

Dec. 28, 1937.

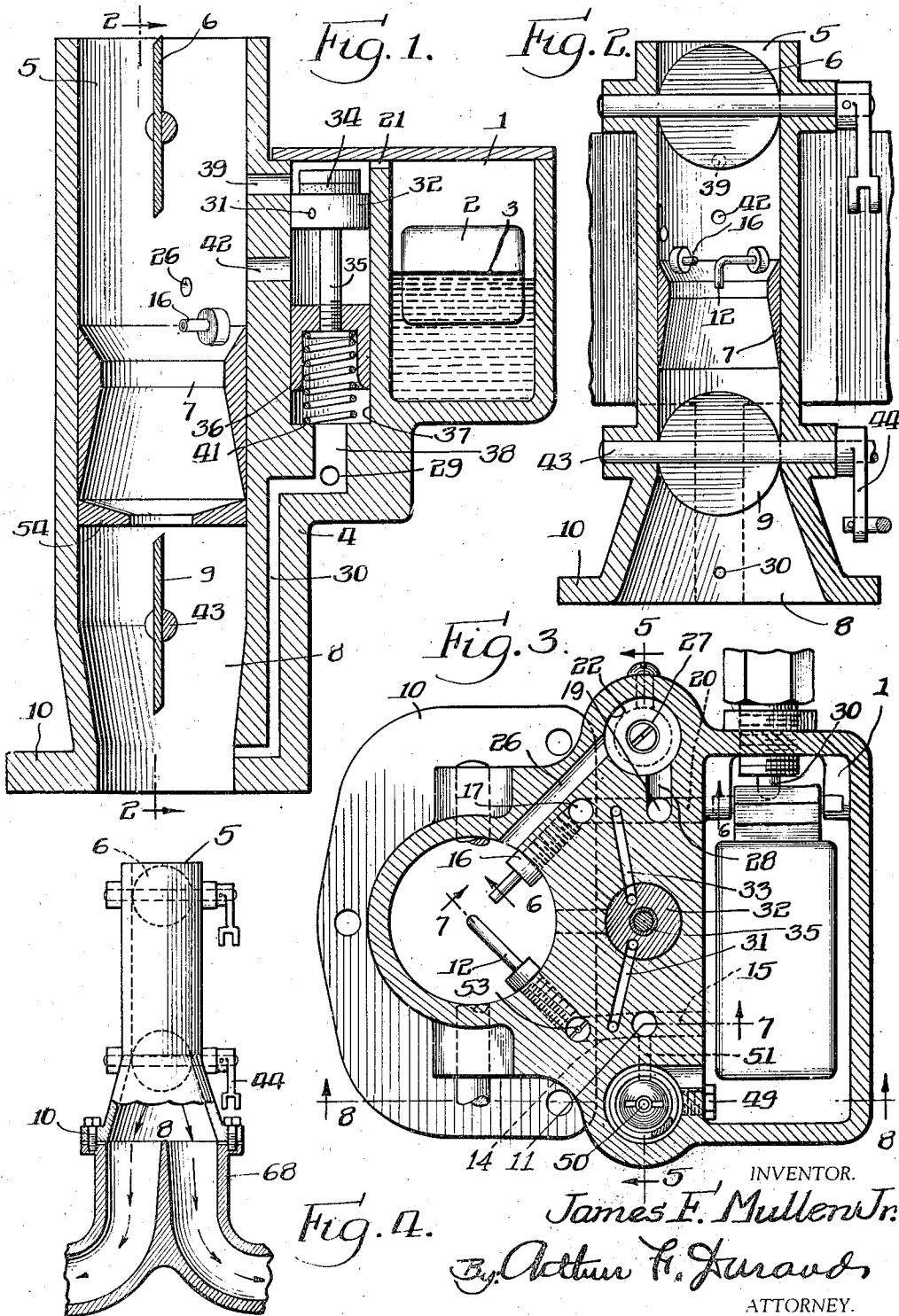
J. F. MULLEN, JR

2,103,689

CARBURETOR

Filed Nov. 1, 1935

4 Sheets-Sheet 1



Dec. 28, 1937.

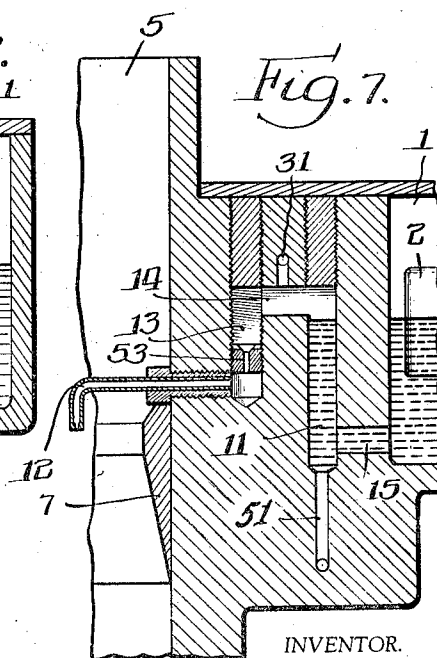
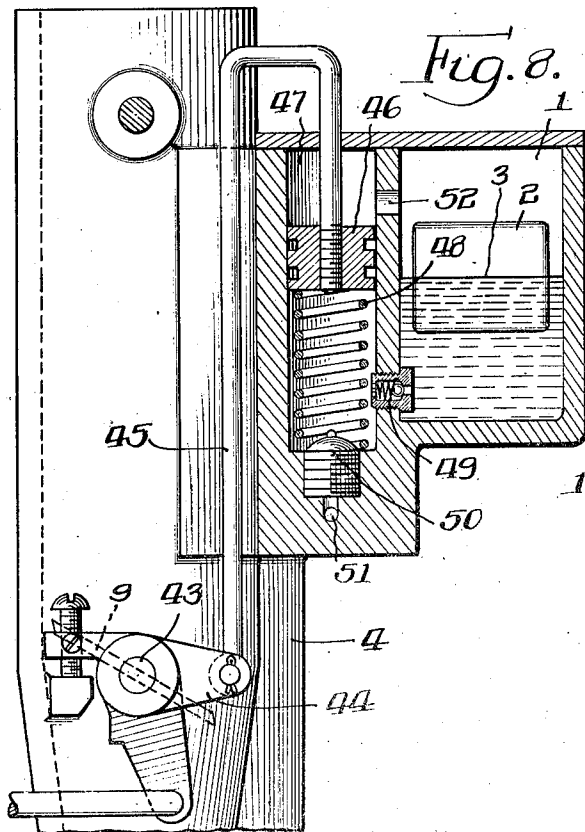
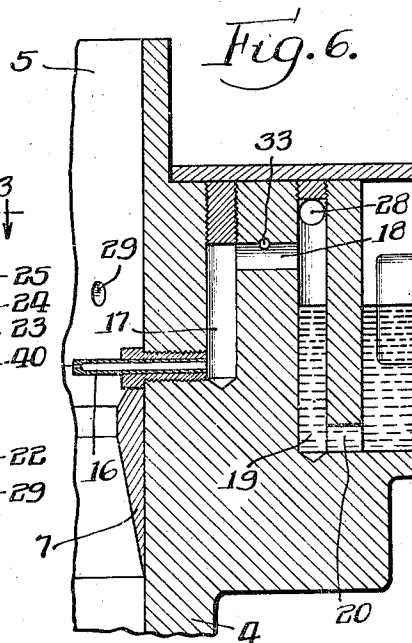
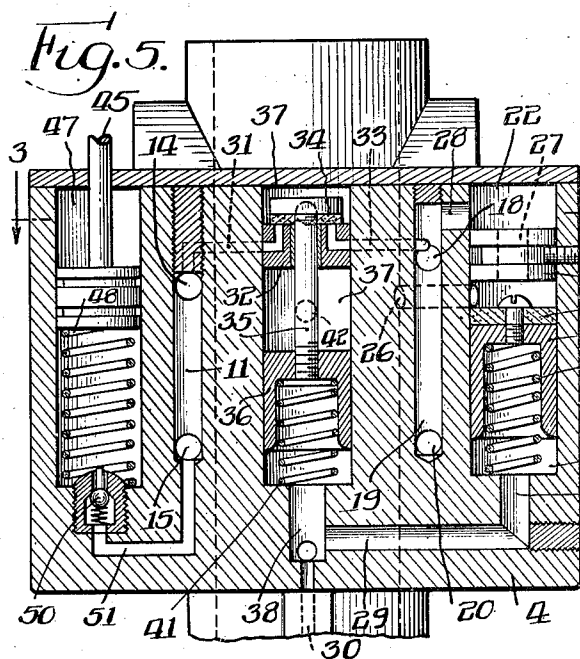
J. F. MULLEN, JR

2,103,689

CARBURETOR

Filed Nov. 1, 1935

4 Sheets-Sheet 2



INVENTOR.
James F. Mullen Jr.,
BY
Arthur P. Durand
ATTORNEY.

Dec. 28, 1937.

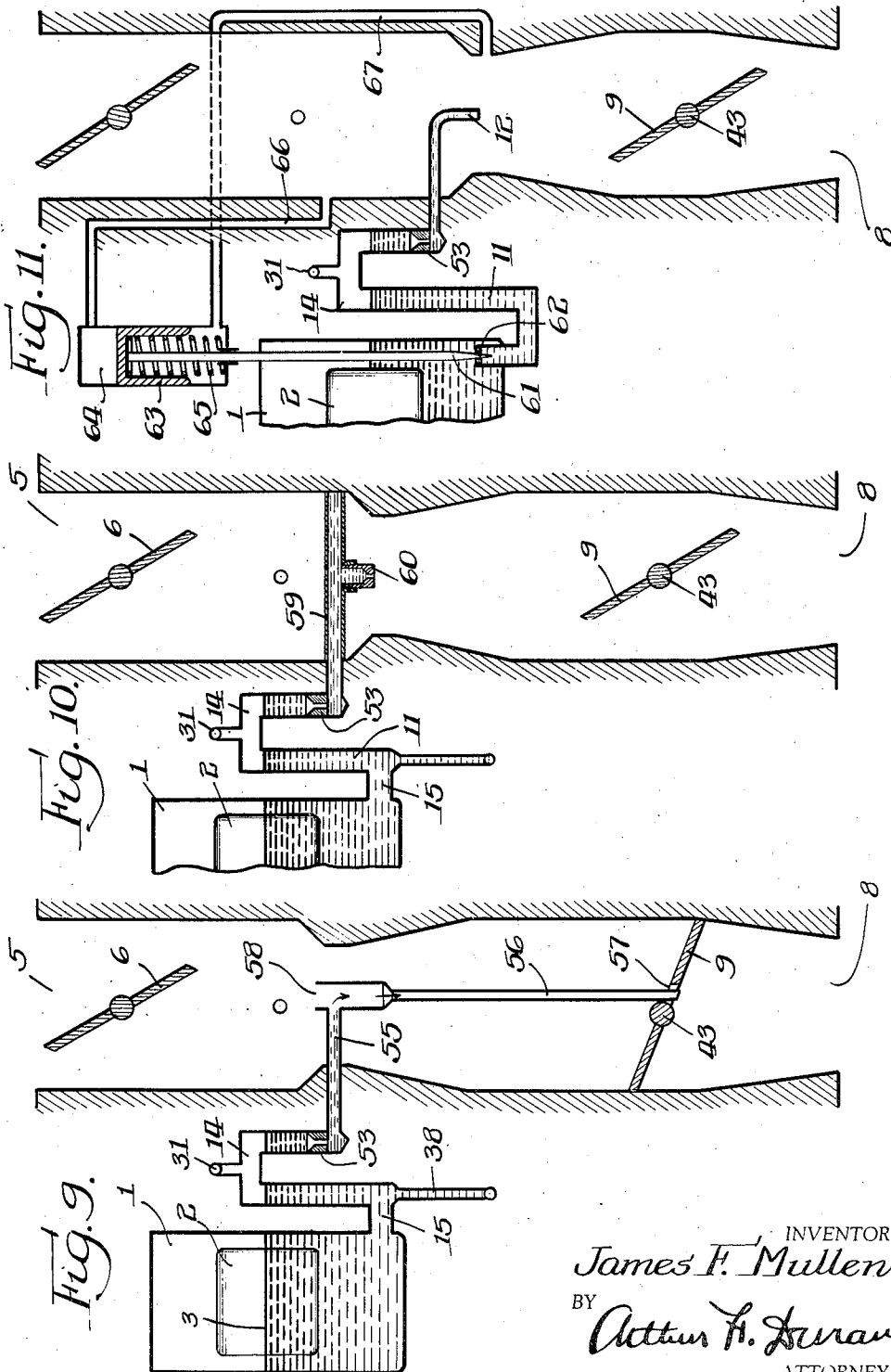
J. F. MULLEN, JR

2,103,689

CARBURETOR

Filed Nov. 1, 1935

4 Sheets-Sheet 3



INVENTOR.
James F. Mullen Jr.
BY
Arthur H. Durand
ATTORNEY.

Dec. 28, 1937.

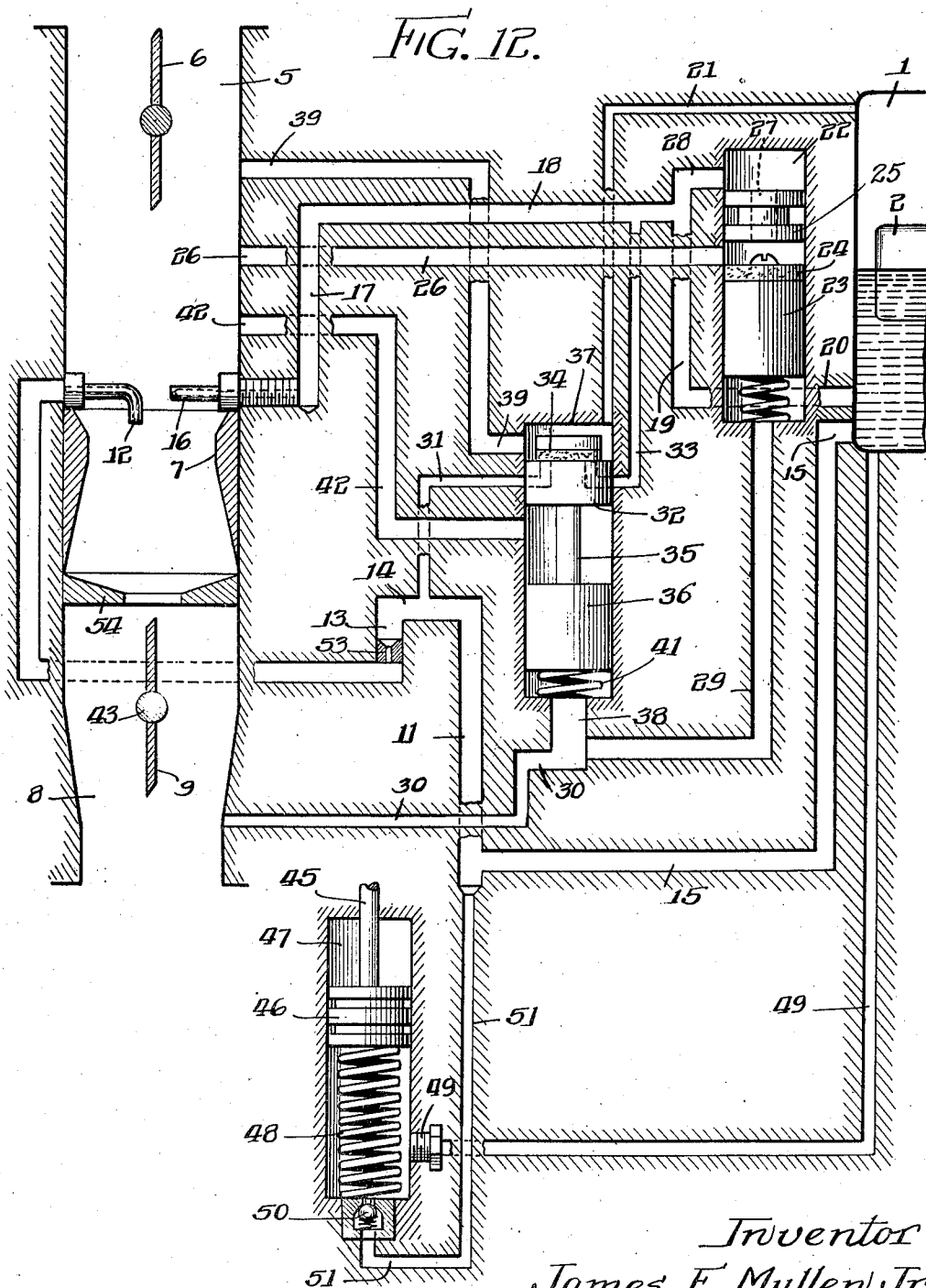
J. F. MULLEN, JR

2,103,689

CARBURETOR

Filed Nov. 1, 1935

4 Sheets-Sheet 4



Inventor
James E. Mullen Jr.

By Arthur F. Swand
att.

UNITED STATES PATENT OFFICE

2,103,689

CARBURETOR

James F. Mullen, Jr., Lincoln Park, Mich.

Application November 1, 1935, Serial No. 47,757

18 Claims. (Cl. 261—34)

This invention relates to carburetors for internal combustion engines, and more particularly to those for use on the engines of motor vehicles.

Generally stated, the object of the invention is to provide a novel and improved construction and arrangement whereby greater efficiency is obtained, greater economy in the use of the fuel, than was heretofore possible with some other types of carburetor, and whereby greater mileage is obtained, per gallon, when the carburetor is used on the engine of a motor vehicle.

Another object is to provide a novel construction and arrangement whereby a carburetor of this kind, having the characteristics above stated, may nevertheless be produced at a comparatively low cost of manufacture, and whereby adjustments and repairs may be easily and satisfactorily made.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and desirability of a carburetor of this particular character.

To these and other useful ends, the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawings, in which—

Fig. 1 is a vertical axial section of a carburetor embodying the principles of the invention.

Fig. 2 is a vertical section, on a reduced scale, on line 2—2 in Fig. 1 of the drawings.

Fig. 3 is a horizontal section on line 3—3 in Fig. 5 of the drawings.

Fig. 4 is a side elevation of the said carburetor, on a smaller scale, showing its adaptability to a double intake manifold.

Fig. 5 is a vertical section on line 5—5 in Fig. 3 of the drawings.

Fig. 6 is a detail vertical section on line 6—6 in Fig. 3 of the drawings.

Fig. 7 is a similar line on line 7—7 in Fig. 3 of the drawings.

Fig. 8 is a similar view on line 8—8 in Fig. 3 of the drawings.

Figs. 9, 10 and 11 are diagrammatic views illustrating different forms of the invention.

Fig. 12 is a diagrammatic view of the construction shown in Figs. 1, 2, and 3 of the drawings.

As shown in Figs. 1 to 8 of the drawings, the invention comprises a float chamber 1, having a float 2 therein, of any suitable or desired character, for maintaining the fuel level approximately at the line 3, as shown. The body 4 of the carburetor has a down draft passage therein, the intake portion 5 of which is provided with an

ordinary choke or butterfly valve 6, and the middle portion of the down draft passage has a restriction formed by the Venturi tube 7, and below is the outlet portion 8 of the down draft passage, provided with the usual throttle valve 9, as shown. Preferably, the base portion 10 of the carburetor body is flared, as shown in Fig. 2 of the drawings, to permit it to be coupled to a double intake manifold, as shown in Fig. 4 of the drawings, thus providing a single barrel carburetor for a double barrel intake manifold, on an engine that ordinarily would require two carburetors, or at least a double barrel carburetor.

From the float chamber 1, there is a passage 11 leading to the outlet nozzle 12, which latter is preferably immediately above the Venturi tube restriction 7, as shown in Figs. 1 and 7 of the drawings. The other leg 13 of the siphon passage, serving as the main fuel passage, is connected to the leg 11 by the top portion 14, and the lower end of the leg 11 is connected by an inlet 15 with the float chamber 1, as shown in Fig. 7 of the drawings.

The auxiliary fuel nozzle 16 is connected by passages 17, 18, 19, and 20, with the float chamber 1, as shown more clearly in Fig. 6 of the drawings, thus forming another siphon passage for feeding fuel for acceleration.

To insure atmospheric pressure in the float chamber, the latter may have an orifice 21 for admitting air into the interior of the float chamber, above the fuel level, as will hereinafter more fully appear.

In the body casting of the carburetor, there is a vertical cylindrical chamber 22 that contains an automatic and vertically reciprocating body 23, the latter being cylindrical to fit the chamber 22, and being provided at its upper end with a valve member 24 and adapted on its top to engage the valve seat member 25, which latter is preferably in the form of a ring removably fastened in place in the chamber 22, previously mentioned. This valve controls an air inlet passage 26 that connects the air intake chamber 5 with the chamber 22, as shown in Fig. 5 of the drawings. As the valve seat 25 has a central opening 27, it follows that the passage 26, when the valve is in the position shown in Fig. 5, is connected with the passage 28, leading from the top of the chamber 22 to the top portion of the siphon passage formed by the passages 17, 18, and 19, previously mentioned. Thus, when the valve 24 is in the position shown in Fig. 5, the passage 26 is open and air can enter the siphon 17, 18 and 19, preventing fuel from discharging from the

nozzle 16, previously mentioned. The valve member 23 is operated by suction, as the bottom of the chamber 22 is connected by a passage 29 with the passage 30, which latter leads to a point near the bottom of the down draft air passage of the carburetor, as shown in Fig. 1 of the drawings, so that when the valve 9 is closed, or partially closed, the suction exerted in the passages 29 and 30 will tend to pull the valve member 23 downward, thus opening the passage 26 and permitting air to enter the top of the siphon 17, 18, and 19, previously mentioned.

The siphon formed by the passages 11 and 13, for the main fuel nozzle 12, has its top portion provided with an air inlet 31, which latter leads to the upper face of the fixed valve seat member 32, as shown in Fig. 5 of the drawings. A similar passage 33 connects the upper portion of the siphon 17, 18, and 19 with the upper face of the valve seat member 32, and a valve 34 is provided to close the passages 31 and 33, as shown in Fig. 5 of the drawings, said valve being on the upper end of the stem 35, to the lower end of which is secured the cylindrical member 36, that is reciprocal up and down in the cylindrical chamber 37, formed in the body of the carburetor. The lower end of this chamber 37 is connected by the passage 38 with the passage 30, previously mentioned, so that suction in the passage 30 tends to pull the valve 34 downward against the seat 32, as shown, depending upon the position of the throttle valve 9, previously mentioned. The passage 39 connects the air intake chamber 5 with the upper end of the chamber 37, so that when the valve 34 is in its raised position, air will enter the top portions of both the main fuel siphon feed passage, and also the auxiliary or acceleration siphon feed passage.

Any suitable or desired means can be employed for keeping the valves 24 and 34 in their normal positions, but in the drawings the springs 40 and 41, disposed in the chambers 22 and 37, below the members 23 and 36, are employed for this purpose. To prevent the escape of the air from the portion of the chamber 37 which is between the member 36 and the valve seat member 32, a passage 42 is provided between this portion of said chamber and the air intake chamber 5, as shown in Fig. 1 of the drawings.

The shaft 43, that operates the throttle valve 9, is provided with an arm 44 that is connected with the lower end of a bent rod 45, which has a plunger head 46 on the lower end of the upper bent portion, which plunger head reciprocates up and down in the chamber 47, formed in the body of the carburetor, with a spring 48 tending to keep the said plunger head in normally raised position. The lower portion of the float chamber is connected by a check valve device 49 with the lower portion of the chamber 47, so that when the plunger head 46 moves upward, fuel is drawn into the lower portion of the chamber 47, and when the plunger moves downward, the check valve closes and causes a quantity of fuel to be discharged through the check valve device 50 into the passage 51, which latter leads to the passage 15, previously mentioned, so that the main fuel supply siphon passage has both gravity and siphon feed, and also at times a forced feed. An opening 52 connects the float chamber with the upper portion of the chamber 47, as a sort of drain passage for draining any fuel back into the float chamber, and for providing atmospheric pressure at all times in the chamber 47 above the plunger 46, for obvious reasons.

It may also be desirable to place a restriction 53 in the siphon passage 13, as shown in Fig. 7 of the drawings, depending upon what action or result is desired, in the feeding of the fuel through the main siphon fuel passage.

As a feed control expedient, a restriction 54 can be placed in the barrel of the carburetor, at the lower end of the Venturi tube restriction 7, as shown in Fig. 1 of the drawings, if so desired.

It will be understood that the float 2 is used in the ordinary and well known manner to operate a valve that controls the supply of fuel to the float chamber.

With the valves 6 and 9 in the position shown in Fig. 1 of the drawings, fuel passes from the float chamber 1 through the passages 15, 11, 14, 13, and 53 to the main fuel nozzle 12, so that fuel is introduced into the air stream entering the intake manifold through the carburetor. For acceleration, in the manner explained, fuel passes from the said float chamber through passages 20, 19, 18, and 17 to the auxiliary fuel nozzle 16, so that fuel enters the air stream through this nozzle also, for the purpose of acceleration. Both nozzles, it will be seen, deliver the fuel to the air stream as the result of gravity and suction feed of the fuel from the float chamber. An auxiliary forced feed, through the main nozzle 12, is produced by the action of the plunger 46, in the manner previously explained, whereby the forced feed is added to gravity and suction feed, when the throttle valve 9 is turned to the position shown in Fig. 8 of the drawings. Therefore, with the exception of the forced feed, all moving parts of the carburetor are operated by suction and spring pressure. Also, both feed siphons are subject to the influx of air, by the construction previously explained, through the passages 31 and 33 shown in the drawings, thus preventing draining or siphoning off of the fuel when the engine stops.

As shown in Fig. 9 of the drawings, the main fuel passage 55 (which is supposed to have the same siphon arrangement as the nozzle 12 has) has a depending nozzle 56 that has its lower end disposed in position to extend through an opening 57 in the throttle valve 9, previously mentioned. It will be seen that the upper end of the nozzle 56 is enlarged and is open to the atmosphere at 58, or rather to the air in the upper portion of the carburetor barrel. Therefore, except for the depending spout 56 and the opening 57 and the opening 58, the construction shown in Fig. 9 is the same as that in Figs. 1 to 8, inclusive.

In Fig. 10, the construction is assumed to be the same as that shown in Figs. 1 to 8, inclusive; but in this case the discharge nozzle 59 extends entirely across the barrel of the carburetor, and has a middle depending jet nozzle 60, as shown.

In Fig. 11 of the drawings, the construction is assumed to be the same as that shown in Figs. 1 to 8 of the drawings, but in this case the intake of the main fuel siphon passage is controlled by a needle valve 61, the siphon passage having a relatively small intake opening 62 for the tapered end portion of said needle valve, but this intake opening is never entirely closed by the said valve, but is normally and always open. The said valve is operated by a piston head 63 in a chamber 64, preferably formed in the body of the carburetor, with a spring 65 to keep the piston head normally raised, so that the opening 62 is the maximum at such time. A passage 66 connects the air intake portion of

the carburetor with the upper end of the chamber 64, and another passage 67 connects the Venturi tube formation or restriction with the lower end of the chamber 64, so that suction will pull the piston head 63 downward, at certain times in the operation of the carburetor, and will partially close the opening 62, to in effect provide economy at high speed.

As shown in Fig. 4 of the drawings, the downwardly flared base 10 of the carburetor body is of a size and shape to be coupled to the double intake manifold 68, thus obviating the necessity of using a double barrelled carburetor, the kind usually employed on the double intake manifold of a V-type engine.

Thus, air is admitted to the auxiliary siphon 19, to prevent acceleration when such is not wanted, and to prevent draining of the float bowl when the engine stops. In addition, air is admitted to the main siphon passage 11, to prevent the draining of the float bowl at certain times. When the engine is running, the valve 34 is always closed, and while the engine is running the valve 24 may be either open or closed, depending upon the degree of vacuum in the intake manifold. The spring 41, of course, must be of less strength than the spring 40, so that the valve 34 may remain closed while the valve 24 is in closed position. When the engine stops, the valve 34 is opened to admit air to both the main and auxiliary siphon passages, while the valve 24 remains closed, thereby preventing draining of the float bowl through either siphon.

It will be seen that, in each form of the invention, there is a main siphon feed passage for feeding the fuel in the same way for both the economy range and the power range, together with separate auxiliary suction and gravity siphon feed means to increase the flow of fuel for acceleration, operable independently of the choke valve which controls the air inlet end of the carburetor.

What I claim as my invention is:

1. In a carburetor for an internal combustion engine, such as the motor of an automobile, the combination of a float chamber for the fuel, a main siphon gravity and suction feed passage leading from said chamber, an auxiliary gravity and suction feed passage leading from said chamber, for acceleration, suction operated means for admitting air to the auxiliary passage to prevent acceleration, and a suction operated valve which, when released by the suction, admits air to both siphon passages, to prevent drainage through the latter of the float chamber when the motor stops.

2. A structure as specified in claim 1, said carburetor comprising a single casting providing said float chamber and the mixing chamber of the carburetor, and said suction operated means and suction operated valve being disposed in a plane between the mixing chamber and the float chamber.

3. A structure as specified in claim 1, comprising a fuel feed pump connected to the throttle of the carburetor to add forced feed to the said main siphon gravity and suction feed for the fuel.

4. A structure as specified in claim 1, said valve comprising a stem with a valve head thereon, means forming a seat for said valve head, with a passage from the top of each siphon to the face of said seat, for admitting air to the top of each siphon, and means on the other end of said stem subject to engine suction to keep said valve closed during the running of the engine.

5. A structure as specified in claim 1, compris-

ing passages whereby the air admitted to said siphons is taken from the air inlet, with a valve to control the primary influx of air into the carburetor.

6. A structure as specified in claim 1, including a feed pump connected to the throttle of the carburetor, to add forced feed to the said gravity and suction feed, said pump and said suction operated valve and suction operated means being disposed in a common plane between the float chamber and the mixing chamber of the carburetor.

7. In a carburetor for a motor, a float chamber for the fuel, an air inlet control, suction and gravity siphon feed means providing a main feed passage for feeding the fuel in the same way for both the economy range and the power range, and separate auxiliary suction and gravity siphon feed means to increase the flow of fuel for acceleration, operable independently of said air inlet control, a throttle valve, and a feed pump separate from the main suction feed passage and connected with the throttle to add forced feed to the said main siphon suction and gravity feed, in said main passage, the latter having one inlet from the pump, and another inlet directly from the float chamber, comprising suction operated valve means for automatically admitting air to the second-mentioned siphon, to prevent acceleration, when the latter is not needed.

8. In a carburetor for a motor, a float chamber for the fuel, an air inlet control, suction and gravity siphon feed means providing a main feed passage for feeding the fuel in the same way for both the economy range and the power range, and separate auxiliary suction and gravity siphon feed means to increase the flow of fuel for acceleration, operable independently of said air inlet control, a throttle valve, and a feed pump separate from the main suction feed passage and connected with the throttle to add forced feed to the said main siphon suction and gravity feed, in said main passage, the latter having one inlet from the pump, and another inlet directly from the float chamber, comprising suction operated valve means for admitting air to the first-mentioned siphon, to prevent draining of the carburetor when the motor stops.

9. In a carburetor for a motor, a float chamber for the fuel, an air inlet control, suction and gravity siphon feed means providing a main feed passage for feeding the fuel in the same way for both the economy range and the power range, and separate auxiliary suction and gravity siphon feed means to increase the flow of fuel for acceleration, operable independently of said air inlet control, a throttle valve, and a feed pump separate from the main suction feed passage and connected with the throttle to add forced feed to the said main siphon suction and gravity feed, in said main passage, the latter having one inlet from the pump, and another inlet directly from the float chamber, comprising suction operated valve means for admitting air to the top of each siphon at certain times, substantially as shown and described.

10. In a carburetor for a motor, means providing a general air passage through which the air flows to the motor, providing a mixing chamber, means providing a float chamber for the liquid fuel, means forming in effect a siphon between the float chamber and the air passage, adapted to feed the fuel by suction and gravity into the air stream, forming the main fuel passage from the float chamber to the mixing chamber, normally

open and free from direct manual control, all coordinated to maintain the level of the fuel in the float chamber at a point high enough above the outlet end of the siphon to maintain a positive static head, while the motor is running, to provide the same gravity and suction feed for both the power range and the economy range, another siphon fuel feed passage, for acceleration, and means comprising a suction operated valve, which is closed by suction and opened by a spring, for admitting air to the top of each siphon when the suction holding the valve closed is reduced.

11. In a carburetor for an internal combustion engine, such as the motor of an automobile, the combination of means forming a float chamber for the fuel, a main siphon gravity and suction feed passage leading from said chamber, an auxiliary gravity and suction feed passage leading from said chamber, for acceleration, and a suction operated valve which, when released by the suction, admits air to both siphon passages, for the desired purpose.

12. A structure as specified in claim 11, comprising means for admitting air to the auxiliary passage to prevent acceleration.

13. A structure as specified in claim 11, said carburetor comprising a single casting providing said float chamber and the mixing chamber of the

carburetor, and said valve being disposed in a vertical plane between the mixing chamber and the float chamber.

14. A structure as specified in claim 11, comprising a fuel feed pump operable to add forced feed to the said main siphon gravity and suction feed for the fuel.

15. A structure as specified in claim 11, said valve comprising a stem with a valve head on the upper end thereof, and with a plunger on its lower end, together with a compression spring engaging said plunger, serving to open said valve when the suction is discontinued, said plunger being subject to engine suction to keep the valve closed during the running of the engine.

16. A structure as specified in claim 11, comprising passages whereby the air admitted to said siphons is taken from the main air inlet of the carburetor, with a valve to control the primary influx of air into the carburetor.

17. A structure as specified in claim 11, comprising a suction-opened and spring-closed valve for admitting air to the auxiliary passage to prevent acceleration.

18. A structure as specified in claim 11, comprising a throttle for acceleration, and a fuel feed pump connected for operation by said throttle.

JAMES F. MULLEN, JR.