

July 23, 1929.

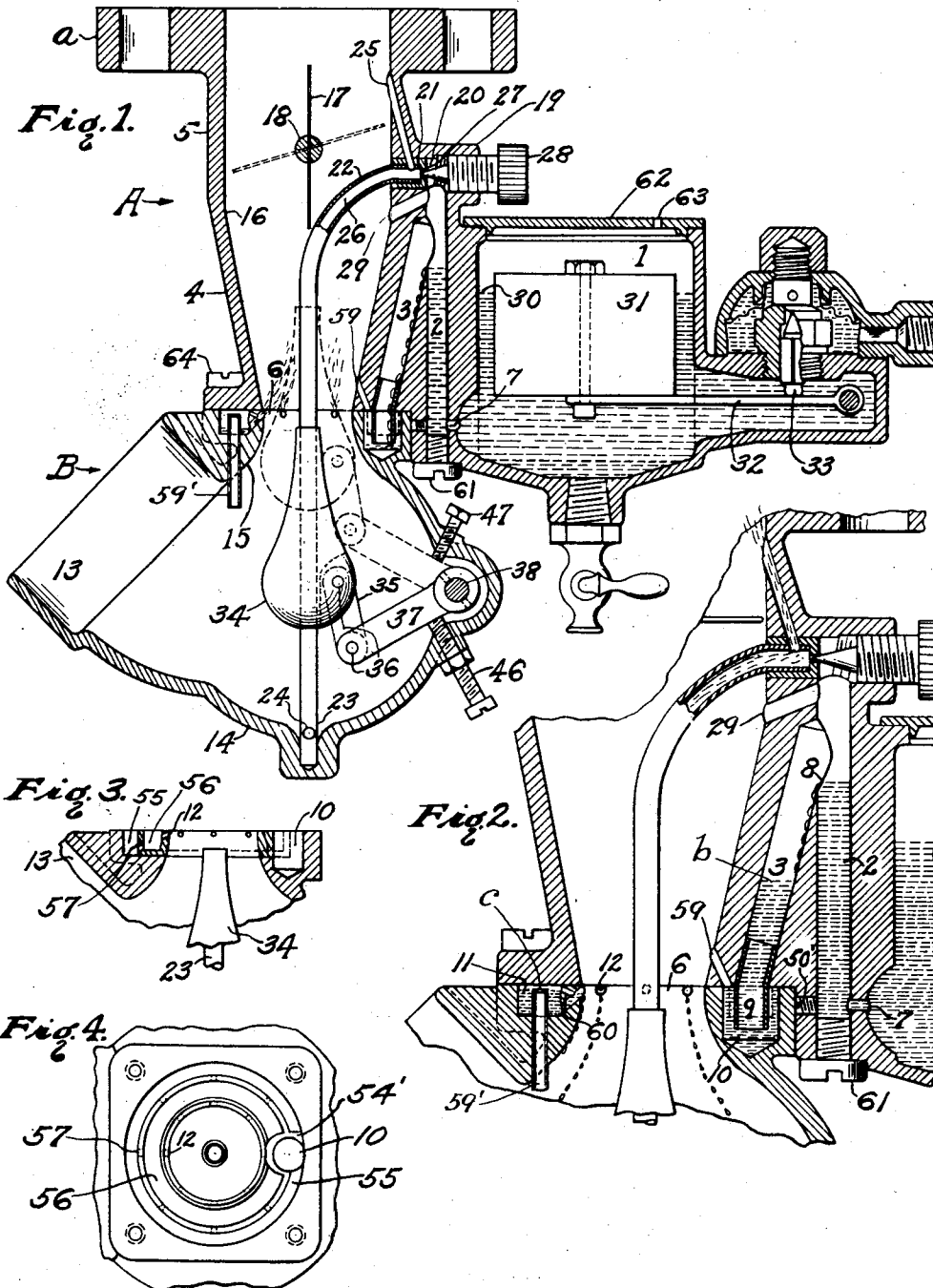
O. H. ENSIGN

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CARBURETOR

Filed April 17, 1922

2 Sheets-Sheet 1



WITNESS
J. R. McDowell

INVENTOR
ORVILLE H. ENSIGN
James R. Townsend
his atty

July 23, 1929.

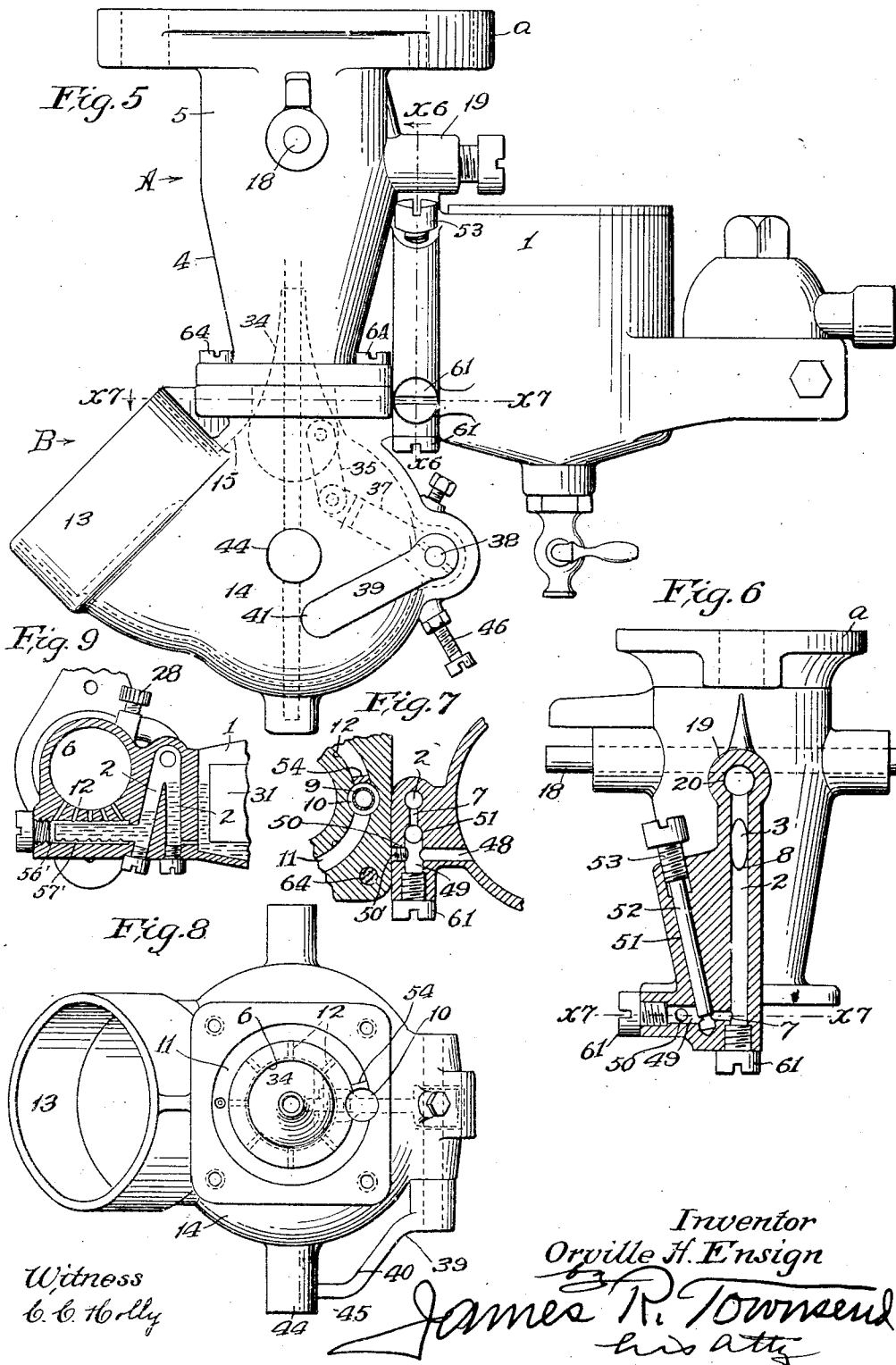
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CARBURETOR

Filed April 17, 1922

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

ORVILLE H. ENSIGN, OF PASADENA, CALIFORNIA, ASSIGNOR TO ENSIGN CARBURETOR COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

CARBURETOR.

Application filed April 17, 1922. Serial No. 554,027.

An object of this invention is to make an improved complete self-contained economical carburetor of moderate cost adapted to produce a more perfect mixture at all speeds.

5 An object is to provide means whereby an internal combustion engine equipped with the Venturi type of carburetor can be started readily in cold or ordinary weather and can immediately be adjusted from a point convenient to the operator to develop smooth and economical operation from idling up to full power and will be free from excessive consumption of fuel at the higher speeds, when set to run smoothly at low or any other speed.

15 An object is to utilize the starting device above referred to as a means for making adjustments of capacity or as a means for making it possible to abandon the adjustment of the metering orifice, and to use this device for adjustment of motor mixture proportions on factory run of equipment.

20 An object is to provide a novel carburetor that is more easily adaptable to different size motors.

25 Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detail description and the appended claims.

30 The invention may be applied in various forms and will be mainly illustrated as applied in a vertical type.

The accompanying drawings illustrate the invention.

35 Figure 1 is a vertical section of a carburetor showing the invention applied in a simple form with parts in full load running position. Dotted lines indicate a starting position.

40 Fig. 2 is an enlarged fragmental detail of the Venturi throat and fuel supply means shown in Fig. 1, with the fuel in the position it takes when in idling operation.

45 Fig. 3 is a fragmental section through the throat of the venturi in Fig. 1, showing a different form of accelerating well from that shown in Fig. 1.

Fig. 4 is a plan of the construction shown in Fig. 3.

50 Fig. 5 is a side elevation of a form of the carburetor showing the parts in engine starting position.

Fig. 6 is a vertical section on line x^6 , Fig. 5, of the upper piece of the carburetor through the fuel adjusting means.

Fig. 7 is a horizontal section on line x^7 , 55 Figs. 5 and 6.

Fig. 8 is a plan view of the lower member of the carburetor showing the accelerating chamber and starting levers.

Fig. 9 is a diagrammatic cross section 60 through the throat of a horizontal venturi indicating delivery of liquid fuel to such throat in accordance with the principles of this invention.

The vertical type of carburetor shown in 65 Figs. 1-8 is of such character that it may be made of two main pieces A, B, and certain necessary auxiliary parts for the purpose of operation and adjustment, and the main pieces are shown joined together at the point of maximum air velocity through the carburetor. The piece A may be a single casting comprising and containing a constant level fuel chamber 1, riser 2 and drop pipe 3; the upper expanding portion 4 of the venturi, a 75 throttle barrel 5 and a flange a by which said piece A may be attached to the manifold of an internal combustion engine, not shown.

Piece B is conveniently made to include the air intake and the accelerating well and 80 the fuel jets for delivering fuel to the venturi.

Located in the wall between the constant level fuel chamber 1 and the expanding portion 4 of the venturi, and extended to the throttle 5, are the various elements which constitute the means for delivery of fuel from 85 the constant level chamber to the throat 6 of the venturi; and in such wall are also located the means for adjustment thereof. The means for delivering fuel to the throat 6 comprises a fuel orifice 7 that delivers fuel to the fuel riser 2 which is adapted to furnish fuel by overflow at 8 into the drop pipe 3 that forms the upper portion of a fuel passage the lower end of which is extended by the tube 9 which 95 forms a seal in a sealing pocket 10 formed in the bottom of a reservoir that in Figs. 1, 2 and 8 is cut in the upper end of piece B and such reservoir is shown as a circular groove that lies in an approximately horizontal 100 plane around the Venturi throat. Said reservoir constitutes a portion of the fuel passage between the overflow 8 and the throat of the venturi where the fuel is ejected or delivered into the main air stream by means of the ports 105 12 opening from the reservoir into said throat around the periphery of the throat.

The piece B is provided with an air intake

13 that opens into the spherical inlet chamber 14, from which a gradual approach 15 extends upwardly to the Venturi throat 6. From this throat 6 the walls of the venturi in piece A gradually expand through the portion 4 joining the throttle barrel 5 at the intersection 16. The throttle barrel is provided with a throttle 17 mounted on a shaft 18.

The piece A is provided with a boss 19 through which a bore 20 extends into the throttle barrel below the throttle. Into the inner end of bore 20 there is fitted a bushing 21 into which is soldered a by-pass idling tube 22 that extends through the center of the Venturi throat and connects to a sump 23 and that is provided therein with a hole 24 for allowing liquid and air to be drawn from the sump into said tube. An upwardly inclined idling fuel passage 25 extends through the walls of the bushing 21 and the tube 22 into the tube, thus providing a passage from the hole 24 at the lower end of the tube 22 through said tube and the inclined passage 25 to the space above the throttle. Said bushing 21 is further provided with a vent 27 which opens from said by-pass tube 22 and the idling jet hole 25 into the bore 20 and thereby communicates with the riser above the overflow, and an adjusting needle valve 28 is provided for regulating the opening through the vent 27.

The fuel riser 2 is extended upwardly to join the bore 20 so that the depression arising at the upper end of the idling fuel passage 25 at idling may be controlled by the valve 28 to apply suitable depression at the top of the riser to supply sufficient fuel for idling, the flow of which is controlled by the valve 28.

The depression arising at 25 is applied to the tube 22 and is bled according to the degree of opening of the valve 28. However, the depression arising during idling at 25 and applied to the hole 24 through the tube 22 is sufficient at any opening of the valve 28 to draw fuel from the sump 23 and deliver the same beyond the throttle from the idling fuel passage 25.

There is also provided an unregulated vent 29 acting as an air bleed and which connects the top of the riser 2 and the throttle barrel underneath the throttle, to modify the depression at the top of the riser, which depression is produced under load by the Venturi throat through the medium of the fuel passage or during idling by the high vacuum above the throttle applied through the inclined passage 25. One function of the by-pass tube 22 is to first pick up any fuel which drops from the fuel jet holes 12 to the sump 23 and to deliver such fuel above the throttle when starting and when idling. One function of the jet 25 is to provide suction at the top of the fuel riser 2 when idling, to lift the fuel from the constant fuel level 30 over the over-flow point 8, which is preferably located

some distance above the constant fuel level 30 to prevent leakage, thus providing means for adjusting the idling mixture of the operating carburetor by utilizing the suction beyond the throttle modified by means of the fixed vent 29 and the adjustable vent 27 for controlling idling mixture.

The constant level fuel chamber 1 is provided with a float 31 connected to a float lever 32 which engages a float valve 33 to control the flow of fuel and to practically maintain the fuel at the constant level 30.

For purposes of starting the engine, and for other uses to be described later, a pear shaped plug 34 concentric with the bore of the throat of the venturi 6, is provided and arranged to slide upon the tube 22. Said plug 34 is connected through the link 35, pins 36, lever arm 37 and shaft 38 to the outside lever 39 where it may be connected to a wire not shown for operating the plug to raise and lower the same to reduce the opening through the throat 6 for purpose of starting and controlling the mixture for a short time after starting a cold motor.

This is brought about by moving the outside lever 39 by such wire which may be extended to a point convenient to the operator. Raising and lowering the lever 39 raises and lowers the plug 34 for the purpose above described.

The inside lever 37 is adapted to engage an adjusting screw 46 for determining the lowest position of the plug 34.

A top screw 47 provides adjustment of the upper position of the plug so that the plug may not close the throat 6. For a predetermined engine and a predetermined work the form in Fig. 1 represents a fixed fuel orifice type of carburetor, but it is generally desired that the fuel orifice be adjustable, as in the form shown in Figs. 5, 6 and 7.

In Figs. 5, 6 and 7 the opening 48 constitutes a connection between the constant level fuel chamber and the approach 49 to the fuel orifice 7 in this type. This orifice 48 is drilled through from a hole 50 which is plugged with a screw 50'.

The approach 49 and the fuel orifice 7 are intersected by the drilled hole 51 into which is fitted the fuel valve 52 operated by screw 53.

In Figs. 1, 2 and 8 the reservoir 11 of the fuel passage is shown as a plain groove cut in the top of the piece B and covered by piece A, and deepened at 10 to form the seal pocket. At one side of the seal pocket 10 is an obstruction or dam 54 inserted in said groove so as to prevent the flow of fuel and air in any but one direction around the groove, thus to make the delivery of air with the fuel through holes 12, progressive.

Figs. 3 and 4 show an alternative form of accelerating chamber in which the fuel passage is extended to surround the Venturi

throat in the form of an outer covered groove 55 into which the fuel is delivered from the seal pocket. This is also obstructed by a dam 54' so that the fuel can flow only one way around the groove. This outer annular groove progressively delivers fuel and air at the bottom into the inner annular groove or reservoir 56 of the fuel passage through the holes 57.

The fuel and air flowing from the seal pocket 10 will flow around the outer groove and through the holes 57; and the air will bubble across the groove 56 to the holes 12 which are opposite the supply holes 57 and surround the plug 34 and discharge from the top of the reservoir into the Venturi throat. Said air will not only carry the fuel from the groove 55 but will carry fuel gradually from the groove 56 so that there is a progressive delivery of fuel through the combination of the grooves 55 and 56, and so that the fuel will be delivered less rapidly than with the form shown in Fig. 1.

In the form of accelerating chamber shown in Figs. 1 and 2 there may be provided an additional air passage 59 extending downwardly from a point slightly above the Venturi throat into the top of the groove 11.

And there may also be provided air vents 60 extending from the top of the reservoir 11 to the discharge end of the jet holes 12, so that air will at all times join the fuel in the holes 12 at the discharge end of said holes and will pass from the holes 12 with the fuel, thus breaking the surface tension and insuring atomization at all air velocities through the venturi, and preventing a too rapid emptying of the accelerating chamber.

Said passages are formed by drilling from the outside of the carburetor casing and the open ends of these passages are closed by plugs 61. The cover 62 to the constant level fuel chamber 1 is provided with air vent 63 to apply atmospheric pressure upon the surface of fuel 30. The machine screws 64 are provided for the attachment of piece A to piece B.

The operation of this carburetor may be described as follows:

With the form shown in Fig. 1, the fuel orifice 7 is of fixed dimensions for equipment at a factory where with accurately built engines it is possible to develop the right size of this fuel orifice 7 for such engines so that satisfactory results will be attained without further adjustment means except for idling.

For miscellaneous use on different engines it is necessary to provide means for making individual adjustments and this is shown in Figs. 5, 6 and 7.

Assuming that the fuel orifice has been properly adjusted for full load operation, and the engine is cranked when cold, the operator will first move the arm 39 upwardly and thereby cause the plug 34 to take the starting posi-

tion shown in dotted lines, Figs. 1 and 5, to cause a high vacuum to be produced above the throat of the venturi which in turn causes the fuel to flow in large quantities through the fuel orifice 7, the riser 2, drop pipe 3, and reservoir 11, and to issue from the jet holes 12 to the main air stream below the constant fuel level 30 at a high velocity and to be thoroughly atomized by the high velocity of air through the opening around the plug 34 in the throat 6 of the venturi, thus forming a rich mixture for starting the engine quickly, even in cold weather. The plug should then be gradually withdrawn as the engine is warmed up and should be left in the position shown in full lines, Fig. 1, during normal operation.

Under load operation the depression at the throat 6 of the venturi, which is the greatest depression below the throttle, will be communicated through the jet holes 12, the reservoir 11, and drop pipe 3 of the fuel passage, to the surface of the fuel in the riser, and such depression will cause the fuel to flow through the fuel orifice 7 and over the top 8 of the riser, and will cause air or mixture to be drawn through the fixed vent 29 and such air and fuel will flow together downwardly through the seal tube 9, and sealing pocket 10, and into the reservoir 11. The air and fuel issuing together through the jet holes 12 into the venturi will atomize the fuel in all loads or velocity of air through the venturi, except for extreme low idling speed.

When the engine is idling the depression at the throat 6 of the venturi is not sufficient to lift the necessary amount of fuel for operating the engine over the difference of elevation between the normal fuel level 30 and the point of overflow 8.

Upon closing the throttle to allow the engine to idle, there is produced a considerable depression above the throttle, generally of the order of eight pounds to the square inch, which causes air to be drawn from the air intake 13 through the hole 24 into the bore 26 of the by-pass tube 22 and thence through the inclined passage 25 which communicates with the throttle barrel beyond the throttle.

With the idling adjustment needle valve 28 open, the suction produced by the depression from beyond the throttle, slightly modified by the flow of air with fuel into the hole 24 at the lower end of the by-pass tube 22, is communicated to the fuel riser above the level of the overflow 8, and such depression in the fuel riser is further modified by the vent 29 and may be adjusted or controlled by adjustment of the needle valve 28.

Although the depression applied in the fuel riser during idling through the inclined idling fuel passage 25 is modified by the hole 24 and the vent 29, the depression from beyond the throttle is very great so that the hole 24 which admits air from the air intake

13 only slightly modifies such depression and serves to admit fuel from the sump 23 into the by-pass tube 22 from which it is delivered to beyond the throttle. Therefore, the fuel admitted into the hole 24 serves to further reduce the modification of the depression in the by-pass tube 22.

Thus it will be seen that the correct portion of the depression from beyond the throttle will be applied in the fuel riser 2 and drop pipe 3, the lower end of which during idling has been sealed as shown in Fig. 2. The vent 29 admitting air to the fuel riser above the level of the overflow therein serves to supply the necessary air to finally lower the depression in the fuel riser 2 and the sealed drop pipe 3 a sufficient amount to cause the depression in such fuel riser 2 and drop pipe 3 to cause the fuel in the riser to be lifted to the overflow point 8 and to also act upon the surface of the fuel in the drop pipe 3 to retain a column of fuel therein which may be subsequently used for accelerating purposes when the throttle is opened and the depression therein removed.

The constant level fuel chamber 1 will hold the fuel level therein at the normal height indicated at 30, and with the carburetor at rest, the fuel will be at the same height in the fuel riser, therefore, in idling or under-load the depression at the top of the fuel riser must be sufficient to create the necessary delivery of fuel through the fuel orifice 7 and also to lift the fuel from the fuel level 30 to and over the point of overflow 8 from whence such fuel flows by gravity through the fuel passage to the holes 12.

By adjustment of the vent 27 with the needle valve 28, a portion of the depression beyond the throttle will be applied to provide the requisite idling fuel and lift it over the overflow point 8. This adjustment, however, also accomplishes another purpose, viz, it provides for the necessary accumulation of fuel in the drop pipe 3 of the fuel passage, and the reservoir 11 for accelerating the engine from the lower speeds to the higher speeds and during idling it will accumulate fuel to fill the reservoir 11 and the drop pipe 3 to a height *b*. This is accomplished because the first fuel flowing over the overflow 8 accumulates in the seal pocket 10 and seals off the end of the seal tube 9 which is below the level of the reservoir 11. Such seal prevents any backward flow of air into the drop pipe 3, and immediately permits a greater depression in the drop pipe 3 and the riser 2, which depression is applied to the fuel orifice 7 and thereby increases the flow of fuel from the supply chamber until the new depression in the drop pipe 3 is balanced by the weight of the column of fuel sustained therein. At this time the reservoir 11 will have been filled and an equilibrium established at the normal idling speed, and fuel continuing to flow

through the orifice 7, riser 2 over the overflow 8 to the top of the fuel at *b* in the drop pipe 3 will displace an equivalent amount through the fuel holes 12, and such displaced fuel will flow down the side of the member B to the sump 23 from which it will be delivered to above the throttle through the idling by-pass 26 and the inclined passage 25.

The height of the column of fuel sustained in the drop pipe 3 constitutes a measure of pressure necessary to furnish the idling fuel through the orifice 7 and to lift such fuel over the overflow point 8.

Means are provided to allow air trapped in the reservoir from the previous full load running position to escape so that the reservoir will be filled with fuel when idling, and such means are shown as the vent 59 leading from the top of the reservoir to some point near the throat of the venturi, or there may be provided a vent open to the atmosphere as shown by atmospheric air pipe 59' which is shown communicating between the atmosphere in the air intake and the top of the reservoir through a small vent *c* in the top of the pipe 59'. The above described vents are for the sole purpose of venting trapped air to permit the reservoir to fill.

As soon as the throttle is opened, the air vent 60 which leads from the top of the reservoir into the jet holes 12 at a level corresponding to that of the lower edge of said holes, will tend to allow any air still remaining at the top of reservoir 11 or which may enter said reservoir in small quantities through the vent 59 or the pipe 59' to escape at jet holes 12 and to immediately break any surface tension at the discharge ends of said holes so that the fuel collected in said reservoir will be ejected in a direction away from the wall of the throat of the venturi at the first acceleration of fuel delivery.

Upon further opening of the throttle, the depression will greatly increase at the throat and draw more fuel in at 7, and more air mixed with some fuel through the air vent 29, and cause the fuel held at the level *b* in the drop pipe 3 to be immediately discharged into the reservoir 11 simultaneously with the beginning of the discharge from the jet holes 12; and when the drop pipe 3 and seal tube 9 have been emptied of solid fuel, the air coming from the fixed vent 29 will flow together with fuel into the reservoir 11. The dam 54 in said reservoir 11 compels the fuel and air to flow in but one direction so that such air will gradually reach the various jet holes, one after the other. As the velocity increases through the throat 6 of the venturi, there will be for any stable speed or velocity through the throat 6, a lesser depression at the vent 29 than there is at the jet holes 12 so that considerable air mixed with some fuel will flow through the vent 29 and then flow with the fuel through the jet holes 12.

The air vents 60 at the top of the reservoir are supplied with air from the fixed vent 59 and provide means whereby any and all air flowing with the fuel will, under any load, be used to atomize the fuel at the jet holes 12. Each vent 60 is equal to or larger than the air vent *c* at the top of the tube 59' so that the vent in tube 59' constitutes only a small factor in the amount of air which flows through the vent 60. Practically all of the air supplied to the vent 60 comes from the fixed vent 29 except such minor portions as may come through the vent 27 from the air intake of the carburetor during load operation.

It is therefore seen that at all times all of the fuel is delivered to the main air stream through one set of fuel jet holes, and that when idling this fuel will fall downward from the jet holes at the throat of the venturi and be picked up by a by-pass and ejected with great atomizing force above the throttle, and during load operation a large volume of air will at all times pass through the jet holes 12 with the fuel and cause violent atomization.

It is further seen that during idling operation a large amount of fuel accumulates in the reservoir 11 and drop pipe 3 and becomes available for adding fuel to the normal fuel flow during an accelerating period, and that the opening of the throttle causes such fuel to be delivered rapidly to the air stream. Use is made of the partially recovered pressure underneath the throttle above the throat of the venturi to cause air to flow into the fuel passage from that point of higher pressure and to circulate again through the throat of the venturi with the fuel emitted from the jet holes 12.

The starting plug 34 may be used not only for starting the carburetor into action and to regulate a richer mixture while the motor is warming up, but by adjusting the same by means of the adjusting screw 46 to a higher position than that shown in full lines in Fig. 1, the area of the opening at the Venturi throat may be changed, to adapt the carburetor for use with a smaller engine than when using the full opening of the Venturi throat, instead of having to change the Venturi throat.

The means shown in Figs. 3 and 4 for accumulation and delivery of fuel for acceleration differs from those shown in Figs. 1, 2 and 8, in that the fuel passage from the drop pipe 3, seal tube 9 and seal pocket 10 is extended by groove 55 surrounding the fuel reservoir 56. In this case when idling, both the extension 55 of the fuel passage, and the reservoir 56 will entirely fill with fuel and upon opening the throttle to accelerate the engine, fuel will be emptied out of the extension through the holes 57 in the same manner as from the reservoir 11, and as the air

from fixed vent 29 reaches the holes 57, the flow of air and fuel across the reservoir 56 from the holes 57 to the jet holes 12 will act as an ejector, and as the engine speeds up under open throttle, will gradually eject all the stored fuel out of the reservoir 56 including that lying between the holes 57 thus furnishing a gradual supply of accelerating fuel with increasing velocity in access of the normal flow.

Fig. 9 illustrates broadly how this invention is applicable to a venturi with a horizontal throat. In this case the riser 2 with the overflow point 8 and the drop pipe 3 is practically the same as in the other figures. The fuel passage is extended by tube 55 and performs a similar function to that of groove 55 in Figs. 3 and 4, and delivers through the supply holes 57' into the reservoir 56' and from such reservoir through the jet holes 12 into the throat 6 of the venturi and in this way operates similar to the construction shown in Figs. 3 and 4.

I have discovered that by providing a pear shaped plug as at 34 it is possible to so control the opening at the Venturi throat that upon starting a cold motor and then adjusting the plug to get a smooth operating condition with a richer mixture than normal, the proportions of such mixture do not vary upon changing from no load operation to full load operation and that I thereby avoid an unsatisfactory variation common to the operation with an ordinary butterfly choke. This is because of smooth stream line flow at the throat of the venturi which has been thus reduced instead of the violent eddies produced by the ordinary starting choke, in fact this starting means acts in a manner as though the size of the venturi had been reduced.

In ordinary conditions the plug can be set to give a little richer mixture and will operate as though the mixture were set by adjusting the screw 52.

I claim:

1. A Venturi type carburetor provided with an air inlet and a mixture outlet; a throttle to control the mixture outlet; a fuel riser; a fuel orifice to admit fuel to the riser; a fuel passage adapted to conduct fuel downward by overflow from the riser to the throat of the venturi and comprising a reservoir adapted to accumulate fuel at closed throttle; a fixed port connecting the venturi above the throat with the riser above the point of fuel overflow; a by-pass extending from the air intake to beyond the throttle and provided with a vent communicating with said riser above the point of fuel overflow; and a valve to control said vent whereby the accumulation of fuel in said reservoir may be controlled.

2. A Venturi type carburetor provided with an air inlet and a mixture outlet; a throttle to control the mixture outlet; a fuel riser; a fuel orifice to admit fuel to the riser;

a fuel passage adapted to conduct fuel downward by overflow from the riser to the throat of the venturi and comprising a reservoir adapted to accumulate fuel at closed throttle; a fixed port connecting the venturi above the throat with the riser; means for applying to the riser above the point of fuel overflow, a modified depression from beyond the throttle; and means for regulating the application of such depression whereby the accumulation of fuel in said reservoir may be controlled.

3. A Venturi type carburetor provided with an air intake; a mixture outlet; a constant level fuel supply chamber; a fuel riser; a fuel orifice connecting said riser and fuel supply chamber; a fuel passage receiving fuel by overflow from said riser and adapted to conduct fuel to the throat of the venturi, said fuel passage being expanded at its lower end to constitute a reservoir surrounding the throat of the venturi; and jet holes leading upward from the bottom of said reservoir and open to the throat of the venturi.

4. A Venturi type carburetor provided with an air intake; a mixture outlet; a constant level fuel supply chamber; a fuel riser; a fuel orifice connecting said riser and fuel supply chamber; a fuel passage receiving fuel by overflow from said riser and adapted to conduct fuel to the throat of the venturi, said fuel passage being expanded at its lower end to constitute a reservoir surrounding the throat of the venturi; jet holes leading upward from the bottom of said reservoir and open to the throat of the venturi; and air vents respectively communicating with the top of the reservoir and with the discharge end of each jet hole.

5. A carburetor having an air inlet; a mixture outlet; and a mixing chamber in the form of a Venturi tube; a throttle in the mixture outlet; a constant level fuel chamber; a suction chamber; a riser opening into said suction chamber and supplied with fuel from said constant level fuel chamber; a drop-pipe receiving fuel by overflow from said riser and discharging said fuel into the main air stream adjacent the Venturi throat; means for admitting the depression above the throttle to the suction chamber; and means for admitting the depression underneath the throttle direct into the suction chamber to modify the depression admitted to the suction chamber from above the throttle.

6. A Venturi type carburetor provided with a Venturi throat and a fuel riser; a fuel orifice to admit fuel to said riser, and a drop-pipe to conduct fuel downward by gravity from said riser to said Venturi throat; and means whereby fuel may be drawn through the fuel orifice over the top of the fuel riser under the depression imposed by the air velocity through the venturi as applied at the throat of the venturi, modified by the depression immediately under the throttle during

certain phases of engine operation, and by regulated depression from above the throttle during other phases of engine operation.

7. A Venturi type carburetor provided with a Venturi throat and throttle and a fuel riser, means to supply fuel to the riser, a drop-pipe into which fuel overflows from the riser; means to apply a depression in the riser and drop-pipe; a reservoir surrounding the venturi throat and into which fuel from the drop-pipe may accumulate during idling, means connecting said reservoir with the venturi throat; and means whereby the fuel accumulated in said reservoir will be delivered to the Venturi throat upon opening the throttle.

8. A carburetor having a Venturi tube, a throttle and a constant level fuel chamber, a fuel passage, a fuel orifice to admit fuel to said fuel passage from said fuel chamber, said fuel passage being provided with a reservoir and also extended to surround the Venturi tube, said reservoir being provided with supply holes opening from said extended portion at the bottom thereof and arranged to fill the reservoir, said reservoir being provided at its top opposite said supply holes with jet holes discharging into the Venturi tube from the top of the reservoir, so that upon opening the throttle, such extension will be emptied through the reservoir in such a manner as to gradually empty the extension.

9. A Venturi type carburetor provided with a reservoir around the Venturi throat and communicating with the throat through jet holes extending upwardly from the bottom of the reservoir to a point level with the top thereof where they communicate with the Venturi throat below the normal fuel level, said reservoir constituting a portion of a fuel passage supplied with fuel through overflow from a fuel riser and with air from the expanding portion of the venturi underneath the throttle.

10. A Venturi type carburetor provided with a reservoir in an approximately horizontal plane around the Venturi throat and communicating with the throat through jet holes extending upwardly from the bottom of the reservoir to a point level with the top thereof where they communicate with the Venturi throat below the normal fuel level, said reservoir constituting a portion of a fuel passage supplied with fuel through overflow from a fuel riser and with air from the expanding portion of the venturi underneath the throttle, said reservoir being so adapted and arranged that fuel and air will flow in but one direction along the same.

11. A Venturi type carburetor provided with a reservoir around the Venturi throat and communicating with the throat through jet holes extending upwardly from the bottom of the reservoir to a point level with the top thereof where they communicate with

the Venturi throat, said reservoir constituting a portion of a fuel passage supplied with fuel through overflow from a fuel riser and with air from the expanding portion of the venturi underneath the throttle; said reservoir being provided with means to form a seal pocket where the reservoir receives fuel.

12. A Venturi type carburetor having a fuel riser; means to supply fuel to said riser; an annular reservoir surrounding the throat of the venturi; jet holes connecting said reservoir to the main air stream at the throat of the venturi; a sealing pocket in the reservoir; and a drop-pipe communicating at its upper end with said fuel riser and having its lower end extended into said sealing pocket.

13. A carburetor having a Venturi tube; an air inlet and a mixture outlet; a constant level fuel supply chamber; a fuel passage adapted to deliver fuel from said fuel supply chamber to the main air stream at the Venturi throat and comprising a reservoir; and means in said reservoir to form a seal pocket where the reservoir receives fuel.

14. A Venturi type carburetor provided with a fuel passage for delivering fuel to the main air stream at the Venturi throat under all conditions of operation; and provided with idling adjusting means comprising an idling by-pass adapted and arranged to deliver fuel, after such fuel has been delivered to the main air stream, to beyond the throttle, said by-pass tube being fitted with an adjustable vent open to said fuel passage.

15. A carburetor provided with a Venturi tube, a throttle and an air intake; a fuel passage adapted to deliver fuel to the main air stream at the Venturi throat; a sump in the air intake adapted to accumulate fuel from the fuel passage; and a by-pass open to said fuel passage intermediate its ends and adapted to deliver fuel accumulated in said sump to beyond the throttle.

16. A Venturi type carburetor provided with a throttle barrel, a throttle and a fuel passage adapted to conduct fuel to the main air stream at the throat of the venturi; a fixed port communicating between said fuel pas-

sage and the throttle barrel below the throttle; a valve controlled vent extending from beyond the throttle to said fuel passage; a reservoir arranged to accumulate fuel from said fuel passage under control of the valved vent at closed throttle; upwardly extending jet holes communicating from the bottom of said reservoir to the throat of the venturi so as to empty the reservoir under suction, and a vent communicating between the top of the reservoir and the atmosphere to prevent trapping of air in said reservoir.

17. A Venturi type carburetor provided with a throttle bore, a throttle and a fuel passage adapted to conduct fuel to the main air stream at the throat of the venturi; a fixed port communicating between said fuel passage and the throttle barrel below the throttle; a valve controlled vent extending from beyond the throttle to said fuel passage; a reservoir arranged to accumulate fuel from said fuel passage under control of the valved vent at closed throttle; upwardly extending jet holes communicating from the bottom of said reservoir to the throat of the venturi so as to empty the reservoir under suction, and a vent communicating between the top of the reservoir and the venturi.

18. A Venturi type carburetor provided with a throttle bore, a throttle and a fuel passage adapted to conduct fuel to the main air stream at the throat of the venturi; a fixed port communicating between said fuel passage and the throttle barrel below the throttle; a valve controlled vent extending from beyond the throttle to said fuel passage; a reservoir arranged to accumulate fuel from said fuel passage under control of the valved vent at closed throttle; upwardly extending jet holes communicating from the bottom of said reservoir to the throat of the venturi so as to empty the reservoir under suction, a vent communicating between the top of the reservoir and the atmosphere; and a vent communicating between the top of the reservoir and the venturi.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 8th day of April, 1922.

ORVILLE H. ENSIGN.