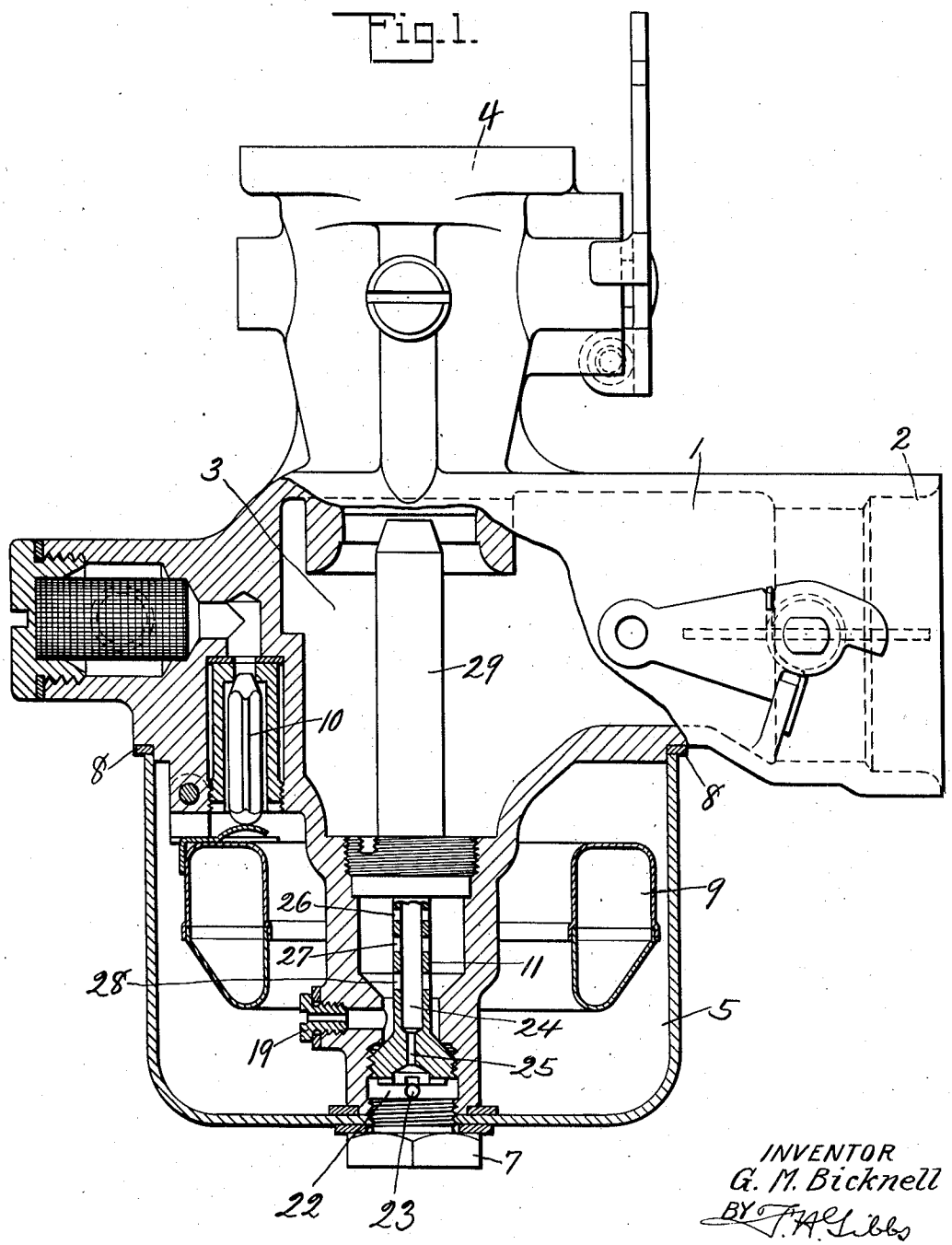
Nov. 10, 1931. G. M. BICKNELL 1,831,056

CARBURETOR

Filed Dec. 17, 1925 6 Sheets-Sheet 1

Fig. 1.



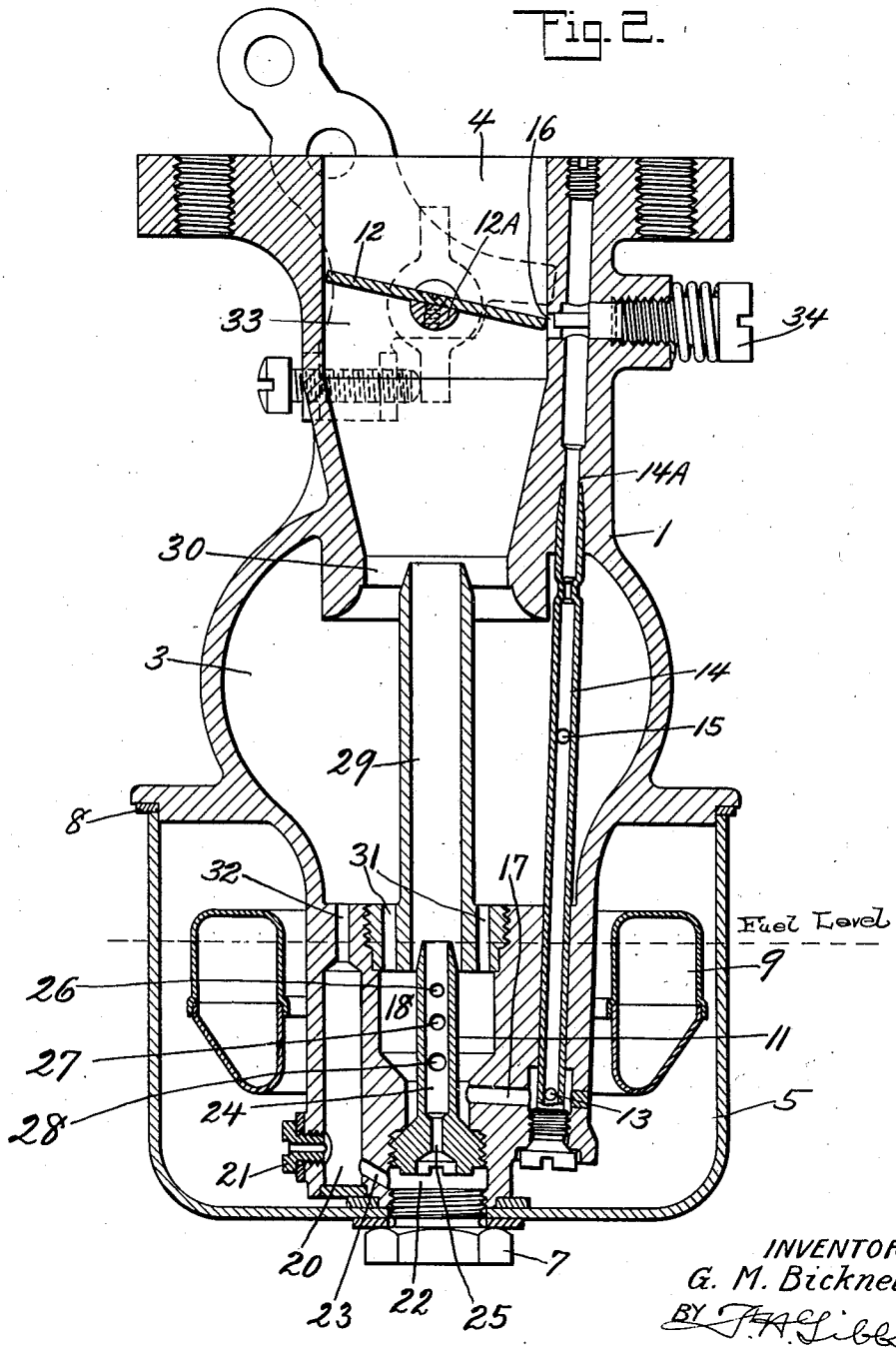

INVENTOR
G. M. Bicknell
BY T. A. Gibbs
ATTORNEY

Nov. 10, 1931. G. M. BICKNELL 1,831,056

CARBURETOR

Filed Dec. 17, 1925 6 Sheets-Sheet 2

Fig. 2.



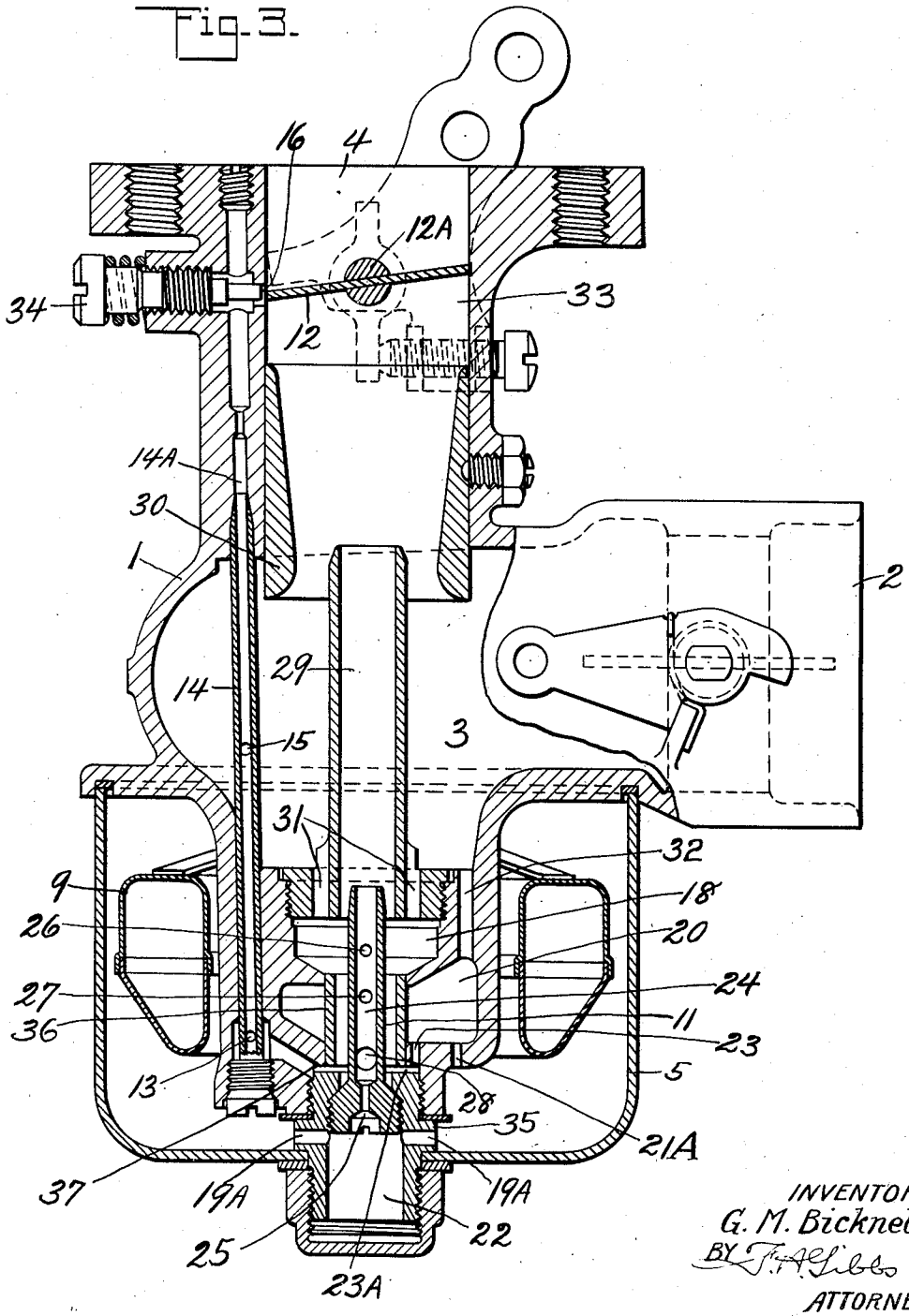

INVENTOR
G. M. Bicknell
BY J. A. Gibbs
ATTORNEY

Nov. 10, 1931. G. M. BICKNELL 1,831,056

CARBURETOR

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Fig. 3.



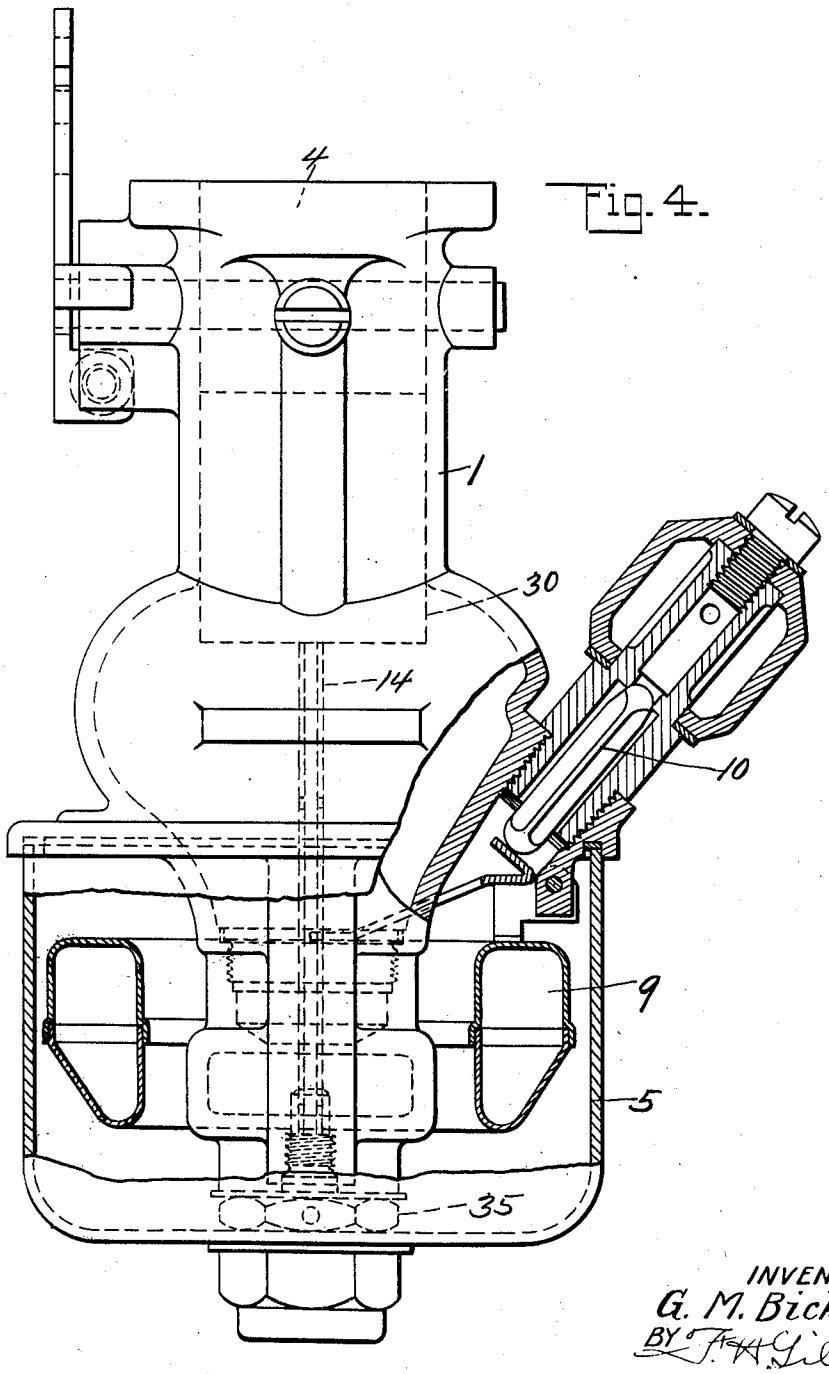

INVENTOR
G. M. Bicknell
BY J. F. Gibbs
ATTORNEY

Nov. 10, 1931. G. M. BICKNELL 1,831,056

CARBURETOR

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Fig. 4.



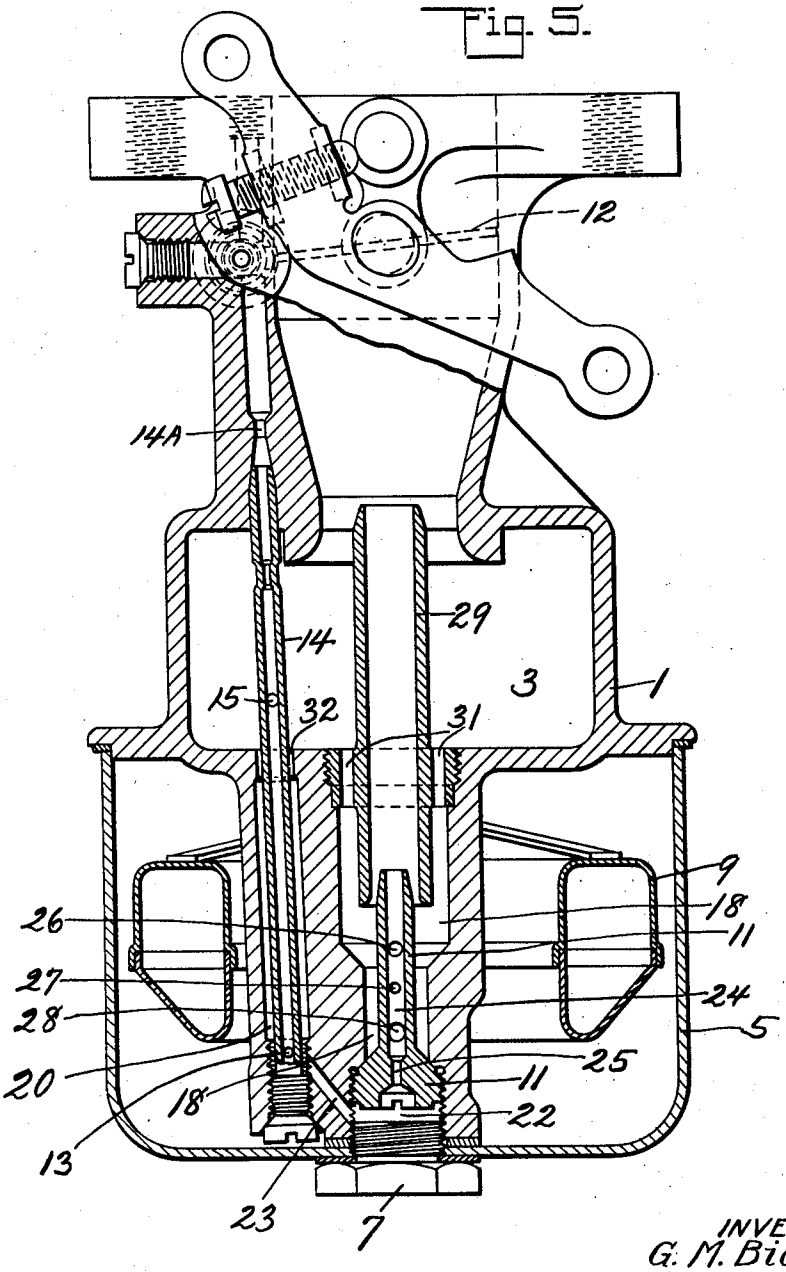

INVENTOR
G. M. Bicknell
BY F. H. Gibbs
ATTORNEY

Nov. 10, 1931. G. M. BICKNELL 1,831,056

CARBURETOR

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Fig. 5.




INVENTOR
G. M. Bicknell
BY J. A. Gibbs
ATTORNEY

Nov. 10, 1931. G. M. BICKNELL 1,831,056

CARBURETOR

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Fig. 7.

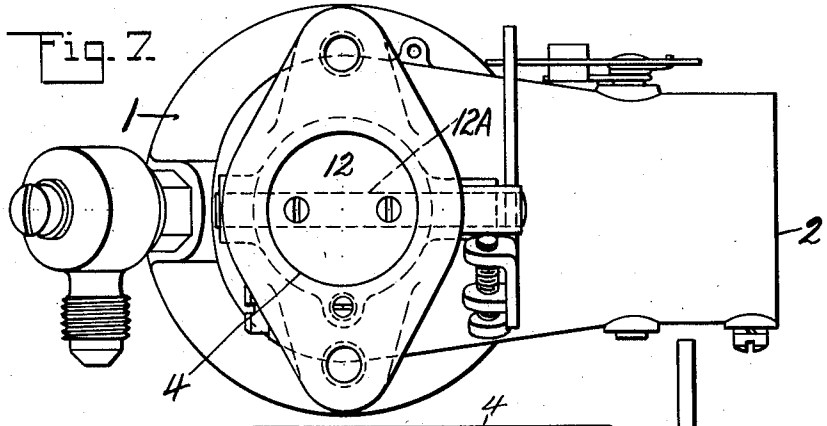
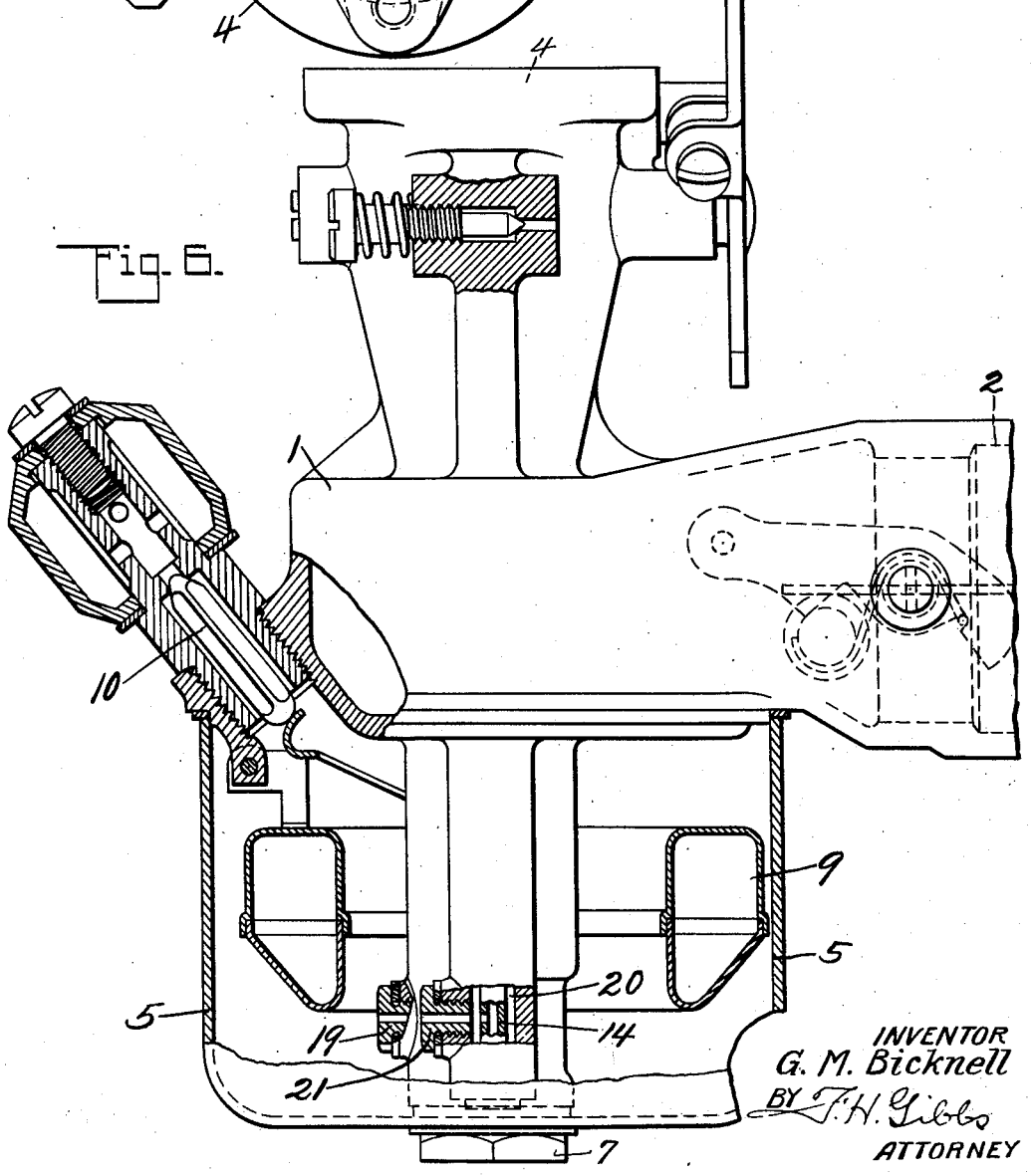



Fig. 6.




INVENTOR
G. M. Bicknell
BY T. H. Gibbs
ATTORNEY

Patented Nov. 10, 1931

1,831,056

# UNITED STATES PATENT OFFICE

GEORGE M. BICKNELL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO CARTER CARBURETOR CORPORATION, OF ST. LOUIS, MISSOURI, A CORPORATION OF DELAWARE

## CARBURETOR

Application filed December 17, 1925. Serial No. 76,108.

Reference is had to the accompanying drawings, which illustrate the preferred form of the invention; though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

In said drawings:

Fig. 1 is a view partly in elevation and partly in vertical section of a carburetor constructed in accordance with this invention;

Fig. 2 is a central vertical section of the carburetor shown in Fig. 1 looking from the left in Fig. 1.

Fig. 3 is a view partly in elevation and partly in central vertical section of a carburetor showing a modified construction of this invention;

Fig. 4 is a view in elevation of the carburetor shown in Fig. 3, looking from the left in that figure, parts being broken away and other parts being shown in section;

Fig. 5 is a view partly in elevation and partly in central vertical section of a carburetor showing a further modification of this invention;

Fig. 6 is a view in elevation of the carburetor shown in Fig. 5, looking from the left in that figure, parts being broken away and other parts shown in section; and

Fig. 7 is a top plan view of the carburetor shown in Fig. 5.

In driving automobiles, one of the greatest difficulties encountered is to get the engine to operate quickly and smoothly on an economical mixture. This is especially true in cold weather and is accomplished in many instances by using a valve or choker in the air passage of the carburetor, so connected that it may be operated from the driver's seat and which, when kept partially closed, restricts the flow of air into the carburetor and causes a heavy or rich mixture to be delivered to the manifold and cylinders. When the engine is cold but running at a constant speed, a relatively lean mixture can be used satisfactorily but as an example, on slowing down for a corner or crossing and then again trying to accelerate or increase the speed of the car, by operating the throttle, if the engine is still cold the lean mixture will often not be sufficient for the acceleration and will cause the engine to miss fire or possibly stall, and the engine may not resume firing evenly until the choker has been operated or some other device operated to cause at least a temporary enrichment of the mixture.

Under the conditions just described, it is often noticed that the engine will fire a few times when the throttle is first opened, then miss on several cylinders and perhaps after this interval, start firing again irregularly or with little power. It is at this period of warming up that the secondary well arrangement hereinafter described, is of great benefit. As an example, when a car is slowed down and the throttle closed to or near the idling position, a considerable quantity of liquid fuel collects on the inside walls of the inlet manifold and passages between the carburetor and the inlet valves. Then when the throttle is suddenly opened this collected moisture is swept into the cylinders by the first sudden inrush of air through the carburetor and manifold. This momentary period of high velocity also starts a rapid flow of fuel through the carburetor nozzle and draws out much of the initial accelerating charge from the main well of the carburetor. Assuming that the engine is pulling a car in high gear and rotating at a relatively low speed, a sudden drop in velocity follows the initial inrush of air as the load on the engine prevents it from gaining speed rapidly, hence much of the initial accelerating charge does not reach the cylinders at once, but drops out of the air stream and becomes surface fuel in the intake manifold and ports. A continued heavy supply of fuel is therefore necessary to insure a sufficient quantity reaching each cylinder to form an explosive mixture. The surface fuel works its way along the surface of the intake passage and eventually reaches the cylinders but far behind the air with which it was fed into the manifold by the carburetor. Once the intake passages are again thoroughly wet, the motor will continue to run evenly and the fuel supply may then be reduced. If a rich mixture is

continued for too long a time, it may cause "loading" due to unequal amounts of liquid fuel reaching the cylinders. "Loading" is very apt to follow excessive use of the carburetor choker. The excessive amount of fuel in relation to the amount of air being admitted, that caused the uneven firing, also washes the lubricating oil off the cylinder walls, causes dilution of the oil in the crank case and other troubles. Therefore, the desirability of having a mixture so proportioned that acceleration may be obtained while the motor is cold, without frequent use of the choker, will be readily apparent, also the desirability of having a much leaner mixture as soon as the acceleration period is over and the car has again attained its normal driving speed.

It is an object of this invention to provide a carburetor that will be economical in operation when used with an internal combustion engine, preferably for propelling an automobile or similar use, and that will supply a heavy mixture for accelerating said engine from a low to a higher speed and a leaner mixture for running the engine at any constant speed. It is also an object of this invention to provide a carburetor that will supply a rich enough mixture to properly accelerate an engine from a low to a higher speed through a considerable range in engine temperature, or before the engine has been thoroughly warmed up, and it is also an object of this invention to provide a carburetor that, when adjusted for a lean or economical mixture will automatically supply a heavier mixture for accelerating the engine without the use of air valves, dash pots, plungers, or other mechanical devices and that can be manufactured at a low cost. Other objects will appear in the course of the following description.

As shown in the drawings, reference being had particularly to Figs. 1 and 2, the carburetor comprises a casing 1 having an air inlet 2 an air chamber 3, a mixture outlet or outlet chamber 4 and a fuel chamber 5 preferably made of pressed sheet metal and attached to the casing by the threaded nut 7 which engages the lower portion of the casing. Suitable gaskets are provided between the casing and fuel chamber and the nut and fuel chamber to prevent leakage at this point. A gasket 8 is also provided at the upper edge of the fuel chamber and between it and the circular groove machined in the carburetor casing to receive this part. Fuel enters the fuel chamber in the usual manner, the fuel level being controlled by the float 9, and fuel intake needle 10, all of these parts being of well known construction and, as they do not form a part of my invention, need no further description here. Nozzle 11 is threaded into the base of the casing forming a tight joint against the machined surface thereof. Idling tube 14 is threaded at its base and forms a fuel tight joint at that point, the tubular portion extending upward through the air passage and entering the reamed tapered passage 14A and forming an air-tight joint at its upper end. The usual type of throttle valve 12, mounted on rotatable shaft 12A, is located in the upper portion of the casing and, when closed, separates the mixing chamber and mixture outlet chamber 4.

The idling mixture can be regulated by the cylindrical end of adjusting screw 34, which is threaded into the casing 1 and positioned to regulate the opening in the upper portion of port 16, as fully described in my Patent No. 1,554,619 dated Sept. 22, 1925. Fuel for idling is supplied through port 13 from horizontal passage 17 which communicates with the main accelerating well 18. The fuel supply for the main well 18 is through a calibrated plug 19 which is threaded into the lower portion of the casing, below the sustained level of fuel in the fuel chamber 5. A suitable gasket is provided between the enlarged end of the plug 19 and casing to prevent fuel leaking into the well 18 around the threads. An auxiliary well 20 is supplied with fuel from the fuel chamber 5 by calibrated plug 21 which is very similar to plug 19, first described. The well 20 communicates with the sump 22 under the nozzle 11 by drilled passage 23 and the fuel enters the nozzle chamber 24 through the restricted opening 25 in the base of the nozzle 11. Drilled into the side of the nozzle 11 and forming passages between the cylindrical nozzle chamber 24 and the well 18 are accelerating ports 26—27—28, the purpose of which will be described later. The stand pipe 29 forming the top of the well is threaded into the casing and extends upwardly into the Venturi tube 30, which is shown as a machined portion of the casing. The stand pipe 29 forms a means of communication between the Venturi tube 30 and the nozzle 11. Holes 31 in the base of the stand pipe 29 form an air passage from the air chamber 3 into the main well 18 and passage 32, in a like manner, forms an air passage between the air chamber 3 and the auxiliary well 20.

In the operation of the device when the engine, to which the carburetor is attached, is shut off the fuel level will be approximately at the top of the nozzle 11. When the motor is idling with the throttle approximately closed or in the idling position, fuel is drawn from the main well 18 through passage 17 and orifice 13 into idling tube 14. Air enters the tube at port 15, commingling with the fuel and passing with it through the drilled passage 14A into mixture outlet chamber 4 through port 16. Fuel being drawn into the idling tube 14 very slightly reduces the fuel level in main well 18 as the feed to the well 18 is by gravity with the throttle in closed

position. As the throttle is opened, more of port 16 is exposed to the suction in the mixture outlet chamber 4 and the fuel level in the well 18 is reduced slightly more, due to the added suction on port 13, causing it to draw additional fuel from the well 18 to compensate for the additional air entering the mixture outlet chamber 4 around the edge of throttle valve 12. This additional flow of air through Venturi tube 30 also sets up a slight suction on the nozzle 11 and a slightly greater opening of the throttle valve 12 will cause a discharge of fuel through nozzle 11 from the main well 18. This discharge will lower the level of fuel in the main well 18 and uncover the top port 26 in the side of the nozzle 11 and air, which enters the well 18 through ports 31, will enter the nozzle chamber 24 through top port 26, emerging from top of nozzle 11 with the fuel and tending to break the fuel up into fine particles.

Air also enters the stand pipe 29 around the top of the nozzle 11 assisting in sweeping the fuel up through the stand pipe into the mixing chamber 33 where it is carried to and by the throttle valve 12 by the main air supply entering the mixing chamber through the venturi 30. The finer portions of fuel unite readily with the main air supply and are carried past the valve 12 into mixture outlet chamber 4 and on into the cylinders. The coarser portions of fuel will strike against the throttle valve 12 and be drawn to its edge where they are again turned into a fine spray as they are drawn over the sharp edge of valve by the air passing at high velocity between the valve 12 and the casing 1. As the throttle is opened further the velocity at the edge of the valve is reduced due to the increased opening but it is increased at the venturi 30 which reduces the feed through port 13 and passage 14A and increases the fuel feed from the nozzle 11 and well 18 in proportion to the increased amount of air entering the venturi 30. This increase in fuel supplied by the nozzle 11 will further lower the level of the fuel in the wells 18 and 20 uncovering additional ports in side of nozzle 11 and, through them, admitting more air into the nozzle chamber 24 causing the fuel being drawn therefrom to be broken up still finer as it enters the stand pipe 29 and mixing chamber 33.

When the throttle is opened enough to require more fuel to maintain a uniform mixture than can be supplied by gravity through the calibrated plugs 19 and 21, the main well 18 will be emptied and a suction applied to the calibrated plug 19 which is communicated to the well 18 by the stand pipe 29. Fuel from the calibrated plug 19 will then enter the bottom accelerating port 28 in the side of the nozzle 11. Also, after a slight interval, the auxiliary well 20 will be emptied and begin to feed a mixture of fuel and air into the nozzle chamber 24 through the opening 25 at the bottom of the nozzle 11. Suction now assists the gravity feed from the float or fuel chamber 5 in supplying the necessary amount of fuel for the desired mixture ratio. However, due to the difference in size between the ven uri 30 and main air opening 2, the reduction of pressure in the main air chamber 3 is always much less than in the mixing chamber 33 and consequently while the reduction of pressure in the air chamber will cause additional fuel to be drawn through the calibrated plugs 19 and 21, as said reduction increases due to motor speed or throttle opening, it remains always much less than the reduction in the mixing chamber 33 above the throat of the venturi 30. There will also be a difference in the rate of flow from calibrated plugs 21 and 19 at the open throttle positions, because the suction applied through stand pipe 29 to well 18 is from the mixing chamber 33 which will cause a more rapid flow of fuel through calibrated plug 19 than will be drawn from calibrated plug 21 as the latter feeds into auxiliary well 20 which is open to the relatively low reduction in the air chamber 3 at 32 and connects with the main well 18 only through the restricted passage 25, in the base of the nozzle 11. Thus the fuel flow through calibrated plug 21 will increase approximately in proportion to the increased reduction of pressure in the air chamber 3, while the flow through calibrated plug 19 will be proportionate to the relatively greater reduction of pressure in the mixing chamber 33. The air openings 31, in the top of well 18, prevent the full suction from venturi 30 from being applied to calibrated plug 19, these holes being of a size to insure the proper rate of fuel flow, proportionate to the air flow in the venturi. It follows, therefore, that the flow of air into the wells and through the nozzle and stand pipe will be proportionate to the flow of air through the main venturi, just as the flow of fuel into the wells will be proportional to the flow of air therethrough.

When the throttle valve 12 is closed to its idling position the low speed or idling tube 14 immediately starts feeding fuel to the motor through port 16 and the wells 18 and 20 quickly fill by gravity to their normal level. While the above describes the action of the carburetor on slowly opening the throttle and at open throttle, it is clear that this action will be repeated after the throttle valve is closed and again opened.

If the engine is idling slowly and the throttle valve is quickly opened, the action is slightly different because the fuel in the main well 18 will be rapidly drawn off through the accelerating ports in the side of the nozzle 11, as they greatly exceed the size of the opening in the calibrated plug 19, and the main well 18 will be quickly emptied. The

fuel stored in the auxiliary well 20, however, cannot be drawn off as quickly as the orifice 25 in the base of the nozzle 11 is more nearly the size of the orifice of the calibrated plug 21 that feeds the auxiliary well 20. The feed from the well 18 to the nozzle chamber 24, therefore, will continue to be rich until the auxiliary well 20 is completely emptied at which time both fuel from the auxiliary well 20 and air which enters the well 20 through passage 32, from the main air chamber 3, will be drawn into the nozzle chamber 24 as previously described, the admission of air reducing the amount of fuel that can pass through the orifice 25 in the base of the nozzle 11 and greatly aiding in atomizing the fuel that does pass through. This air bleed, which causes a leaning out of the mixture may be controlled by varying the size of the orifice 25 in the base of the nozzle 11 and the size of the opening in the calibrated plug 21 which greatly aids in securing the desired mixture characteristics for different types of engines. For example, were orifice 25 very large and the opening in the plug 21 very small the auxiliary well 20 would empty rapidly and the air bleed into the fuel supply occur at a relatively low engine speed but if the proportions of these orifices were reversed with orifice 25 very small and the opening in the plug 21 large the gravity feed through plug 21 would supply the amount of fuel used by orifice 25 for a considerable range of engine speeds and the air bleed would not occur until a relatively high speed had been attained and the suction applied to orifice 25 capable of drawing fuel therethrough in excess of the amount being fed through plug 21 by the combined force of gravity and suction through passage 32 from the air chamber.

In Figs. 3 and 4, a slightly different construction is shown in which fuel enters the nozzle 11 from the float or fuel chamber 5 through passages 19A drilled in a plug 35, which is threaded into the base of the casing 1 and is provided with an opening into which the nozzle 11 is threaded. Passages 19A lead to a sump 22 below port 25 in the nozzle 11. The main well 18 is filled by fuel overflowing from the nozzle chamber 24 through ports 26, 27 and 28 in the side of the nozzle 11 and by fuel entering through the port 23, which connects the auxiliary well 20, with passage 23A at base of the well 18, the passage 23A being formed by the space between the upper portion of the nozzle plug 35 and the bottom 37 of the openings in which the plug 35 is fitted. A cylindrical bushing 36, pressed into an opening in the casing forms a partition between the main and auxiliary wells 18 and 20. Calibrated port 21A supplies fuel direct to the auxiliary well 20 from float or fuel chamber 5.

Air enters the casing at the air opening 2 which leads into the air chamber 3. The Venturi tube 30 extends into air chamber 3 and connects chamber 3 with the mixing chamber 33. Port 32 forms a passage from the air chamber 3 to the auxiliary well 20. The stand pipe 29 is threaded into the casing 1 and forms the top portion of the accelerating well 18 and the holes 31, drilled in the enlarged base of stand pipe, form air passages from air chamber 3 into the well 18. The cylindrical upper portion of the stand pipe extends upward to a point slightly beyond the throat of the main venturi 30 and gives direct communication from the venturi 30 to the well 18 and nozzle 11.

The operation of this device is the same as previously described except that the air bled fuel feed will enter the main well 18 instead of the nozzle chamber 24 and be drawn into the nozzle 11 through the port 28. The air passage 32 and restricted fuel passage 23 prevent the suction in the auxiliary well 20 and on fuel metering port 21A from equalling that in main well 18.

With this construction it can readily be seen that when the throttle 12 is opened rapidly, the sudden increase in suction on the nozzle 11, will quickly drain the main well 18, the fuel being drawn into the nozzle chamber 24 and stand pipe 29 through the side ports 26, 27 and 28 in the nozzle 11 and that fuel will continue to be fed into the well 18 through passage 23 from the auxiliary well 20 for a period of time longer than is required to drain the main well and that a rich accelerating mixture will, therefore, be supplied until the auxiliary well 18 is drained, after which time the lean or normal running mixture will be supplied.

In Figs. 5, 6 and 7, a further modification is shown in which the fuel enters the main well 18 from the fuel chamber 5 through a calibrated plug 19, the main well 18 being in communication with the air chamber 3 through the ports 31 in the base of the stand pipe 29 as in the construction shown in Figs. 1 and 2. Fuel is supplied to the auxiliary well 20 from the fuel chamber 5 through a calibrated plug 21 and the auxiliary well 20 is connected by passage 23 to the sump 22 beneath the nozzle 11, the sump 22 being connected by passage 25 to the nozzle chamber 24 also as shown in Figs. 1 and 2. In this construction, however, the idling tube 14 is mounted in the auxiliary well 20 and the auxiliary well 20 is in communication with the air chamber 3 through a passage 32 which is formed of sufficient size to permit of the insertion of the tube 14 and to leave the proper clearance between the tube 14 and the casing 1 for the passage of air to the chamber 20. The operation of this construction is the same as that shown in Figs. 1 and 2.

The invention has been described in its preferred forms but it will be obvious that

these forms may be varied without departing from the spirit of the invention.

What is claimed is:

1. In a carburetor, a plurality of fuel wells, a fuel supply having independent connections to said wells, a nozzle in one of said wells, and a connection from the other of said wells to said nozzle, said nozzle draining said wells in different time periods.

2. In a carburetor, an air chamber, a plurality of fuel wells, a fuel supply having independent connections to said wells, a nozzle in one of said wells, a connection from the other of said wells to said nozzle, and connections between said wells and air chamber, said nozzle draining said wells in different time periods.

3. In a carburetor, means forming a mixing conduit, a plurality of fuel wells communicating at their upper ends with said conduit, a fuel supply having independent calibrated connections to said wells, and a nozzle having connections of different capacities with said wells, said nozzle draining said wells in different time periods.

4. In a carburetor, a main accelerating well, an auxiliary well, a fuel supply chamber connected to said wells, a nozzle in one of said wells, and connections between said wells and nozzle, said nozzle draining said wells in different time periods and said fuel supply chamber supplying fuel to said nozzle through said wells upon the draining of said wells.

5. In a carburetor, an air chamber, a main accelerating well, an auxiliary well, connections between said wells and air chamber, a fuel supply chamber connected to said wells, a nozzle, and connections between said wells and nozzle, said nozzle draining said wells in different time periods and establishing connections to said air chamber and fuel supply chamber through each of said wells upon the draining of said wells.

6. In a carburetor, an air chamber, a main accelerating well, an auxiliary well, connections between said wells and air chamber, a fuel supply chamber having independent calibrated connections to said wells, a nozzle mounted in said main accelerating well, and connections between said wells and nozzle, said nozzle draining said wells in different time periods.

7. In a carburetor, a main accelerating well, an auxiliary well, a fuel supply chamber having independent connections to said wells, a nozzle mounted in said main accelerating well, and connections between said wells and nozzle, said nozzle draining said main accelerating well more rapidly than said auxiliary well.

8. In a carburetor, a main accelerating well, an auxiliary well, a fuel supply for said wells, a nozzle in said main accelerating well, independent calibrated connections between said fuel supply and wells, and a connection between said nozzle and auxiliary well, said nozzle draining said wells in different time periods.

9. In a carburetor, an air chamber, a plurality of fuel wells having openings to said air chamber, a nozzle having connections to said wells, and a fuel supply having connections to said wells, said fuel supply and air chamber being connected to said nozzle through each of said wells upon the draining of said wells by said nozzle.

10. In a carburetor, a plurality of fuel wells, a fuel supply having independent calibrated connections to said wells, calibrated constantly open connections for conducting air at a pressure varying inversely as a function of the rate of flow through said carburetor to the upper part of each of said wells, a nozzle, and connections of different capacities between said nozzle and said wells whereby said wells may be drained by said nozzle in different time periods.

11. In a carburetor, a plurality of fuel wells, a fuel supply having calibrated connections with said wells, calibrated connections of fixed size for conducting air to said wells, said wells being otherwise sealed against the admission of air, a nozzle, and connections between said nozzle and said wells, the proportion of the volume of said wells to the capacity of said connections being different, whereby said wells may be drained by said nozzle in different time periods.

12. In a carburetor, means forming a mixing conduit, a main accelerating well, an auxiliary well, calibrated air connections between said wells and said conduit, a fuel supply chamber having independent calibrated connections to said wells, a nozzle, and connections between said wells and nozzle of different capacities.

13. In a carburetor, means forming a mixing conduit, a butterfly throttle valve controlling the flow of fuel mixture through said conduit, said valve being mounted on a shaft transverse to said conduit, one side of said valve moving toward the inlet end of said conduit and the other side of the valve moving toward the outlet end of the conduit during the opening movement of the valve, means forming a constant level fuel supply chamber, a branched conduit connected by means of a calibrated orifice to said fuel supply chamber, a first branch of said conduit having one or more discharge outlets adjacent and controlled by the side of the throttle valve which moves toward the inlet end of the mixing conduit during its opening movement, means for admitting air to said first branch anterior to said discharge outlet, said branched conduit having a second branch comprising a main nozzle discharging into said mixing conduit at a point anterior to said throttle valve, said main nozzle hav-

ing a well connected thereto at a point below the normal fuel level in said constant level chamber, said well having a calibrated opening near its upper end for admitting air, the branches of said conduit cooperating to supply a substantially constant ratio of fuel to the air flowing through the mixing conduit during constant speed operation of the carburetor, and said well giving at least a slight additional charge upon acceleration, and a second accelerating device adapted to receive fuel from the supply chamber and to discharge it during acceleration, at least a portion of said discharge occurring subsequent to the discharge of said well, said second accelerating device being constructed and arranged to supply additional fuel, even when the acceleration takes place slowly, and being adapted to operate independently of the suction on the posterior side of the throttle.

14. In a plain tube carburetor, means forming a mixing conduit, means forming a constant level fuel supply chamber, a throttle valve controlling the flow of fuel mixture through said conduit, a low speed supply conduit connected through a calibrated orifice with the constant level chamber, said low speed tube having one or more discharge outlets in the wall of said mixing conduit adjacent said throttle, said port or ports being swept by the edge of said valve during the early stages of its opening movement, said opening movement of the valve uncovering and exposing to the suction above the throttle an increasing area of said port or ports as the opening movement proceeds, the suction in the mixing conduit posterior to the throttle operating to draw fuel from said constant level chamber to supply the low speed requirements of the carburetor, means comprising a chamber mounted below the fuel level and adapted to receive fuel therefrom for supplying accelerating charges to said mixing conduit, said accelerating means operating independently of the degree of suction posterior to the throttle, a main nozzle, a well connected to said nozzle at a point below the fuel level in said constant level chamber, said well having a vent near the upper part thereof, said well and nozzle operating in accordance with the suction in the mixing conduit anterior to the throttle to discharge fuel into the mixing conduit, said well being separate and distinct from said accelerating device.

15. In a carburetor, means forming a mixing conduit, a throttle valve controlling the flow of mixture through said conduit, a suction chamber on the posterior side of said throttle valve, means forming a fuel supply chamber, a low speed conduit leading from said fuel supply chamber and having a discharge outlet in a wall of said mixing conduit adjacent an edge of said valve, a portion of said discharge outlet being constantly in communication with said suction chamber, said valve when in closed position restricting the communication between the discharge outlet and the suction chamber, said valve uncovering said discharge outlet and permitting it to discharge more freely into the suction chamber as the valve is opened, means for admitting air into said supply conduit at a point substantially below said discharge outlet, the walls of said suction chamber being sealed to prevent the admission of air thereto when the throttle is closed, except by means of said discharge port, a main fuel supply nozzle having a plurality of vertically spaced openings therein, means for supplying fuel to said main nozzle and normally maintaining a fuel level therein above said openings, a vented chamber surrounding said nozzle, said vented chamber comprising a primary accelerating device, a secondary accelerating device receiving fuel from said fuel supply chamber and supplying supplementary charges of fuel to said mixing conduit during acceleration, said secondary accelerating device being constructed and arranged to supply at least some additional fuel to the carburetor during the acceleration of the carburetor, irrespective of the rate at which such acceleration is accomplished.

In witness whereof I have hereunto set my hand.

GEORGE M. BICKNELL.