July 20, 1943. H. L. McCURDY 2,325,010

CARBURETOR

Filed June 14, 1941 2 Sheets-Sheet 1

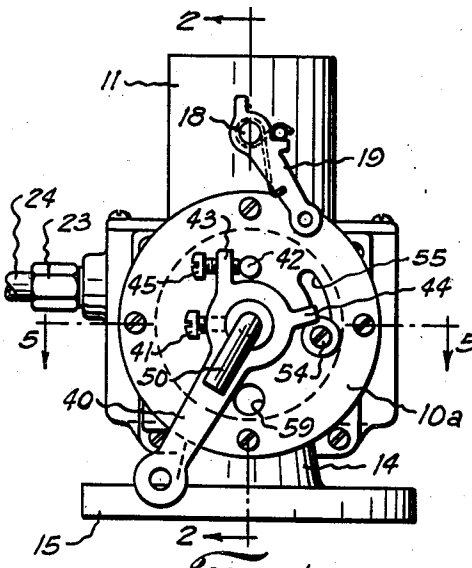


Fig. 1.

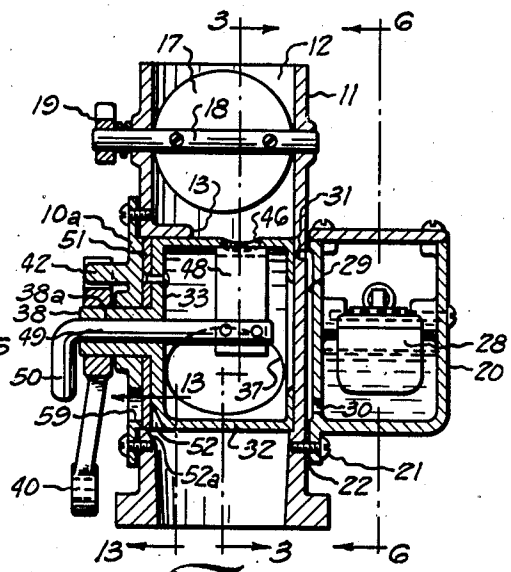


Fig. 2.

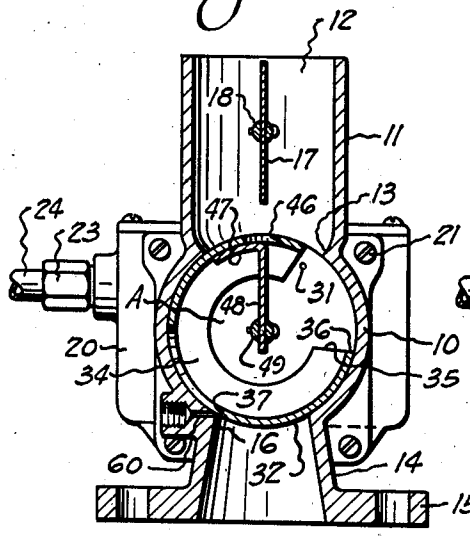


Fig. 3.

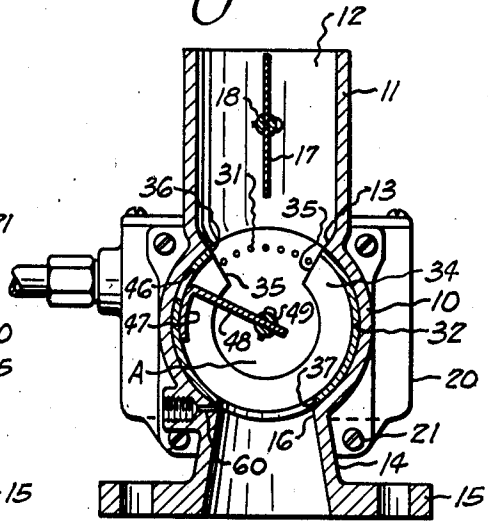


Fig. 4.

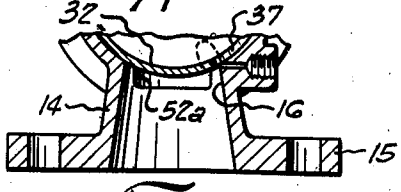


Fig. 13.

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CARBURETOR

Filed June 14, 1941 2 Sheets-Sheet 2

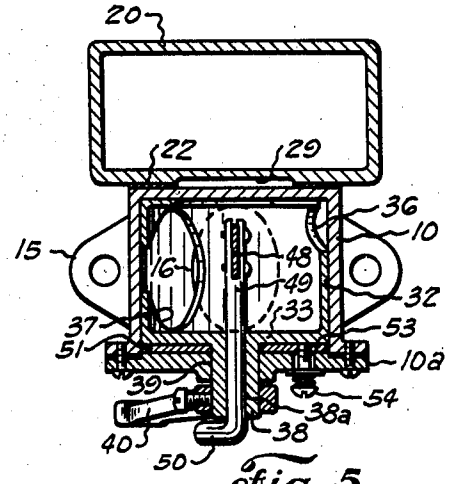


Fig. 5.

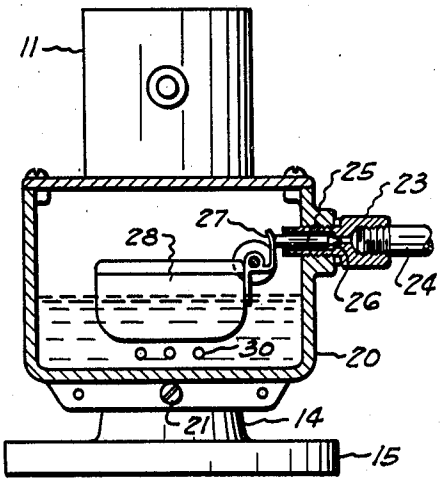


Fig. 6.

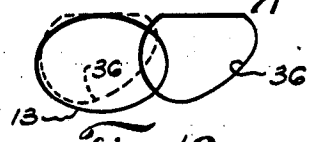


Fig. 12.

Fig. 7.

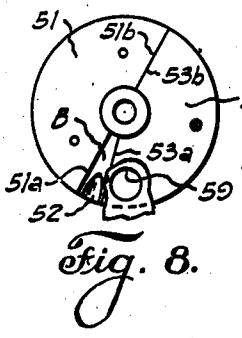


Fig. 8.

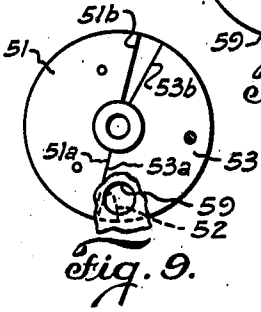


Fig. 9.

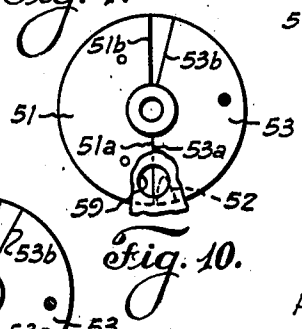


Fig. 10.

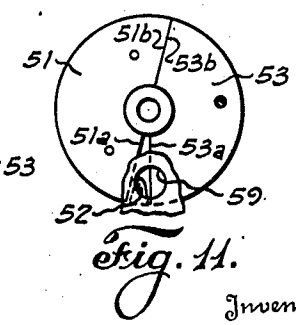


Fig. 11.

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APPARATUS.
41

Patented July 20, 1943

2,325,010

UNITED STATES PATENT OFFICE

2,325,010

CARBURETOR

Horace L. McCurdy, Keene, Tex., assignor to William E. Abbas, Cleburne, Tex.

Application June 14, 1941, Serial No. 398,126

8 Claims. (Cl. 261—41)

This invention relates to new and useful improvements in carburetors.

One object of the invention is to provide an improved gasoline carburetor which is constructed so as to vary the fuel-air mixture proportionately to the load, whereby maximum power and economy is obtained.

An important object of the invention is to provide an improved carburetor which is arranged to positively control the volume of admitted gasoline and also the volume of admitted air, whereby the engine suction alone is not depended upon to control the volume of fuel and air admitted, with the result that a proper mixture is provided under all engine speeds.

Another object of the invention is to provide an improved carburetor having a variable opening in the air inlet to the mixing chamber, together with a variable throttle opening for controlling the flow of the fuel-air mixture from the mixing chamber to the engine, said openings co-acting with each other and functioning to control, within certain limits, the suction within the mixing chamber, whereby the fuel-air mixture is varied and controlled proportionately and in accordance with conditions under which the engine is operating.

A further object of the invention is to provide an improved carburetor, of the character described, wherein the area of the throttle opening is less than the area of the air inlet opening when the engine suction is relatively high, and is greater than the area of the air inlet opening when the engine suction is relatively low; both the throttle and air inlet openings being variable and co-acting with each other at all positions so that a predetermined varying relationship is had between the openings in accordance with the load under which the engine is operating.

Still another object of the invention is to provide an improved carburetor wherein the admission of gasoline and air is controlled simultaneously, such admission being primarily controlled by varying or changing the area of the admission opening, whereby a variation of the volume of the fuel and air entering the mixing chamber is had.

A further object of the invention is to provide an improved carburetor, having means for admitting the gasoline in such manner as to substantially completely atomize said gasoline to assure efficient combustion without the necessity of employing preheating means for preheating the gasoline to produce complete atomization.

Still another object of the invention is to provide an improved carburetor having means for automatically enriching the mixture upon acceleration and for leaning the mixture upon deceleration and also under ordinary operating conditions of the engine, whereby more efficient engine operation with maximum economy is produced; the result being obtained not only by varying the air volume but also by varying the volume of fuel and the arrangement eliminating the necessity of employing a booster or acceleration pump, or other auxiliary device.

A particular object of the invention is to provide a carburetor, of the character described, having a single rotatable element for controlling the variable air inlet opening and also the variable throttle opening, said element controlling the gas inlet orifices, which element requires no adjustment after its initial assembly; the device also including an auxiliary variable air admitting opening for idling speeds.

Another object of the invention is to provide a device, of the character described, having co-acting air admitting openings which function to gradually increase or decrease the admitted air, whereby extreme sudden changes in the mixture are obviated.

The construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, as an example of the invention is shown, and wherein:

Figure 1 is an elevation of a carburetor, constructed in accordance with the invention,

Figure 2 is a transverse, vertical sectional view, taken on the line 2—2 of Figure 1,

Figure 3 is a transverse, vertical sectional view, taken on the line 3—3 of Figure 2 and illustrating the rotatable control element in a closed, or idling position,

Figure 4 is a view, similar to Figure 3, with the control element moved to an open position,

Figure 5 is a horizontal, cross-sectional view, taken on the line 5—5 of Figure 1,

Figure 6 is a transverse, vertical sectional view through the float chamber and taken on the line 6—6 of Figure 2,

Figure 7 is an isometric view of the rotatable control element and its associate parts, the various parts being separated to more clearly illustrate the same,

Figures 8 to 11 are schematic views, illustrat-

ing the action of the co-acting plates which function to enrich the mixture upon acceleration,

Figure 12 is a schematic view showing the co-action between the air admitting opening in the control element and the air inlet, which parts provide the variable Venturi opening, and

Figure 13 is a vertical, sectional view, taken on the line 13—13 of Figure 2.

In the drawings, the numeral 10 designates a casing or body which is substantially cylindrical in cross-section (Figures 3 and 4) and which is constructed of metal, or other suitable material. The body has one end closed and its opposite end open and the open end is closed by a suitable flanged cover plate 10a which is fastened to a flange formed on the body by suitable screws. An upwardly extending sleeve or collar 11 is preferably made integral with the casing 10 and has its upper end open to provide an air inlet 12. The inner end of the air inlet 12 communicates with the interior of the cylindrical casing 10 through an elliptical shaped opening 13. A depending base 14 which is formed with an annular base flange 15 is preferably made integral with the casing or body 10. As is clearly shown in Figures 2 and 3, the bore of the base 14 is substantially elliptical at 16, adjacent its intersection with the casing or body 10. It is pointed out that the longitudinal axis of the elliptical opening 16 in the base is disposed at a right angle to the longitudinal axis of the opening 13 which establishes communication between the air inlet 12 and the interior of the casing or body 10.

The usual butterfly valve or choke 17 is mounted within the sleeve 11 on a transversely extending shaft 18 and this butterfly is adapted to control the admission of air through the inlet 12. One end of the shaft 18 extends outwardly through the sleeve and has an actuating arm 19 secured thereto, whereby the butterfly may be manually controlled through a cable (not shown) or by other suitable manually operated means. It will be evident that when the butterfly is open, air may pass into the inlet 12 and then through the opening 13 into the interior of the cylindrical casing or body 10, and then downwardly through the opening 16 and through the bore of the base 14. The flange 15 of the base is secured to the intake manifold (not shown) of an internal combustion engine, whereby the admitted air may pass to the engine in the usual manner.

A fuel receiving bowl or container 20 is secured to one side of the casing or body, being fastened to the exterior wall thereof by suitable screw 21. A packing gasket 22 is interposed between the bowl and the casing or body. A connecting nipple 23 is threaded through an opening in the upper portion of one wall of the bowl and this nipple is adapted to be connected to a fuel supply line 24. A valve 25 is slidably mounted within the bore of the nipple and is arranged to engage a valve seat 26 formed therein. The valve 25 is engaged by an angular arm 27 which is connected with a pivoted float 28 and obviously, as the float rises and falls within the bowl in accordance with the liquid level therein, the valve 25 is moved toward and away from its valve seat. Fuel, such as gasoline, passing through the inlet line 24 may flow past the valve 25 when the same is unseated and into the bowl 20. When the level of this fuel rises to a predetermined point within the bowl, the float 28 is lifted to close the valve 25 and prevent further admittance of fuel into the bowl until such time as the liquid level within said bowl again falls.

A channel or recess 29 is formed in the exterior wall of the bowl 20, which wall is adjacent to or abutting the exterior wall of the casing or body 10 and this channel or recess provides a vertical flow passage between the bowl and the body or casing. The lower end of this passageway communicates with the interior of the bowl through a plurality of openings or ports 30 which extend through the wall of the bowl. With this arrangement, the liquid fuel from within the bowl may flow through the ports 30 and upwardly through the passage 29. The upper end of the passage is in direct communication with a plurality of fuel admitting orifices 31, which extend through the wall of the body or casing 10. As is clearly shown in Figure 4, the orifices are disposed on an arc which is swung on a radius from the center of the cylindrical casing or body 10 and these orifices are relatively fine or small. When the engine to which the device is attached is operating, the suction of said engine acts through the orifices 31 to draw fuel or gasoline from the bowl, upwardly through the passage 29 and then outwardly through the reduced orifices 31. Since the orifices are very fine, the liquid fuel drawn therethrough is sprayed within the interior of the casing 10, whereby substantially complete atomization of the liquid fuel is accomplished. Obviously, the fuel which enters the casing 10 through the orifices 31 admixes with the air which is flowing downwardly through the casing to admix therewith and provide the combustible mixture for operating the engine.

For controlling the admission of air and fuel into the interior of the casing 10 which forms a mixing chamber and subsequently into the engine, a cylindrical control element or sleeve 32 is rotatably mounted within the casing or body 10, as is clearly shown in Figures 3 and 4. The control element or sleeve has one end closed by an end plate 33, while its other end is open, this open end being formed with an inwardly directed, annular flange 34. The flange 34 is adapted to abut the end wall of the casing or body 10 in which the orifices 31 are located, whereby when the sleeve 32 is rotated within the casing, the flange is arranged to move over these openings to cover and uncover the same. A portion of the flange 34 is cut away as illustrated at 35 and when the cut out portion of the flange is in the position shown in Figure 4, all of the orifices 31 are open. Above the cut out portion 35 of the flange, the wall of the control sleeve 32 is formed with an air admitting opening 36 which is adapted to move into and out of registration with the elliptical shaped opening 13 of the air inlet as the sleeve is rotated. The opening 36 has a general elliptical shape, but is wider at one end, as is clearly shown in Figure 12. Upon initial registration with the opening 13 of the inlet, the wider portion of the opening 36 is in registration and upon continued movement of the sleeve the remainder of said opening moves into registration. Obviously, the opening 36 controls the admittance of air into the mixing chamber A formed within the casing or body and forms a variable air-admitting opening, said opening co-acting with the openings 13 to provide a valve.

When the sleeve 32 is in the position shown in Figure 3, the wide portion of the opening 36 in the sleeve is in registration with the opening 13, whereby only a relatively small volume of air may flow from the inlet and into the mixing

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chamber A of the casing; however, when the sleeve 32 is rotated in a counter-clockwise direction in Figure 4, to the position shown in this figure, the opening 36 in the sleeve is in substantially complete registration with the opening 13 of the air inlet, whereby a maximum volume of air may enter the mixing chamber A of the casing. Since the opening 36 is adjacent or immediately above the cut out portion 35 of the flange 34, it will be evident that as the sleeve 32 is rotated to increase the air supply, the flange 34 functions to uncover an increased number of the fuel inlet orifices 31.

Diametrically opposite the opening 36 in the sleeve 32, said sleeve is provided with an opening 37 and this opening is adapted to co-act with the elliptical shaped opening 16 in the base member 14. The opening 37 has substantially the same shape as the opening 16, and as the sleeve 32 is rotated, said opening registers with the opening 16 to control the flow of the fuel-air mixture from the mixing chamber A to the outlet. The co-acting openings 37 and 16 provide a variable throttle opening.

It is pointed out that when the sleeve 32 is in the position shown in Figure 3, the area of the throttle opening 37 is less than the area of the air admitting opening 36, whereby a restriction occurs at the throttle opening, with the result that the suction within the mixing chamber is reduced adjacent the fuel inlet orifices 31. As the sleeve is rotated in a counter-clockwise direction, the effective areas of both openings are increased because the openings 36 and 37 move into greater registration with the openings 13 and 16, respectively, but since the opening 36 is reduced toward one end and is not a true ellipse, as is the opening 37, it will be evident that when the parts are as shown in Figure 4, the throttle opening is of greater area than the air admitting opening, through which air enters the chamber A. This change occurs gradually as the sleeve is rotated and at wide open throttle the restriction of air is at the air admitting opening, whereby the suction adjacent the fuel inlet orifices 31 is increased. Thus, under relatively light loads when the suction is relatively high, the restriction is at the throttle opening but as the load increases, and the suction is proportionately reduced, the restriction is shifted to the air admitting opening. In this manner, the suction at the fuel inlet orifices 31 is controlled in accordance with load conditions to vary the fuel-air mixture proportionately to such conditions and maximum power and economy is obtained.

From the foregoing, it will be seen that the single, rotatable sleeve 32 controls the air volume and also controls the fuel volume admitted into the casing or body 10. As the air supply is increased due to a counter-clockwise rotation of the element 32 from the position shown in Figure 3, the volume of fuel which may be admitted is also increased because the number of inlet orifices 31 which are uncovered by the flange 34 are proportionately increased. Therefore, a positive control of both the air and fuel, in addition to the control of the suction within the mixing chamber, as described, is effected by the rotation of the sleeve 32.

The rotatable sleeve 32 is mounted upon a stub shaft 38 which is preferably made integral with the closed end 33 of said sleeve and which extends outwardly to an opening 39 provided in a cover plate 10a which closes the open end of the casing 10. An actuating arm 40 is secured to the extending end of the stub shaft 38 by means of a set screw 41 and manifestly, when the arm is swung, the stub shaft is rotated to impart rotation to the sleeve 32. The rotation of the sleeve 32 is limited by means of an outwardly directed stop pin 42 which is formed on the cover plate 10a and which is disposed between radial lugs 43 and 44 which are formed integral with the actuating arm 40. The lug 43 is provided with an adjustable screw 45 which is adapted to abut the stop pin 42 to limit the travel of the sleeve toward a closing position. Obviously, counter-clockwise rotation of the sleeve is limited by the engagement of the lug 44 with the stop pin 42.

For providing an adjustable air inlet for idling speeds, the sleeve 32 is formed with an air inlet port 46 which extends through the wall thereof and which is arranged to move into registration with the opening 13 of the air inlet when the parts are in the position shown in Figure 3. An adjustable slide valve element 47 is adapted to cover and uncover the port 46 and this element is provided with a radially extending shank 48 which is fastened to a rotatable shaft 49. The shaft 49 is disposed axially of the control sleeve 32 and the casing 10 and has its outer end projecting through an axial bore 38a formed in the stub shaft. The extreme outer end of the shaft 49 is bent radially to provide a handle 50. The shaft has a tight fit within the bore 38a of the stub shaft 38, whereby when said shaft is rotated, it will be frictionally held in its various adjusted positions. If desired, a set screw or other positive fastening means (not shown) could be mounted in the stub shaft 38 for engaging the shaft 49 and locking it in adjusted positions. It is evident that when the shaft 49 is rotated, movement is imparted to the valve element 47 to move said element with respect to the opening 46 to cover or uncover this opening. By properly adjusting the valve element 47, the volume of air entering the interior of the casing or body 10 through the opening 46 which air is in addition to that entering the chamber through the partially uncovered opening 36, may be accurately adjusted, whereby an efficient idling mixture is had.

For automatically enriching the fuel and air mixture upon a sudden acceleration, that is, upon a sudden movement of the control sleeve 32 in a counter-clockwise direction, and also for leaning the mixture upon clockwise rotation thereof, the closed end 33 of the control sleeve 32 is provided with a semi-circular plate 51 which is riveted or otherwise secured to the end of said sleeve. A triangular shaped recess 52 is formed in the marginal portion of the end 33 of the sleeve being located outside of the marginal edge of the plate 51, and is disposed opposite a recess 52a which is formed in the wall of the base 14 adjacent the outlet opening 16 (Figure 13), whereby a flow from the recess 52 into the base may occur. The fixed plate 51 which, of course, rotates with the valve element 32 is adapted to co-act with a second plate 53 which is confined between the control element 32 and the cover plate 10a of the casing 10. The plate 53 is less than a semi-circle, whereby when the same is placed in abutting relation to the end 33 of the sleeve, one of its marginal edges 53a is spaced from the edge of the plate 51 so as to provide a space B therebetween. The plate 53 floats between the end 33 of the sleeve 32 and the rear surface of the cover plate 10a and is frictionally connected with the cover plate by means of a

screw 54 which passes through a slot 55 in the cover plate and is threaded into an opening 56 in the plate 53. A washer 57 surrounds the screw 54 and a spring 58 is confined between the washer and the screw head and exerts its pressure to constantly urge the plate 53 against the inner surface of the cover plate 10a. Manifestly, the spring maintains a frictional engagement between the cover plate and the plate 53 so that under certain conditions, as will be hereinafter explained, the sleeve 32 may be moved a predetermined limited distance relative to the floating plate 53. The plates 51 and 53 and the recess 52 are adapted to co-act with an air inlet port 59 which extends through the cover plate 10a.

The operation of the plates 51 and 53 and their co-action with the port 59 in the cover plate 10a, as well as their co-action with the air inlet recess 52 in the end wall of the control element 32, is clearly illustrated in Figures 8 to 11.

Figure 8 illustrates the parts in position during idling of the engine, while Figure 9 shows the engagement of the edges 51a and 53a of the plates, which engagement occurs after a predetermined initial rotation of the sleeve 32 in a counter-clockwise direction. Figure 10 illustrates the position of the parts upon a continued rotation of the sleeve 32, the engaging edges 51a and 53a having been moved opposite the air opening 59 in the cover plate 10a. Figure 11 shows the position of the parts immediately following a clockwise rotation of the sleeve 32 from the position shown in Figure 10, such rotation being for the purpose of reducing the supply of the fuel-air mixture to the engine to decelerate the same. In this position, Figure 11, the edges 51a and 53a of the plates are separated and being opposite the air opening 59, permit air to flow between said separated edges and into the recess 52.

When the engine is idling and the parts are in the position shown in Figure 3, the plates 51 and 53 are as illustrated in Figure 8. In such position, air cannot pass through the port 59 because the plate 53 is covering this port. As the control sleeve 32 is rotated in a counter-clockwise direction to increase the supply of fuel-air mixture passing through the bore 16 of the engine, the plate 51 which is secured to said sleeve will be rotated therewith, but the floating sleeve 53 which is frictionally secured to the cover plate 10a will remain stationary upon the initial movement. Thus, the triangular recess 52 in control sleeve 32 moves under the plate 53 and the edge 51a of the plate 51 engages the edge 53a of the plate 53, whereby no air may be admitted through the port 59 or recess 52 into the base 14 and bore 16. Upon continued counter-clockwise rotation of the sleeve, it is evident that the plate 53 will be forced to move simultaneously with the plate 51 so that the air inlet port 59 remains closed. Such movement of the plates moves the joint formed by the engaging edges 51a and 53a into alinement with the air opening 29 in the cover plate 10a. This position of the parts is illustrated in Figure 10.

Upon deceleration at this time, the control sleeve 32 is rotated in a clockwise direction and under such a condition, the suction of the engine is increased because the air volume is reduced. At this time, it is desirable to increase the supply of air by establishing communication between the port 59 and the recess 52. This is automatically accomplished by the co-action of the plates 51 and 53 because as soon as the control sleeve 32 is moved in a clockwise direction, the plate 51 which rotates with said sleeve is moved so that its edge 51a disengages the edge 53a of the plate 53. This occurs because the spring 58 holds the plate 53 stationary upon initial rotation of the sleeve in a clockwise direction and upon such action, the port 59 in the cover plate is registered with the recess 52 in the end wall 33 of the sleeve, whereby additional air is introduced into the mixture passing to the engine upon initial clockwise rotation of the sleeve 32. A continued rotation of the sleeve 32 in a clockwise direction will result in the edge 51b of the plate 51 engaging the edge 53b of the plate 53, after which time the plates will move as a unit to finally again cover the port 59. Through the arrangement of the plates 51 and 53 the air volume is automatically reduced upon acceleration and also, is automatically increased upon deceleration, whereby efficient performance and maximum economy is produced.

It is pointed out that the size of the recess 52 and the area of the opening 59 may be varied so that the recess may be in registration with the opening throughout any portion or all of the movement or travel of the control sleeve 32. As illustrated, the recess 52 will be alined with the opening throughout substantially one-half of the travel of the control sleeve which means that during normal driving ranges, the decrease in air supply upon acceleration and increase of said air supply upon deceleration will be accomplished by the co-acting plates 51 and 53. However, by merely elongating the recess 52 and the opening 59, it is apparent that said recesses would remain in alinement throughout the entire movement or travel of the control sleeve, that is, from idling position to wide open throttle, with the result that the plates 51 and 53 would function to control the air flowing through said opening and recess throughout all ranges of engine operation. However, as is well known, the average motorist seldom operates his vehicle at wide open throttle so that, practically speaking, elongation of the opening 59 and recess 52 is not necessary.

From the foregoing, it will be seen that upon accelerating the engine, the auxiliary air supply through the opening 59 is shut off to enrich the mixture. In actual driving practice, the accelerator is depressed beyond the point at which said accelerator is to be held for the desired speed; in other words, if it is desired to operate the vehicle at 40 M. P. H., the accelerator is first depressed to quickly accelerate the engine and is then gradually released back to the point which will operate the vehicle at the desired speed. This natural driving habit is utilized in the present device to provide maximum efficiency and economy for manifestly, when the engine is accelerated, the control sleeve 32 is moved in a counter-clockwise direction (Figures 8 to 11) and this results in shutting off the auxiliary air supply through the opening 59 to enrich the fuel mixture; so long as acceleration continues, the enriched mixture is supplied. However, as soon as the accelerator is gradually released to operate the vehicle at the desired speed, the plates 51 and 53 separate and auxiliary air enters through the opening 59. Thus, at such time, a leaner mixture providing economical operation is had. Of course, acceleration at any time again closes flow through the opening to again enrich the mixture. It might be noted that the operator will readily learn that a slight depression of the accelerator at any point in its travel will enrich the mixture, while a slight release of said accelerator will again

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lean said mixture, whereby efficient engine operation is produced.

Briefly, in the operation of the device and assuming the parts to be in the position shown in Figure 3, the air supply is through the inlet 12 and downwardly through the ar admitting opening 36 which is in slight registration with the opening 13 of said inlet and then through the throttle opening 37. Additional air is supplied through the idling opening 46 which is, of course, adjusted to provide the proper volume of air. The fuel is supplied through a single orifice 31, the remaining orifices being covered by the flange 34 of the control sleeve 32. At this time, the plates 51 and 53 are as illustrated in Figure 8 and there is no flow of air through the recess 52 in the sleeve or the port 59 in the cover plate 10a. As has been explained, in this position, the area of the throttle opening 37 is less than the area of the Venturi opening 36 and therefore, the restriction of air occurs at the throttle opening, with the result that the suction within the mixing chamber A adjacent the orifice 31 is relatively reduced, whereby a minimum volume of fuel is drawn through the orifice.

Upon a swinging of the actuating arm 40, the stub shaft is rotated to rotate the sleeve in a counter-clockwise direction and as this movement of the sleeve occurs, the air volume is increased because a greater portion of the air admitting opening 36 is registered with the opening 13 of the air inlet and also a greater portion of the throttle opening 37 in the sleeve 32 is registered with the opening 16 which leads to the engine manifold. At the same time, the flange 34 is moved so as to uncover more of the orifices 31, whereby the volume of fuel which is admitted into the casing is proportionately increased. Thus, throughout the entire movement of the single control element or sleeve 32, the volume of air and the volume of fuel is positively controlled, whereby the suction of the engine alone is not depended upon to draw the proper mixture into the mixing chamber.

As previously described, a continued counter-clockwise rotation of the sleeve causes the relative areas of the air admitting and throttle openings to vary, the area of the air admitting opening being reduced with respect to the area of the throttle opening. As this takes place, the restriction of air is transferred from the throttle opening to the air admitting opening, with the result that the suction is relatively increased, adjacent the fuel orifices 31 to increase the volume of fuel drawn into the mixing chamber A by said suction. Since the fuel is introduced through a plurality of relatively fine orifices, said fuel enters the casing in a fine spray, whereby complete atomization is assured.

The initial counter-clockwise movement of the sleeve 32 which increases the fuel and air supply causes the edge 51a of the plate 51 which is secured to the sleeve, to contact the edge 53a of the floating plate 53 so that so long as acceleration continues there is no admittance of air through the port 59 and recess 52. Upon deceleration of the engine and clock-wise rotation of the sleeve, the edge 51a of the plate 51 moves away from the edge 53a of the plate 53 so that the port 59 is brought into registration with the recess 52 in the end 33 of said sleeve and thus, additional air is supplied to the mixture flowing to the engine, whereby a leaner mixture is provided. After the parts have moved to the position as shown in Figure 11 and additional air is being introduced, a sudden acceleration which would be brought about by a rotation of the sleeve in a counter-clockwise direction would immediately result in the edge 51a of the plate 51 again contacting the edge 53a of the floating plate 53, whereby the port 59 and recess 52 are closed. Therefore, upon acceleration, the air volume is reduced to enrich the mixture. The operation of the plates 51 and 53 is entirely automatic and is controlled by the rotation of the sleeve 32.

It is pointed out that the entire carburetor is simple in construction and involves only the single movable part 32 which is the main control element for positively and simultaneously controlling the volume of fuel and the volume of air. The carburetor provides an efficient mixture under all operating conditions, whereby maximum economy and maximum power is provided. The base 14 of the casing may be provided with a small passage 60 which is exposed to the engine suction, whereby a tube or conduit (not shown) may be connected thereto for operating the windshield wiper, or other suction actuated device, of the motor vehicle in which the engine may be mounted.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A carburetor for an internal combustion engine including, a body having an air inlet and a fuel inlet and also having an outlet, said body being annular in cross-section, a circular rotatable control valve for simultaneously controlling the volume of air and fuel from the air and fuel inlets to the outlet, said valve having one closed end which is adjacent one vertical wall of the body, which wall has an auxiliary air inlet for admitting air to the body, and a pair of co-acting plates disposed between the control valve and the wall of the body and adapted to co-act with the auxiliary inlet to open and close said inlet, said plates being actuate by the control valve and being movable relative to each other and to the auxiliary inlet, said plates engaging each other to close said auxiliary inlet upon movement of the valve toward a position increasing the fuel-air mixture to the outlet and being disengaged from each other to open said inlet upon a reverse movement of the element.

2. A carburetor for an internal combustion engine including, a body having an air inlet and a fuel inlet and also having an outlet, said body being annular in cross-section, a circular rotatable control valve for simultaneously controlling the volume of air and fuel from the air and fuel inlets to the outlet, said valve having one closed end adjacent to one vertical wall of the body, which wall has an auxiliary air inlet connected to the outlet of said body, a pair of co-acting plates disposed between said valve and the wall of the body, one of said plates being secured to the end wall of the valve and movable therewith, the second plate floating between the valve and body and having a frictional engagement with the body, whereby the first plate may undergo limited independent movement relative to the floating plate, said plates being located to co-act with the auxiliary inlet to close said inlet when engaged with each other and to open said inlet when separated from each other,

whereby the auxiliary inlet is opened and closed in accordance with the position of the control valve.

3. A carburetor including, a cylindrical body having flat end walls and having its interior forming a mixing chamber, an air inlet for admitting air to said mixing chamber, said body having a plurality of fuel inlet orifices in its side wall for admitting fuel to the mixing chamber, an outlet extending from the mixing chamber for conducting the fuel-air mixture therefrom, a single rotatable control valve within the body, said valve being annular in cross-section with one flat end disposed adjacent one of the flat end walls of the body, the opposite end of the valve having a partial annular flange arranged to co-act with the fuel inlet orifices tc admit more or less fuel as the valve is rotated, said valve element having openings in its annular wall which co-act with the air inlet and the fuel-air outlet, whereby a rotation of the valve within the body accomplishes a simultaneous control of the air and fuel admitted to the mixing chamber and also of the fuel-air mixture flowing to the outlet from the chamber, the flat end wall of the body adjacent the closed end of the valve having an auxiliary air inlet for admitting additional air to the outlet, and a pair of co-acting plates disposed between the control valve and the wall of the body and having their edges movable into and out of engagement with each other in accordance with the movement of the valve, said plates being located to co-act with the auxiliary inlet to open and close said inlet, the inlet being closed when the plates are in engagement with each other and open when said plates are disengaged, said plates being actuated by the control valve and being engaged to close said auxiliary inlet upon movement of the valve toward a position increasing the fuel-air mixture to the outlet and being disengaged to open said inlet upon a reverse movement of the valve.

4. A carburetor including, a cylindrical body having flat end walls and having its interior forming a mixing chamber, an air inlet for admitting air to said mixing chamber, said body having a plurality of fuel inlet orifices in its side wall for admitting fuel to the mixing chamber, an outlet extending from the mixing chamber for conducting the fuel-air mixture therefrom, a single rotatable control valve within the body, said valve being annular in cross-section with one flat end disposed adjacent one of the flat end walls of the body, the opposite end of the valve having a partial annular flange arranged to co-act with the fuel inlet orifices to admit more or less fuel as the valve is rotated, said valve having openings in its annular wall which co-act with the air inlet and the fuel-air outlet, whereby a rotation of the valve within the body accomplishes a simultaneous control of the air and fuel admitted to the mixing chamber and also of the fuel-air mixture flowing to the outlet from the chamber, the flat end wall of the body adjacent the closed end of the valve having an auxiliary air inlet for admitting additional air to the outlet, a pair of co-acting plates disposed between said valve and the wall of the body, one of said plates being secured to the end wall of the valve and movable therewith, the second plate floating between the valve and body and having a frictional engagement with the body, whereby the first plate may undergo limited independent movement relative to the floating plate, said plates being located to co-act with the auxiliary inlet and being movable into engagement with each other to close the auxiliary inlet, said inlet being opened when the plates are separated, whereby the inlet is opened and closed in accordance with the position of the control valve.

5. A carburetor for an internal combustion engine including, a hollow body having an air inlet communicating with the interior of the body, said body also having a plurality of fuel inlet orifices communicating with the interior of the body, an outlet leading from the body for conducting the air and fuel mixture therefrom, a rotatable control valve having means co-acting with the air inlet and additional means co-acting with the fuel inlet orifices whereby when said valve is rotated in one direction the volume of air and fuel admitted to the interior of the body is increased and when rotated in an opposite direction the volume of air and fuel admitted to the body is decreased, said control valve also having means co-acting with the outlet for controlling the flow of fuel air mixture through the outlet, said body having an auxiliary air inlet leading to the interior thereof, and a valve means mounted upon and actuated by the control valve said valve means including a member attached directly to the control valve and a floating member adjacent said attached member, the members coacting with each other and with the auxiliary air inlet upon movement of the control valve for closing said auxiliary air inlet when the control valve is moved in a direction to increase the volume of air and fuel admitted to the body and for opening said auxiliary air inlet to admit additional air when said control valve is rotated in an opposite direction.

6. A carburetor for an internal combustion engine including, a hollow body having an air inlet communicating with the interior of the body, said body also having a plurality of fuel inlet orifices communicating with the interior of the body, an outlet leading from the body for conducting the air and fuel mixture therefrom, a rotatable control valve having means for co-acting with the air inlet and additional means co-acting with the fuel inlet orifices whereby when said valve is rotated in one direction the volume of air and fuel admitted to the interior of the body is increased and when rotated in an opposite direction the volume of air and fuel admitted to the body is decreased, said control valve also having means co-acting with the outlet for controlling the flow of fuel-air mixture through the outlet, means for admitting air to the interior of the body in addition to the air admitted through the main air inlet, and valve means for controlling the flow of said additional air into said body, said valve means forming part of the control valve and including a member attached to the control valve and a floating member adjacent said attached member, said members co-acting with each other and with the additional air-admitting means upon movement of the control valve, whereby when said control valve is rotated to increase the volume of air and fuel admitted to the body the valve means shuts off the additional air and when said control valve is moved in an opposite direction the additional air is admitted to the body.

7. A carburetor as set forth in claim 6, wherein the valve means controlling the flow of additional air to the interior of the body is in a closed position when the main control valve is in a

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position restricting the volume of the air and gas mixture to the engine and during the idling range of said engine.

8. A carburetor for an internal combustion engine including, a casing having an air inlet and adapted to be connected with an engine said casing also having a fuel inlet, whereby fuel and air may be admitted to the casing, a rotatable valve element within the casing and co-acting with both the fuel and air inlets to increase the volume of fuel and air when rotated in one direction and to decrease said volume when rotated in an opposite direction, the casing having an auxiliary air inlet, and valve means within the casing and including a member affixed to the control valve and also including a second member mounted to float adjacent the fixed member, said members coacting with each other and with the auxiliary air inlet upon movement of the control valve for controlling the flow of air through the auxiliary air inlet, said valve means being opened when the control valve is rotated to decrease the volume of air and fuel admitted to the casing and being closed when said valve is rotated in an opposite direction to increase said volume of fuel and air.

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