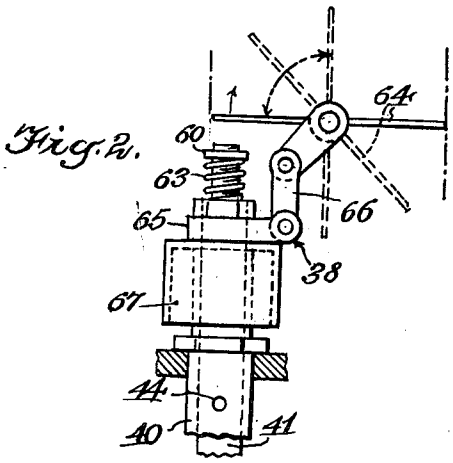
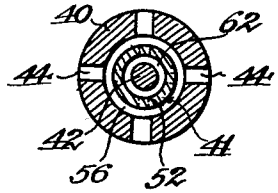


Fig. 3.



INVENTOR.
Enoch Rector
BY
Munn, Liddy & Matheson
Attorneys

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2 Sheets-Sheet 2

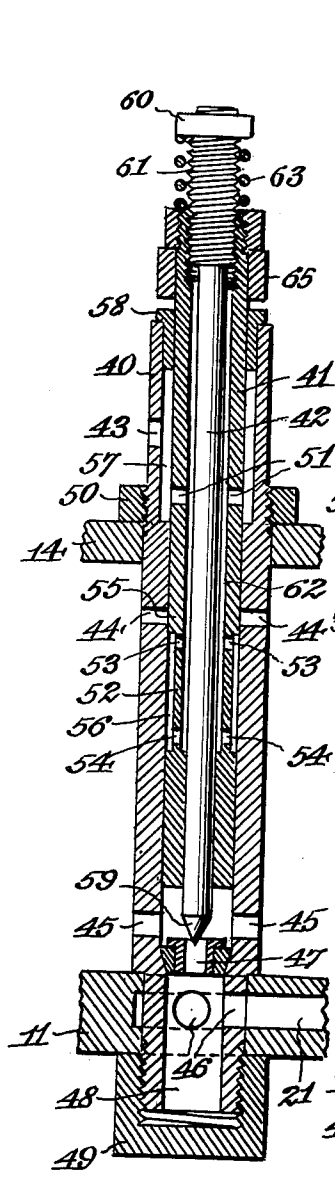


Fig. 4.

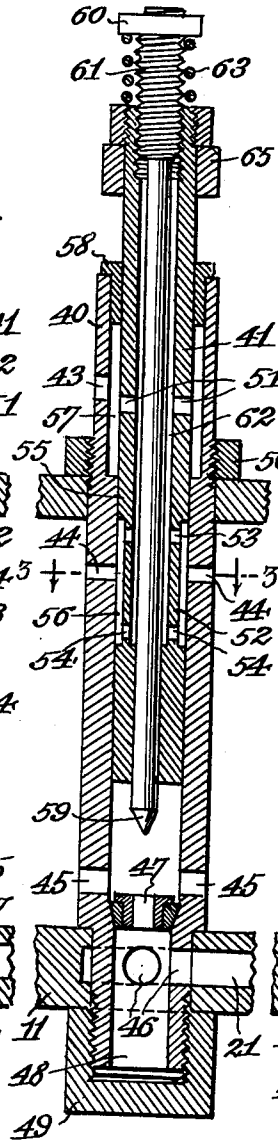


Fig. 5.

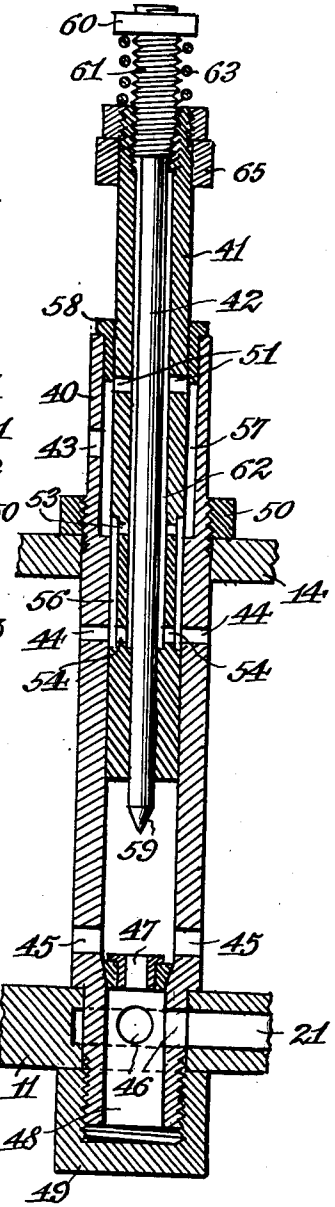


Fig. 6.

INVENTOR.

Enoch Rector

BY

Munn, Liddy & Nathanson

Attorneys

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UNITED STATES PATENT OFFICE

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CARBURETOR

Enoch Rector, New York, N. Y.

Application March 6, 1953, Serial No. 340,724

4 Claims. (Cl. 261—51)

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This invention relates to carburetors of the vacuum feed type.

The principal object of the present invention is the provision of improved means in a carburetor of the indicated character for varying the amount of vacuum in the fuel chamber of the carburetor to control the amount of liqued fuel flowing from the fuel chamber to the mixing chamber of the carburetor, in order to obtain a fuel mixture of various proportions of air and gasoline for starting, idling, acceleration and power demands.

A further object of the invention is the provision of a dual valve connected with the throttle and operated in response to the usual operation of the throttle to meet different engine requirements.

The present invention achieves the following results. When the throttle is closed, a comparatively rich mixture is provided for starting the engine and also for enabling the engine to idle. Upon operation of the throttle for acceleration, a quantity of air is admitted into the float chamber above the gasoline level therein, causing a reduced amount of vacuum in the float chamber with a corresponding increase of pressure in said chamber. As a result there is an increased flow of gasoline from the fuel jet, and vapor from the float chamber, which are available for variations in acceleration. As the throttle is opened wider more air is admitted to the float chamber with a proportionate increase in gasoline, thereby providing a somewhat leaner mixture for high speed. When the throttle is wide open a maximum amount of air is admitted to the float chamber with a proportionate increase in the amount of gasoline to the mixing chamber. All operations of the throttle produce variations in the amount of vacuum in the float chamber with corresponding variations in the amount of gasoline to meet different engine requirements for power and speed.

The nature of the invention and its distinguishing features and advantages will appear when the following specification is read in conjunction with the accompanying drawings, in which

Fig. 1 is a vertical sectional view of a carburetor embodying the features of the present invention, portions being shown in side elevation.

Fig. 2 is a detail side view showing the operating connection between the throttle and the vacuum and liquid fuel valve means.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 5.

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Fig. 4 is an enlarged vertical sectional view of the vacuum and liquid fuel valve means, the parts being shown in the relation they assume when the throttle is closed.

Fig. 5 is a view similar to Fig. 4, but showing the relation of the parts when the throttle is partly open.

Fig. 6 is a view similar to Fig. 5, but showing the relation of the parts when the throttle is wide open.

The carburetor as shown by way of example in the drawings has a hollow body or bowl 10 with a lateral extension 11 providing a circular liquid fuel chamber 12 and a space 13 in communication therewith. The bowl 10 has a removable dome shape top cover 14 and a flanged base 15.

Centrally of the bowl 10 is a venturi 16 composed of sections fitting in the lower end of a tube 17 forming a main down draft air intake passage and a mixing chamber 18 in conjunction with the base 15. It is to be understood that the flange of the base 15 will be secured to an engine intake manifold to establish communication of the carburetor with an engine of the internal combustion type.

The venturi 16 has a plurality of passages or jets 19 which communicate with the mixing chamber 18 and also communicate with an annular space 20 which in turn communicates with a passage 21 in the bottom of the bowl extension 11. The bowl 10 has a jet 6 which establishes communication between the chamber 12 above the fuel level and the mixing chamber 18.

An annular float 22 is arranged in the chamber 12. The float has a lever 23 which is fulcrumed on the extension 11, as at 24. The lever 23 has a rounded end portion 25 disposed between parallel flanges 26 on the stem 27 of a conical valve member 28 on the lower extremity of the stem. A tubular member 29 has its lower end screwed into a tapped hole in the bottom of the bowl extension 11, and its upper end is received in a cap nut 30 screwed into a tapped hole in the cover 14. Thus the tubular member 29 is fixedly secured and disposed vertically in the space 13. The nut 30 has a depending tubular guide 31 which loosely receives the stem 27 so that the latter may have up and down sliding movement. For this purpose the guide 31 extends downwardly into the upper end portion of the member 29. The bore 32 of said upper end portion is larger than the bore 33 of the lower end portion of the member 29. This provides a shoulder which constitutes a valve seat 34 with which the valve member 28 cooperates. The

member 29 has an outlet port 35 therein which communicates with the bore 32 and the space 13. The bore 33 serves as a gasoline inlet duct. A gasoline feed pipe 36 is connected with the member 29 in communication with the bore 32 by means of a nipple 37. It will now be understood that there has been described a valve, operated in response to the rise and fall of the float 22, which controls the admission of gasoline into the chamber 12.

In accordance with the principal feature of the present invention there is provided an air and gasoline control valve which is operatively connected with the throttle valve operating means 38, which latter is cooperatively connected with a dash pot or pump 39 communicating with the chamber 12.

The aforesaid dual control valve includes an outer tubular member 40, an inner tubular member 41 and a valve stem or metering pin 42. The tubular member 40 has an air inlet port 43, a plurality of air outlet ports 44, a plurality of gasoline inlet ports 45, and gasoline outlet ports 46. All of said ports open through the interior surface of the tubular member 40. A jet 47 is secured or formed in the tubular member 40 to establish communication between the ports 45 and the ports 46 by virtue of the hollow of the lower reduced end portion 48 of the tubular member 40. Said end portion 48 fits in a hole in the bottom of the extension 11, and is externally threaded to receive a cupped nut 49. The tubular member 40 extends through the cover 14 and is in threaded engagement with a nut 50 bearing on the cover 14. The tubular member 40 is thus held stationary in a vertical position. The port 43 is open to the atmosphere, the ports 44 communicate with the float chamber 12 above the gasoline level, the ports 45 communicate with the chamber 12 at the bottom thereof, and the ports 46 communicate with the passage 21.

The inner tubular member 41 fits in the tubular member 40 so as to be slidable up and down with respect thereto. The tubular member 41 has a plurality of ports 51, and a reduced intermediate portion 52 with axially spaced sets of ports, there being an upper set of ports 53 and a lower set of ports 54 greater in number than the number of ports 53. A portion of the tubular member 41 directly above the ports 53 in the portion 52 constitutes a slidable valve member 55 which cooperates with the air outlet ports 44 to control the outflow of air from the valve into the chamber 12. It will be apparent that the reduced portion 52 in conjunction with the tubular member 40 provides an annular air space 56 between the members 40 and 41. The internal diameter of the upper end portion of the tubular member 40 is larger than the external diameter of the tubular member 41, thereby providing an annular air space 57 between the members 40 and 41, said space 57 being completed by a gland nut 58 threaded in the upper end of the tubular member 40. The air space 57 is always in communication with the port 43 and ports 51.

Referring to the stem or metering pin 42, it will be seen that its lower extremity 59 is conical and its upper end has an adjustable nut 60. The pin 42 is longer than the tubular member 41 through which it extends in coaxial relation thereto. The upper end portion 61 of the pin 42 is in threaded engagement with the member 41, and the lower end portion of the pin fits in the reduced bore of the tubular member 41, and the major portion of the pin 42 is disposed in the enlarged bore of the member 41, providing a cylindrical air space 62 between the member 41 and pin 42. A helical spring 63 surrounds the upper end portion of the pin 42 and is interposed between the nut 60 and the upper end of the member 41. The pin 42 is thus movable up and down with the member 41 and is axially adjustable with respect thereto so as to be set with its conical end 59 in different normal metering positions of adjustment with respect to the jet 47.

In order that the inner tubular member 41 and the pin 42 connected therewith move up and down in response to the operation of the throttle member 64, the aforesaid means 38 comprises a collar 65 clamped on the upper end of the tubular member 41, and linkage 66 connecting the collar 65 with the arbor of the member 64, as shown in Fig. 2.

When the throttle is closed, air nevertheless is drawn into the main air intake tube 17 for starting the engine and also for enabling the engine to idle. The parts of the dual valve are then in the relation shown in Fig. 4. Atmospheric air cannot pass through the valve into the chamber 12 because the outlet ports 44 are closed by the valve member 55. The conical end 59 of the stem 42 is in its minimum flow position in relation to the jet 47. Gasoline is drawn into the mixing chamber 18 from the chamber 12 through the ports 45, jet 47, hollow of the member 41, ports 46, passage 21, space 20, and jets 19. The float 22 operates the valve stem 28 to maintain the gasoline at the predetermined fuel level in the chamber 12.

Upon operation of the throttle for acceleration, the member 41 and the stem 42 are moved upwardly in unison, as indicated in Fig. 5. This causes a gradual opening of the outlet ports 44 and a lifting of the conical end 59 farther from the jet 47. A quantity of air is admitted to the chamber 12 by way of the port 43, space 57, ports 51, space 62, ports 53 and 54, space 56 and ports 44. This causes a reduced amount of vacuum in the chamber 12 with a corresponding increase of pressure in said chamber. Consequently there will be an increased flow of gasoline through the jets 19 as well as a flow of vapor from the chamber 12 through the jet 6 into the chamber 18. This increased flow of gasoline and the additional vapor are available for variations in acceleration. Conversely, the gradual decreased flow of gasoline and vapor are available for variation in deceleration throttle operations.

When the throttle is wide open as indicated in Fig. 6, a maximum amount of air is admitted to the chamber 12 with a proportionate increase in the amount of gasoline from the jets 19 and vapor from the jet 6 to the mixing chamber 18 to meet different engine requirements for power and speed.

If desired, a hood 67 may be secured to the upper end of the tubular member 40 about the air inlet port 43. The hood is omitted from Figs. 4, 5 and 6.

It is to be understood that the number and the size of the ports in the dual valve may be varied; that the discharge area of the jet 6 is larger than the inlet area of the port 43, and that the present invention includes all other constructions and modifications coming within the scope of the appended claims.

I claim:

1. In a carburetor, a liquid fuel chamber, a valve including a stationary outer tubular member and an inner tubular member having axial movement within said outer tubular member,

said outer tubular member having a reduced portion providing an upper annular air space between said tubular members, said outer tubular member having an air inlet port communicating with said upper air space, said outer tubular member having air outlet ports communicating with said fuel chamber, said inner tubular member having upper ports which communicate with the interior of the inner tubular member and said upper air space, said inner tubular member having a reduced portion providing a lower air space between said tubular members, said reduced portion of the inner tubular member having axially spaced ports which communicate with said lower air space and the interior of the inner tubular member, and said air outlet ports of the outer tubular member communicating with said lower air space, the upper and lower ends of the inner tubular member being closed, the provision and arrangement being such that the inner tubular member closes the air outlet ports of the outer tubular member in the full down position of the inner tubular member, thereby preventing a flow of air through the valve, and that said inner tubular member opens said air outlet ports of the outer tubular member to the lower air space in all partly up and fully up positions of the inner tubular member, thereby allowing metered quantities of air to flow through the valve into said chamber.

2. In a carburetor as set forth in claim 1, and throttle operating means connected with said inner tubular member to cause the axial movement of the latter.

3. In a carburetor, a mixing chamber, a float chamber, a jet establishing communication between said chambers above the fuel level of said float chamber, a fuel passage leading into said mixing chamber, and a dual valve operable to control the flow of air into said float chamber so as to control the amount of vacuum in said float chamber, and to meter the flow of fuel in said fuel passage subject to the amount of vacuum,

said valve including a stationary outer tubular member and an inner tubular member having axial movement within said outer tubular member, said outer tubular member having a reduced portion providing an upper air passage between the outer and inner tubular members, said outer tubular member having an air inlet port communicating with said upper air passage, said outer tubular member having air outlet ports communicating with said float chamber, said inner tubular member having upper ports which communicate with the interior of the inner tubular member and said upper air passage, said inner tubular member having a reduced portion providing a lower air passage between the outer and inner tubular members, said reduced portion of the inner tubular member having axially spaced ports which communicate with said lower air passage and the interior of the inner tubular member, said outlet ports of the outer tubular member communicating with said lower air passage, the provision and arrangement being such that the inner tubular member closes the air outlet ports of the outer tubular member in the full down position of the inner tubular member, thereby preventing a flow of air through the valve, and that said inner tubular member opens said air outlet ports of the outer tubular member to the lower air passage in all partly up and the fully up positions of the inner tubular member, thereby allowing metered quantities of air to flow through the valve.

4. In a carburetor as set forth in claim 3, and means operated by the movement of said inner tubular member for metering the flow of fuel through said fuel passage.

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