

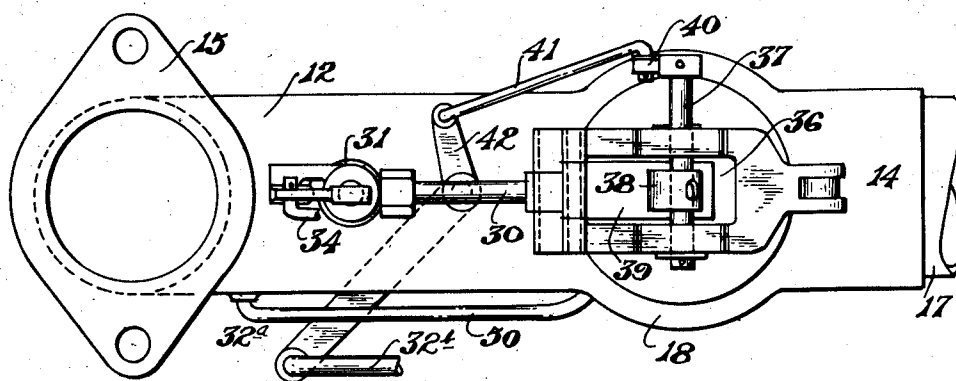
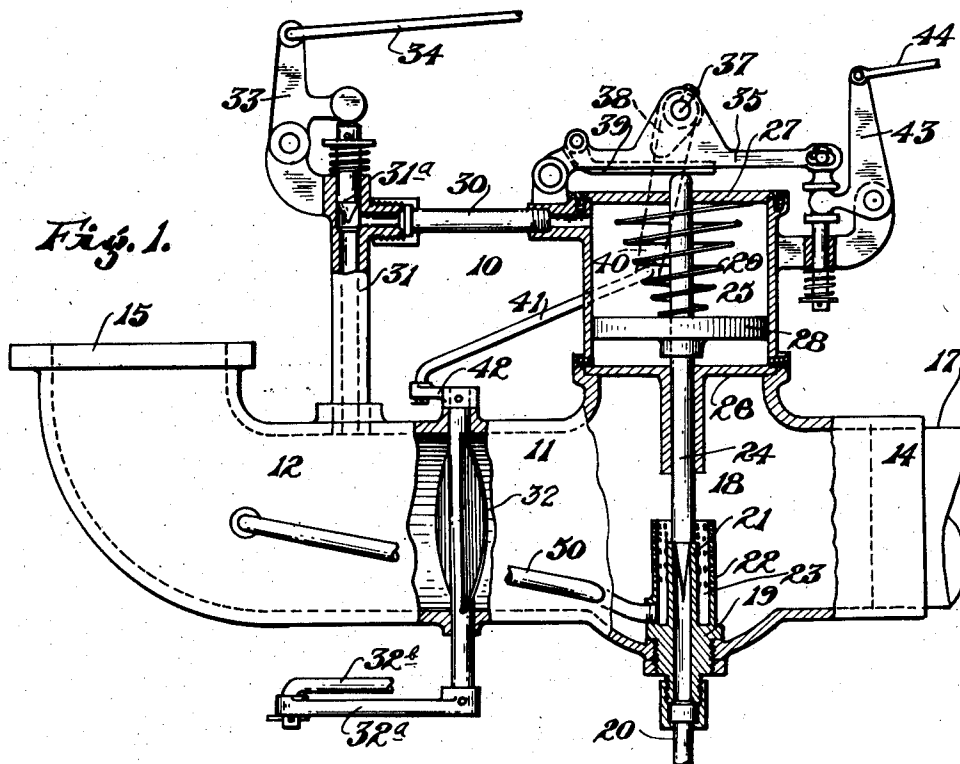
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CARBURETOR

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CARBURETOR.

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This invention relates to carburetors for internal combustion motors.

It is the principal object of the present invention to generally improve and simplify the construction and operation of devices of the character referred to whereby to provide a carburetor of inexpensive construction and capable of efficient operation under varying conditions, and, wherein the relative proportions of air and fuel for forming the combustible mixture will normally remain constant but may be regulated from a point comparatively remote from the carburetor.

In carrying out this object we provide a carburetor having an air intake port at one end and a discharge port at the other end. A throttle valve is provided for controlling the discharge of combustible mixture through the discharge port. A fuel metering valve is disposed between the air inlet port and the throttle valve, and capable of operation to admit fuel to the carburetor for uniting with the intake air to form a combustible mixture. For operating the metering valve, valve controlled vacuum means is provided which is normally capable of opening the valve when the motor is in operation.

To regulate the relative proportions of air and fuel, the amount which the metering valve may open is controlled by the movement of the throttle valve. This latter connection, however, may be adjusted to vary the proportions of fuel and air.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a side elevation of a carburetor embodying the preferred form of our invention with parts disclosed in central section to more clearly illustrate the construction and operation of certain features.

Fig. 2 is a plan view of the carburetor.

Referring more particularly to the accompanying drawings, 10 indicates a carburetor for use in connection with internal combustion engines. This carburetor comprises a shell 11 the opposite ends 12 and 14 of which are tubular in cross section. The end 12 is formed with a flange 15 by means of which the carburetor may be connected to the intake manifold of a motor. The other end is adapted to receive a hot air pipe 17, led from an air heater on the exhaust pipe of the motor to which the carburetor is connected.

Intermediate the ends of the shell is a mixing chamber 18 in the bottom of which is mounted a fuel intake fitting 19. This fitting is tubular and its lower end is adapted to be connected with a fuel delivery pipe 20 led from a source of supply, preferably from a vacuum tank situated above the carburetor so that the fuel will gravitate to the carburetor.

The upper end of the fitting 19 terminates in a cylindrical nozzle 21. A vertical passageway extends through the fitting and the nozzle so that fuel from the delivery pipe may be admitted to the mixing chamber 18 when desired.

Formed concentrically with the nozzle is a tube 22 which is of greater diameter than the nozzle and which is integrally connected at its lower end to the fitting 19. This forms an annular chamber 23 surrounding the base of the nozzle. The upper end of the tube 22 is perforated to assist in atomizing the fuel delivered through the nozzle 21.

To control the amount of fuel admitted to the mixing chamber through the nozzle 21, a metering valve 24 is provided. This valve is disposed in axial alignment with the nozzle 21 and extends upwardly through the mixing chamber 18 and through a vacuum cylinder 25. The lower extremity of the valve 24 is tapered and extends into the passageway in the nozzle. When the valve is in its lowermost position it entirely closes this passageway.

The vacuum cylinder 25 is formed with a closed lower end 26 separating it from the mixing chamber 18 and with a closed upper end 27. The valve 24 is guided for vertical reciprocation in these ends of the cylinder. A piston 28 is slidably mounted in the vacuum cylinder and is secured on the valve 24. A light compression spring 29 is interposed between the piston and the upper end of the cylinder and tends to maintain the piston in its lowermost position.

To operate the valve to admit fuel into the mixing chamber through the nozzle 21, the upper end of the vacuum cylinder 25 is connected by a pipe 30 and a fitting 31 to the tubular end 12 of the shell. The point of connection between the fitting 31 and the shell is intermediate the discharge end of the carburetor and a butterfly throttle valve 32. This throttle valve is located in the section 12 and is adapted to control the amount of

combustible mixture drawn into the manifold of the motor from the mixing chamber of the carburetor. It is obvious that the vacuum created by the motor in the upper end of the cylinder 25 through the fitting 31 and the pipe 30 will cause the piston to raise and open the metering valve. This will permit fuel to enter through the nozzle 21.

A normally open check valve 31^a is mounted in the fitting 31 and is adapted to be closed by a lever 33. This lever may be connected with the instrument board of the vehicle on which the engine is mounted by a connection 34. By closing the valve 31^a, the vacuum in the cylinder 25 will be broken, permitting the spring 29 to lower the piston and close the valve. The vacuum control valve 31^a is fitted with a spring 31^b for normally maintaining it open.

For regulating the amount of fuel admitted through the nozzle 21, we provide means for opening the valve an amount in direct ratio to the opening of the throttle valve. This means comprises a horizontally disposed plate 35 which is pivotally connected at one end to the vacuum cylinder 25. This plate is formed with a central opening 36, at the sides of which bearing lugs are formed for the reception of a cam shaft 37. A cam 38 is secured on this shaft and is adapted to operate in the opening 36. A bearing lever 39 is pivoted at one end to the plate 35 and is disposed within the opening 36 intermediate the cam 38 and the upper end of the valve 24. The cam 38 limits the upward movement of the bearing lever 39 and consequently limits the upward movement of the valve and therefore controls the amount which the valve may open.

A lever 40 is secured on the cam shaft 37 and is connected by a connection 41 with a lever 42 fixed on the shaft of the throttle valve. Therefore, turning movement of the throttle valve shaft will cause turning movement of the cam shaft. This will adjust the position of the cam 38 relative to the bearing lever 39 and determine the amount which the metering valve may open.

In order to vary the relative proportions of fuel and air, the end of the plate 35 opposite its pivotal point is operatively connected with a lever 43. This lever 43 may be connected by a connection 44 with the instrument board of the vehicle and is operative to raise and lower the plate 35. Such movement of the plate 35 will similarly affect the cam 38 and vary its effective position relative to the valve 24.

In operation, the carburetor is constructed and assembled as disclosed in the drawings. The flange 15 is connected with the intake manifold of the motor and the tubular end 14 of the shell is connected with a hot air inlet pipe 17 of the motor. The throttle valve 32 is fitted with a throttle control lever 32^a

which is connected to the dash board of the vehicle by the usual connections such as indicated by 32^b.

Likewise the levers 33 and 43 are connected with the instrument board of the vehicle by means of their connections 34 and 44. The fuel inlet fitting 19 is connected with a fuel supply pipe 20 for supplying fuel to the mixing chamber 18 of the carburetor.

From Fig. 1 it will be noticed that a small tube 50 is provided and leads from the chamber 23 in the intake fuel fitting 19 to a point in the tubular portion 12 of the carburetor intermediate the throttle valve 32 and the discharge end of the carburetor. This connection is for supplying fuel for idling purposes.

When the motor is started and the throttle valve 32 is practically closed, the vacuum created will raise the piston 28 in the vacuum cylinder 25 until the upper end of the valve stem raises the bearing plate into contact with the cam 38. This will permit a small amount of fuel to discharge through the nozzle 21 into the chamber 23. This fuel will be drawn through the tube 50 into the discharge end of the shell and thence into the motor for operating the latter at idling speed.

If it is desired to operate the motor at a higher speed, the throttle valve is opened. This, through the levers 42 and 40 and the connection 41, will swing the cam 38 and allow the bearing plate 39 to be raised further by the valve stem 24, the valve stem being elevated by means of the vacuum created intermediate the piston 28 and the upper head of the vacuum cylinder 25.

As the lower end of the metering valve 24 is tapered, as it is elevated, greater amounts of fuel will be admitted to the mixing chamber 18 of the shell. A suction through the port opened by the throttle valve 32 will draw the hot air from the pipe 17 through the mixing chamber 18 and pick up the fuel admitted to form a combustible mixture which is drawn into the motor. The liquid fuel passing through the perforated portion of the tube 22 will be partially atomized and will be more readily absorbed by the hot air. It is obvious that the metering valve 24 is opened an amount in direct proportion to the opening of the throttle valve.

If it is desired to increase the proportion of fuel to air in the mixture, the lever 43 may be actuated to slightly elevate the plate 35. This, as described, will raise the cam 38 and allow the metering needle 24 to move upwardly into a richer field, thereby increasing the amount of fuel in proportion to the intake of air.

If it is desired to cut off the fuel supply, the lever 33 is actuated to close the valve 31^a and thereby cut off the vacuum from the vacuum cylinder 25. The spring 29 in the vacuum cylinder will then lower the piston 28

and the valve 24 and cause the latter to close, shutting off the inlet of fuel through the nozzle 21. The throttle valve 32 may then be opened to permit nothing but air to enter the motor. This is a very advantageous feature as the motor may be used as a compressor for braking purposes. Also, when coasting down hill, it will serve to cool the motor.

While we have shown the preferred form of our invention, it is to be understood that various changes in its construction may be made by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A carburetor comprising a carburetor shell having an intake port at one end and a discharge port at the other end and provided intermediate of its ends with a mixing chamber, a throttle valve intermediate the mixing chamber and the discharge port, a fuel inlet nozzle projecting into the mixing chamber, a vacuum cylinder disposed above the mixing chamber, a metering valve controlling the passage of fluid through the nozzle and extending through the vacuum cylinder and provided therein with a piston, a fluid connection between the cylinder and the carburetor shell whereby the suction of the motor will cause a vacuum in the cylinder to open the valve, a plate hinged at one end at one side of the vacuum cylinder and extending across the end of the same, a cam shaft carried by the said plate and having a cam for limiting the movement of the metering valve and provided with a lever arm connected with the throttle valve, and means for adjusting the pivoted plate for changing the position of the cam with relation to the metering valve.

2. A carburetor comprising a carburetor shell having an intake port at one end and a discharge port at the other end and provided intermediate of its ends with a mixing chamber, a throttle valve intermediate the mixing chamber and the discharge port, a fuel inlet nozzle projecting into the mixing chamber, a vacuum cylinder disposed above the mixing chamber, a metering valve controlling the passage of fluid through the nozzle and extending through the vacuum cylinder and provided therein with a piston, a fluid connection between the cylinder and the carburetor shell whereby the suction of the motor will cause a vacuum in the cylinder to open the valve, a plate hinged at one side of the vacuum cylinder and extending across the same and provided with an opening, a bearing lever mounted on the plate and operating in the opening and engaging the metering valve, a cam mounted on and carried by the plate and arranged to engage the bearing lever for limiting the movement of

the metering valve, means for operatively connecting the cam with the throttle valve, and means for adjusting the plate to change the position of the cam with relation to the metering valve.

3. A carburetor comprising a carburetor shell having an intake port at one end and a discharge port at the other end and provided intermediate of its ends with a mixing chamber, a throttle valve intermediate the mixing chamber and the discharge port, a fuel inlet nozzle projecting into the mixing chamber, a vacuum cylinder disposed above the mixing chamber, a metering valve controlling the passage of fluid through the nozzle and extending through the vacuum cylinder and provided therein with a piston, a fluid connection between the cylinder and the carburetor shell whereby the suction of the motor will cause a vacuum in the cylinder to open the valve, a plate hinged at one side of the vacuum cylinder and extending across the same and provided with an opening, a bearing lever mounted on the plate and operating in the opening and engaging the metering valve, a cam mounted on and carried by the plate and arranged to engage the bearing lever for limiting the movement of the metering valve, means for operatively connecting the cam with the throttle valve, and operating mechanism for the said plate including a lever fulcrumed at the side of the vacuum cylinder opposite that at which the said plate is hinged and having an arm connected with the said plate.

4. A carburetor comprising a carburetor shell having an intake port at one end and a discharge port at the other end and provided intermediate of its ends with a mixing chamber, a throttle valve intermediate the mixing chamber and the discharge port, a fuel inlet nozzle projecting into the mixing chamber, a vacuum cylinder disposed above the mixing chamber, a metering valve controlling the passage of fluid through the nozzle and extending through the vacuum cylinder and provided therein with a piston, a fluid connection between the cylinder and the carburetor shell whereby the suction of the motor will cause a vacuum in the cylinder to open the valve, a plate hinged at one side of the vacuum cylinder and extending across the same and provided with an opening, a bearing lever mounted on the plate and operating in the opening and engaging the metering valve, a cam shaft mounted on and carried by the said plate and having a cam arranged to engage the bearing lever, said cam shaft having a lever arm, means for connecting the lever arm with the throttle valve, and means for adjusting the plate to change the position of the cam with relation to the metering valve and the bearing lever.

5. A carburetor comprising a carburetor shell having an intake port at one end and a

discharge port at the other end and provided intermediate of its ends with a mixing chamber, a throttle valve intermediate the mixing chamber and the discharge port, a fuel
5 inlet nozzle projecting into the mixing chamber, a vacuum cylinder disposed above the mixing chamber, a metering valve controlling the passage of fluid through the nozzle and extending through the vacuum cylinder and
10 provided therein with a piston, a fluid connection between the cylinder and the carburetor shell whereby the suction of the motor will cause a vacuum in the cylinder to open the valve, a plate hinged at one side of the
15 vacuum cylinder and extending across the same and provided with an opening, a bearing lever mounted on the plate and operating in the opening and engaging the metering valve, a cam shaft mounted on and carried by the said plate and having a cam arranged to
20 engage the bearing lever, said cam shaft having a lever arm, means for connecting the lever arm with the throttle valve, and operating means for the plate including a lever
25 fulcrumed at the side of the vacuum cylinder opposite that at which the plate is hinged and having an arm connected with the said plate.

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