

May 26, 1931.

J. J. MATSON

1,807,423

CARBURETOR

Filed May 4, 1929

2 Sheets-Sheet 1

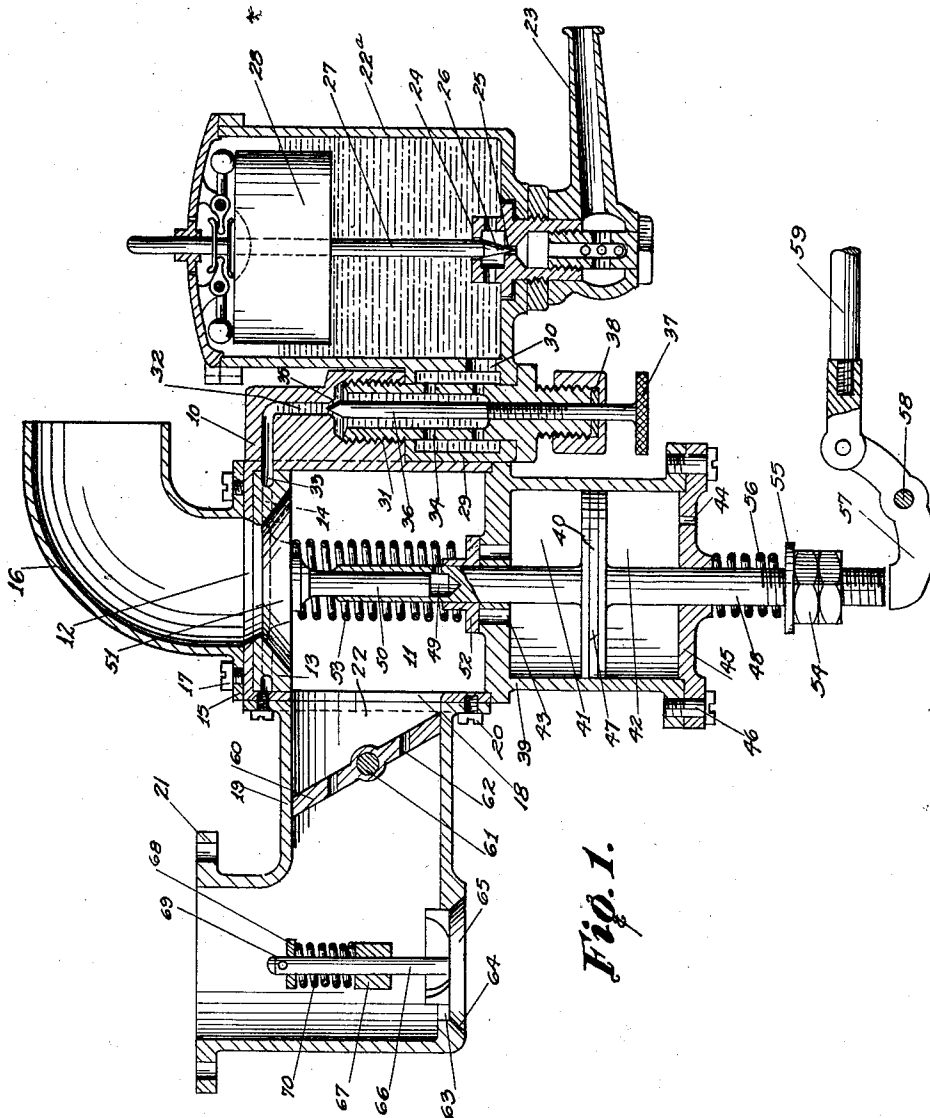


Fig. 1.

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INVENTOR

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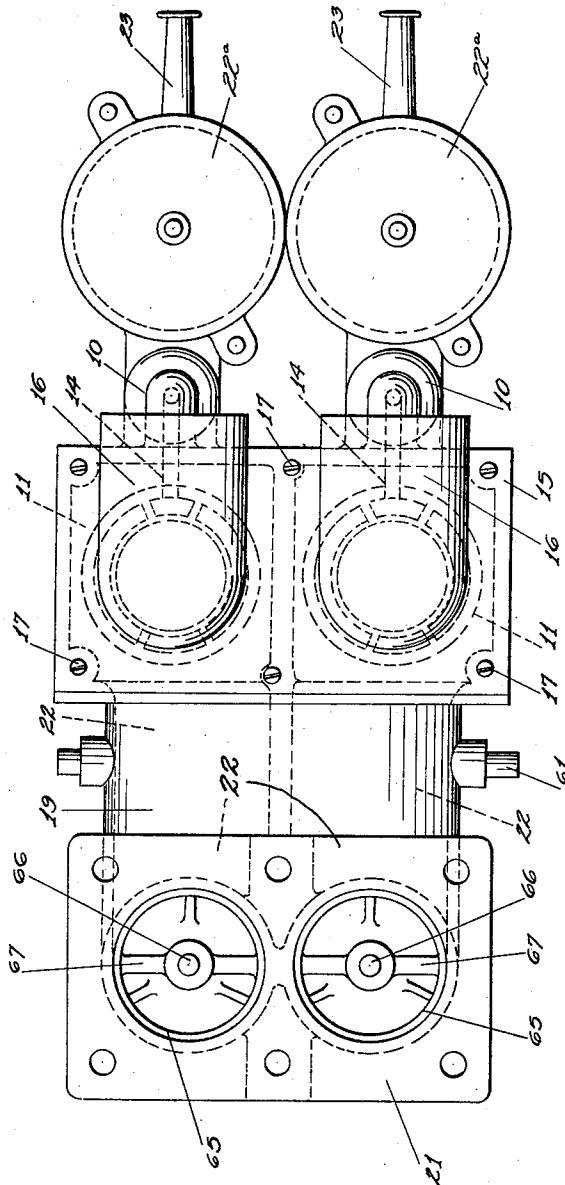
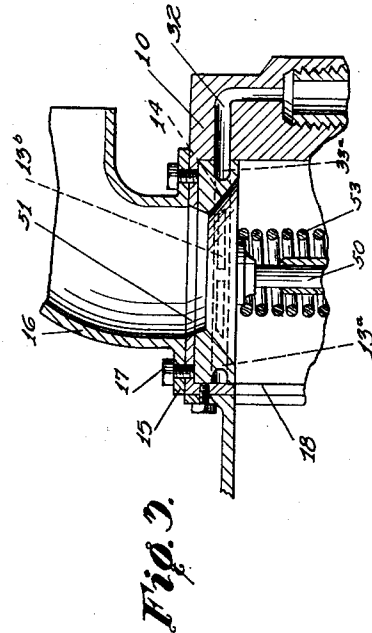


Fig. 2.

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CARBURETOR

Application filed May 4, 1929. Serial No. 360,586.

This invention relates to carburetors capable of employment in connection with motor vehicles, aeroplanes, and in fact all types of engines, even those of the stationary variety, making use of gasoline or gas as a fuel.

5 An important object of the invention is to provide what may be termed a duplex carburetor which will be particularly well adapted for use in connection with aeroplane motors where it is of the utmost importance that there be no failure of the fuel supply.

Another important object of the invention is to provide a carburetor of such construction as to insure a proper automatic mixture of air and fuel vapor at all times, a feature being that the inlet of the air and the fuel is controlled by the same valve.

Another important object of the invention is to provide speed varying means of selectively usable type, depending upon the exact nature of the service to which the carburetor is to be put, one type of control being used under some circumstances and the other type under different conditions.

25 Another object is to provide a carburetor of this character having a safety valve designed to open in the event of back-firing of the motor so that flame cannot reach the main fuel supply.

30 An additional object is to provide a device of this character which will be simple and inexpensive to manufacture, easy to install and adjust, positive in action, efficient and durable in service, and a general improvement in the art.

With the above and other objects and advantages in view, the invention preferably consists in the details of construction and the arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which:—

Figure 1 is a vertical longitudinal section through the carburetor.

45 Figure 2 is a top plan view.

Figure 3 is a fragmentary section illustrating a modification.

Referring more particularly to the drawings I have shown the carburetor as comprising a body 10 which may be formed as a hol-

low casting having various characteristics to be described and formed to provide spaced chambers 11 each of which is provided at its top with an opening 12 at which is located a valve seat 13 formed with a plurality of pas- 55 sages 14 for a purpose to be described. Secured upon the top of the body is a plate member 15 formed with spaced elbows 16 communicating with the respective openings 12, this plate member being held in position 60 by screws 17. At the side of each chamber 11 the body is formed with an opening 18, and secured against this side is a conduit member 19 held in place by screws 20 and of elbow form, this conduit member termi- 65 nating in a flange 21 adapted to be bolted to the intake of an engine, not shown.

The conduit member 19 has two separate passages or openings 22 therethrough communicating with the respective openings 18. 70 By this means it is apparent that the intake manifolds of two separate engines may be connected with the carburetor as clearly indicated in Figure 2.

At that side of the body opposite the con- 75 duit structure 19 are two fuel reservoir chambers 22^a each of which is provided at its bottom with a fuel inlet structure embodying a nipple 23 for connection of a fuel supply line. The inlet structure may embody any 80 desired number of parts certain of which are more or less conventional and capable of variations. However, in the present instance the bottom of each bowl 22^a is shown as equipped with an inlet nozzle 24 having a 85 fuel passage 25 therethrough engageable by the tapered end 26 of a needle valve 27 carrying a float 28. This type of construction is rather characteristic of carburetors and the intention is to provide a float chamber with- 90 in which there will always be a certain predetermined level of fuel to insure proper flow thereof. In that portion of the body between each chamber 11 and the associated fuel reservoir or bowl 22^a there is provided a chamber 95 member 29 communicating with the interior of the bowl 22^a through a port 30. Extending longitudinally through the chamber member 29 is a sleeve member 31 communicating with a passage 32 which leads to an annular 100

passage 33 in the wall of the seat 13 and of course communicating with the radial passages 14 therein.

The interior of the sleeve 31 communicates with the interior of the chamber member 29 through a plurality of ports 34. At the lower end of the passage 32 is a valve seat 35 engaged by a needle valve 36 threaded through the lower or solid end of the sleeve member 31 and equipped with an operating head 37, a suitable packing gland 38 surrounding this needle valve to prevent leakage. Clearly, by manipulating the needle valve 36 the rate of flow of fuel from the reservoir or bowl 22 to the passages 14 in the valve seat 13 may be easily regulated.

Beneath each chamber 11 is a cylinder or shell 39 within which is located a piston 40 which divides the interior into two separate chambers 41 and 42, the former being adapted to communicate with the chamber 11 through ports 43 and the latter being adapted to communicate with the atmosphere through ports 44. Each cylinder 39 is closed at its upper end except for the port 43 and has its lower end closed by a plate 45 held in place as by screws 46. The piston 40 is provided with suitable packing rings to prevent leakage and is carried by a stem 48 slidable through the bottom cap 45 and also slidable through and projecting considerably beyond the closed top of the cylinder 39. The projecting upper end of this stem is formed with a relatively long socket 49 within which is slidably mounted the stem 50 of a valve 51 normally closing the seat 13.

Mounted above the top of each cylinder 39 and normally closing the ports 43 is a gag valve 52 upon which seats a coil spring 53 which surrounds the stem 48 and which abuts against the under side of the valve 51. Clearly, this spring operates normally to hold the valves 51 and 52 closed. The stem 48 also projects beyond the bottom cap 45 of each cylinder and this projecting lower end is threaded and equipped with a pair of adjusting nuts 54, the upper one of which engages against a washer 55 which forms a seat for the lower end of a coil spring 56 encircling the stem 48 and abutting against the under side of the cap. This stem 48 is adapted to be engaged by one end of a rocker arm 57 suitably pivoted as at 58 on a support, not shown, and adapted to be moved by a rod 59 which forms part of the carburetor control mechanism or throttle control.

Located within each conduit 19 is a butter-fly valve 60 carried by a rock shaft 61 which may be equipped with any suitable lever device, not shown, for effecting movement of the butter-fly valve. This butter-fly valve is also represented as provided with idling ports 62 of relatively small size.

Another important feature of the invention is the provision of means for preventing

fire in case the motor back-fires. In carrying out this feature I provide the under side of each conduit member 19 with an opening 63 at which is a valve seat 64 normally closed by a valve 65 carried by a stem 66 slidable through a spider 67 and equipped with a washer and pin 68 and 69 respectively, the former constituting an abutment for one end of the coil spring 70 which has its other end abutting against the spider 67.

Clearly, in the event of a back-fire, the valve 65 will be forced from its seat 64 so that the pressure may escape.

Assuming that the device has been constructed and assembled as described and illustrated, the operation is as follows: To begin with, it should be understood that the chamber 41 is a vacuum chamber and that the chamber 42 is always at atmospheric pressure. It will consequently be apparent that the device automatically controls the flow of supply of gas or gasoline and air by vacuum and atmospheric pressure for all types of internal combustion engines. At each intake stroke of the engine the suction produced thereby will tend to exhaust the air in the mixing chamber 11 and the result is that the valves 51 and 52 will open simultaneously. At the opening movement, air enters the chamber 11, or each of the chambers 11 as it should be said, through the elbow 16 and opening 12, and at the same time the fuel enters at the valve seat 13 through the numerous radial ports 14 which lead from the fuel supply. After the valves 51 and 52 have been opened by engine suction as mentioned above, they will subsequently close instantaneously and simultaneously. As a consequence of the provision of the piston 47 operating within the cylinder 39 the stem 48 will return to its normal position. By this action a perfect mixture is obtained at any angle in which the carburetor may be disposed.

Various engine speeds may be obtained by means of the butter-fly valve 60 which may be opened to the desired extent, or by means of the adjuster nuts 54 on the stem 48. If various speeds are desired by means of the butter-fly valve 60, the adjuster nuts 54 are adjusted so as to effect opening of the valve 51 to permit more fuel to pass through the elbow 16, with the butter-fly valve open. The idling speed is then obtained through the idling ports 62 in the butter-fly valve notwithstanding the fact that this valve is closed. If a variable speed is desired by manipulation of the stem 48, the adjuster nuts 54 are unscrewed until the engine is at idling speed. If constant and automatically controlled speed is desired, the adjuster nuts 54 are screwed upward to compress the spring 56 until the desired speed is obtained with the butter-fly valve 60 and the rocker arm 57 entirely removed. Under such circumstances the engine speed is auto-

matically controlled under load or no load.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a simply constructed and yet very highly efficient carburetor which may be constructed in the duplex manner shown or as an individual unit, this detail being comparatively immaterial. Furthermore, it will be observed that speed variations may be obtained in various selected ways and that ample provision has been made to take care of a back-fire so that the fire hazard will be reduced to the minimum.

It is really believed that the construction, operation and advantages will be readily apparent to one skilled in the art without further explanation.

In Figure 3 I have illustrated a modification of the structure when the fuel used is gas instead of gasoline. In this form it is intended that the gasoline bowl or reservoir and also the butterfly valve be omitted. In practically every other respect the construction is the same except of course there is no necessity for a gasoline supply as use would be made of a suitable supply of gas of an explosive nature. Furthermore the above described needle valve 36 is necessarily omitted or if not necessarily at least preferably. However, the above described valve seat 13 is replaced by a valve seat 13a which is provided with an annular passage 33a communicating with the passage 32 above referred to. However, the radial passages which establish communication between the opening in the valve seat and the passage 33a are laterally elongated or widened as indicated at 13b in order to permit a larger volume of gas to pass than the necessary volume of gasoline in case the latter fuel is used. This is the only change that is necessary to be made in order to adapt the device for use with gaseous fuel instead of a liquid fuel. The operation is of course in every other respect the same as in the first described form and it is believed that a recapitulation is therefore unnecessary.

While I have shown and described the preferred embodiment of the invention, it should of course be understood that I reserve the right to make such changes in the details of construction as well as the combination of parts as will not depart from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:—

1. A duplex carburetor comprising a body provided with a pair of spaced mixing chambers having inlet openings at the top and each having an opening at the side, a conduit member secured to said side and having separate passages communicating with respective ones of the second mentioned openings and adapted for connection with the intake manifolds of engines, air inlet conduits secured to

said body and communicating with the respective first named openings, a valve seat member located within the top of each mixing chamber at the opening in the top thereof, fuel reservoir bowls located at one side of the body and each having a fuel inlet, float operated inlet control means in each bowl, the body having fuel passages communicating with said reservoir bowls and said valve seat members having annular passages communicating with said fuel passages and having a plurality of radial passages communicating with the seat, needle valves for controlling the flow of fuel through the fuel passages, a valve normally closing the opening of each of said valve seat members, a stem connected with each of said valves, a cylinder secured beneath each mixing chamber and having ports communicating with the interior of said chamber and other ports communicating with the atmosphere, a stem slidable through the lower end of each cylinder and slidably connected with and slidably receiving said first mentioned valve stem, a piston upon each of said stems operating within the respective cylinder, a valve slidable with the second named stem and normally closing the cylinder ports which communicate with the mixing chamber, and spring means normally holding said first and last named valves closed.

2. A duplex carburetor comprising a body provided with a pair of spaced mixing chambers having inlet openings at the top and each having an opening at the side, a conduit member secured to said side and having separate passages communicating with respective ones of the second mentioned openings and adapted for connection with the intake manifolds of engines, air inlet conduits secured to said body and communicating with the respective first named openings, a valve seat member located within the top of each mixing chamber at the inlet opening therein, fuel reservoir bowls located at one side of said body and each having a fuel inlet, float operated inlet control means in each bowl, the body having fuel passages communicating with said reservoir bowls and said valve seat members having annular passages communicating with said fuel passages and having a plurality of radial passages communicating with the seat, needle valves for controlling the flow of fuel through the fuel passages, a valve normally closing the opening of each of said valve seat members, a stem connected with each of said valves, a cylinder secured beneath each mixing chamber and having ports communicating with the interior of said chamber and other ports communicating with the atmosphere, a stem slidable through the lower end of each cylinder and slidably connected with and slidably receiving said first mentioned valve stem, a piston upon each of said stems operating within

each respective cylinder, a valve slidable with each second named stem and normally closing the cylinder ports which communicate with the mixing chamber, spring means normally holding said first and last named valves closed, adjusting nuts on the lower end of each piston carrying stem, a spring engaging the bottom of the cylinder and said nuts for normally urging each stem downwardly, and rocker means for moving each stem upwardly.

3. In a carburetor including a mixing chamber, an air inlet and a mixture outlet, a member located at the juncture of the air inlet with the mixing chamber and formed with a valve seat provided with an annular passage and a plurality of radial ports, means for conducting fuel to said annular passage, a valve normally closing said seat and having a stem, a cylinder beneath the mixing chamber having ports communicating therewith, a stem slidable through the cylinder and carrying a piston located therein, said second named stem slidably receiving said first named stem, a valve surrounding the second named stem and normally closing the ports in the top of the cylinder, and spring means normally holding both of said valves seated.

4. In a carburetor including a mixing chamber, an air inlet and a mixture outlet, a member located at the juncture of the air inlet with the mixing chamber and formed with a valve seat provided with an annular passage and a plurality of radial ports, means for conducting fuel to said annular passage, a valve normally closing said seat and having a stem, a cylinder beneath the mixing chamber having ports communicating therewith, a stem slidable through the cylinder and carrying a piston located therein, said second named stem slidably receiving said first named stem, a valve surrounding the second named stem and normally closing the ports in the top of the cylinder, spring means normally holding both of said valves seated, spring means normally urging the second named stem downwardly, and means for positively moving the second named stem upwardly.

In testimony whereof I affix my signature.
JULIUS J. MATSON.

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