Sept. 15, 1936. H. V. CROON 2,054,363

CARBURETOR

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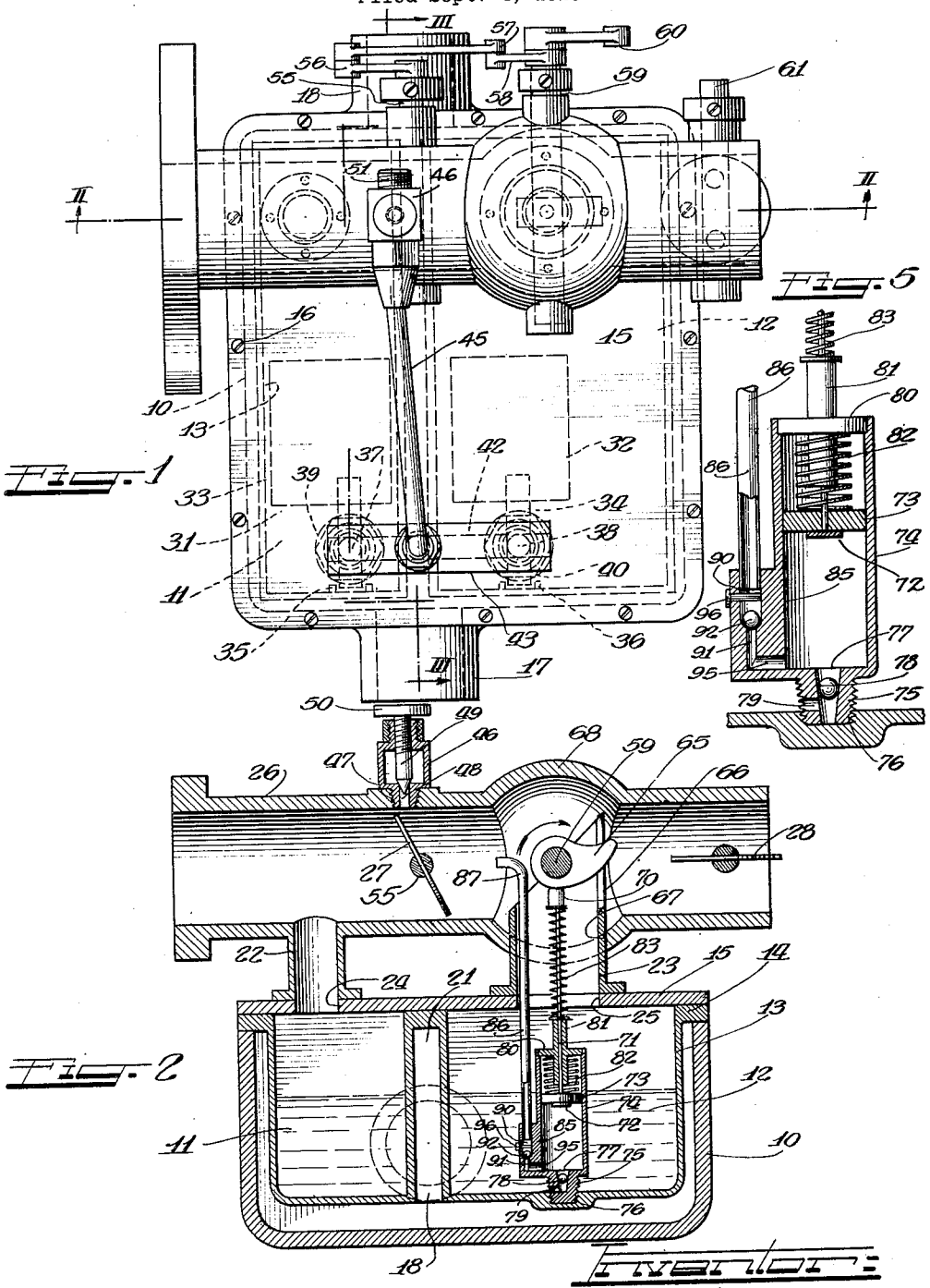


Fig. 1

Fig. 5

Fig. 2

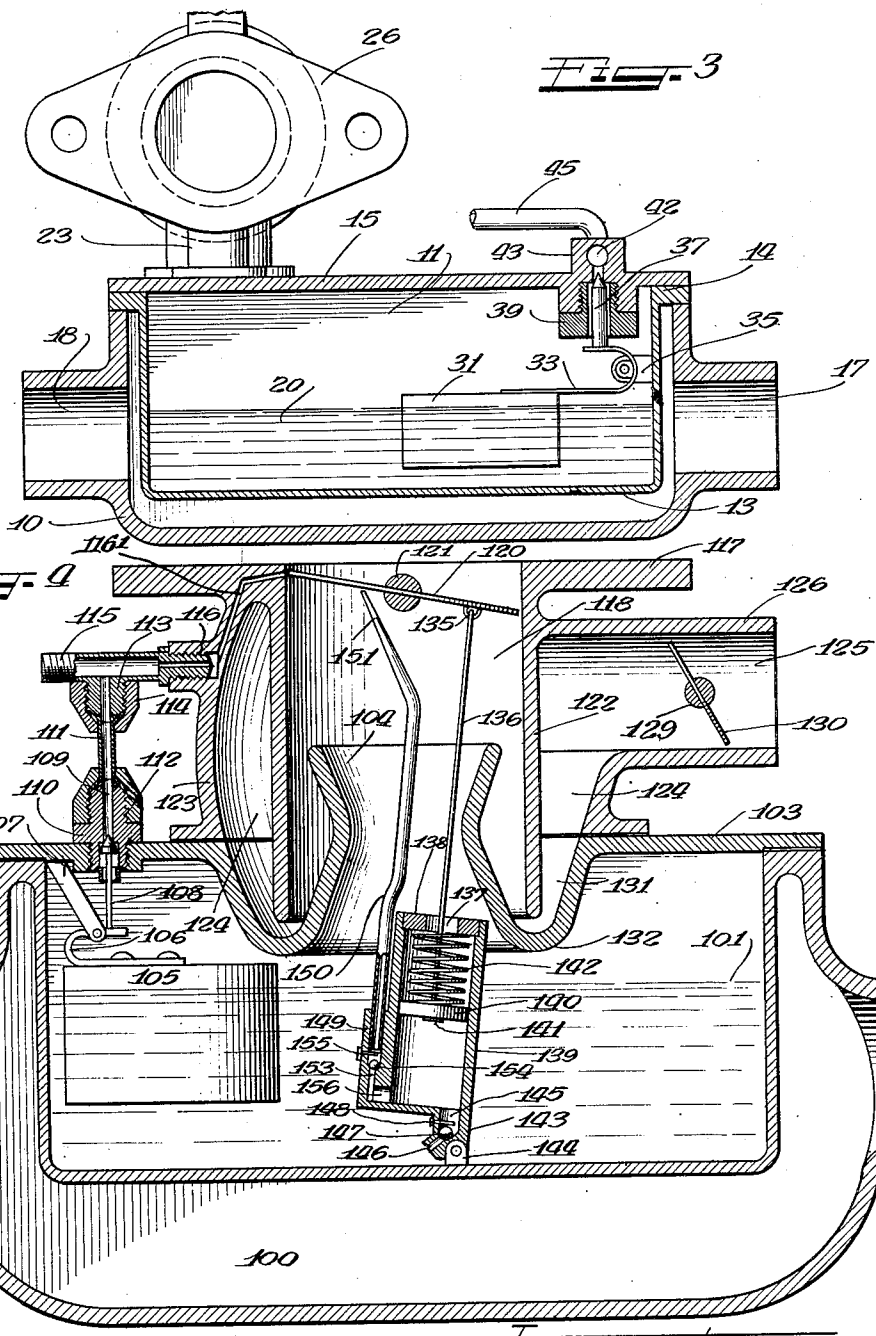
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Fig. 3



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2,054,363

CARBURETOR

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Application September 4, 1929, Serial No. 390,290

17 Claims. (Cl. 261—34)

My invention relates to carburetors and more particularly to a throttle controlled carburetor with an accelerating and decelerating fuel pumping device.

An object of my invention is to provide a carburetor which is better able to meet the different fuel demands of an internal combustion engine than the conventional carburetor.

Another object of my invention is to provide a carburetor with an improved accelerating pumping device.

A further object of my invention is to provide a throttle controlled carburetor with an accelerating and decelerating fuel pumping device.

A still further object of the invention is to provide an accelerating device for use with a throttle controlled carburetor arranged to discharge an extra supply of fuel directly into the high speed jet of the carburetor when the throttle is opened suddenly and adapted upon a quick subsequent closing of the throttle to give a decelerating effect by stopping the flow of fuel through the high speed jet.

In accordance with the general features of my invention there is provided an accelerating device for use in connection with a throttle controlled carburetor which device comprises fuel pumping means including a spring urged piston positioned in a pump cylinder and slidably disposed on a guide rod operable by the throttle valve; the discharge of the cylinder being connected directly to the high speed jet of the carburetor.

Other objects and features of my invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate several embodiments thereof and in which:

Figure 1 is a plan view of a throttle carburetor provided with my novel accelerating and decelerating device;

Figure 2 is a sectional view taken on substantially the line II—II of Figure 1 looking in the direction indicated by the arrows and showing clearly the construction of the pumping device;

Figure 3 is a sectional view partly in elevation taken on substantially the line III—III of Figure 1 looking in the direction indicated by the arrows and illustrating the construction of the float chamber;

Figure 4 is a vertical sectional view similar to Figure 2 through a modified form of carburetor of my invention as shown on the drawings; and

Figure 5 is an enlarged fragmentary view of the pump mechanism as shown in Figure 2.

As shown on the drawings;

Positioned in a heating receptacle 10 are a pair of float chambers 11 and 12 which are formed in a single metal casting 13 having a flange portion 14 for resting on the top edge of the receptacle 10. A cover plate 15 extends over the top of the chambers 11 and 12 and over the flange portion 14. This cover may be secured to the casting 13 by means of screws or bolts 16 which extend through the flange portion 14 into the sides of the receptacle or box 10.

It will be noted from Figures 2 and 3 that the bottom of the casting 13 as well as the walls thereof are spaced from the bottom and walls respectively of the receptacle 10 through which a suitable heating medium is adapted to flow. The ends of the receptacle 10 are provided with passageways 17 and 18 which may be suitably connected to a heating system. For example, if the carburetor of my invention is used in connection with the internal combustion engine of an automobile, one of the passageways 17—18 may be connected to the exhaust manifold of the engine and the other passageway may be connected to the muffler so that the heat of the exhaust gases may be utilized to vaporize the fuel 20 in the chambers 11 and 12.

In Figure 2 it will be observed that the casting 13 is provided with an intermediate recess 21 disposed between the flow chambers and adapted to allow the heating medium to flow upwardly between the chambers to augment the vaporization of the gas or fuel in these chambers.

Fastened to the top of the cover plate 15 are two tubes 22 and 23 disposed in communication with openings 24 and 25 respectively in the cover plate 15. The tube 22 is connected to a horizontal mixture outlet passageway 26 adapted to be connected to the intake manifold in the usual way of an internal combustion engine and having disposed in it conventional throttle and choke valves 27 and 28. The tube 22 establishes communication between the float chamber 11 and a portion of the passageway or mixture chamber 26 between the throttle valve 27 and the intake manifold of the engine.

Pivotally disposed in the two float chambers 11 and 12 are the floats 31 and 32 secured to arms 33 and 34 respectively hingedly connected to brackets 35 and 36 fastened to the wall of the casting 13. Each of the supporting arms 33—34 includes a turned back portion upon which is supported a needle valve member 37—38 which extends through tubular plugs 39—40 threadingly secured to the cover plate 15. Each of the needle valve members is adapted to cooperate with a

valve seat in the usual way to regulate the flow of gas or fuel from a common fuel passageway 42 into the flow chambers 11 and 12. The common fuel passageway 42 is disposed in a block 43 connected to the top of cover plate 15 and having connected to it between the needle valve members 37 and 38 a fuel supply pipe line 45 extending in a direction toward the mixture passageway 26.

From the block 43 the pipe 45 extends to a hollow block 46 having downwardly threaded reduce portion 47 threaded into an opening in the mixture passageway 26 directly over the throttle valve 27. The tubular portion 47 is provided a central opening 48 cooperable with a needle valve member 49 threaded into the top of the block 46 and provided with a thumb wheel 50 by which it may be adjusted. Obviously, by adjusting the position of the valve member 49 with respect to the opening 48 it is possible to vary the amount of fuel allowed to enter the opening 48.

The block 46 is provided with a threaded extension 51 (Figure 1) by which the pipe line 45 may be connected to the fuel line leading to the supply tank or other source of fuel.

The throttle valve 27 is connected to a shaft 55 extending clear through the mixture passageway 26 and having mounted on an outer end (Figure 1) a lever arm 56 pivotally connected to an end of a transverse link 57 the other end of which is pivotally connected to the free end of a lever arm 58 secured to shaft 59 extending through the mixture passageway 26 and suitably journalled therein. Fastened to the free end of this shaft 59 is an arm 60 which may be connected in the usual way to the throttle or the accelerator at the driver's station of the automobile or the like.

The choke valve 28 is also secured to a shaft 61 extending through the mixture passageway 26 and suitably journalled therein. The outer and free end of this shaft 61 may be connected in the usual way to the choke on the dash of the automotive vehicle.

I shall now proceed to describe in detail my novel accelerating and decelerating pumping mechanism. Secured to an intermediate portion of the shaft 59 inside of the mixture passageway 26 is a cam 65 which projects through a slit or recess 66 in the tube 23. This tube 23 extends through an opening 67 in an enlarged portion 68 of the mixture passageway 26 (Figure 2).

The cam 65 is arranged to engage the head 70 on the upper end of a rod 71 extending downwardly through the opening 25 into the float chamber 12. The lower end of the rod 71 has formed integral with it a head 72 upon which is supported a piston 73 loosely mounted on the guide rod 71. The piston 73 is slidably disposed within a cylinder 74 which has its lower end provided with a reduced threaded portion 75 threaded into the bottom of casting 13 at 76. This reduced portion 75 is provided with a frusto conical central opening 77 in which is disposed a ball valve member 78. The lower end of the opening 77 is disposed in communication with the float chamber 12 by means of a lateral passageway 79.

The upper part of the cylinder 74 is provided with a cap 80 suitably secured thereto provided with a central tubular portion 81 through which the guide rod 71 extends. Positioned between the cap 80 and the piston 73 is a compression spring 82 which surrounds the guide rod 71. Also surrounding the guide rod 71 and positioned between the head 70 and the upper end of the tubular portion 81 is a spring 83 the purpose of which will be more fully explained hereinafter.

The lower end of the cylinder 74 is provided with a lateral extension 85 in which is secured an upwardly extending pipe or tube comprising a high speed jet 86. The upper end of this jet is bent laterally toward the throttle valve as indicated at 87. The lower end of the tube 86 is disposed in communication with a fuel passageway 90 formed in the extension 85. The lower end of this passageway 90 is tapered so as to communicate with a smaller passageway 91 and so as to form a seat for a ball valve 92 adapted to rest on this seat between the passageways 90 and 91. The upward movement of the ball valve 92 is limited by a transverse pin 96 extending into the extension 85 and through the passageway 90. The lowermost end of the reduced passageway 91 is disposed in communication with the interior of cylinder 74 by means of a slot 95 (Figure 2).

The operation of my novel carburetor is briefly as follows.

Fuel is supplied to the float or vaporizing chambers 11 and 12 from the pipe 45 as a result of the subatmospheric pressure which prevails in the float chambers, and the amount of fuel allowed to enter these chambers is regulated by the float operated valve members 37 and 38. This arrangement is highly desirable for the reason that it eliminates the necessity of a vacuum tank or the like and enables fuel to be drawn directly from the source of supply which may be the fuel tank on an automobile by the suction of the engine acting on the gas in the float chambers. The fuel in the two chambers 11 and 12 vaporizes readily due to it being submitted to a subatmospheric pressure and this vaporization process is augmented by the heat imparted to the fuel in these chambers from the heating medium flowing through passageway 10 so that vapor is caused to rise from the surface of the fuel in the float chambers.

Upon the starting of the engine the choke valve 28 will be moved to a substantially closed position and the throttle valve 27 will be in substantially the position shown in Figure 2. The suction of the engine connected to the passageway 10 will then function to draw fuel from the tubes 22 and 23 and from the jet or passageway 48. The purpose of the tube 22 is to supply fuel or gas vapor for the initial operation or starting of the engine. It will, of course, be appreciated that when the throttle valve is in a substantially closed position such as that shown in Figure 2, the suction directly over the tube 22 and the opening 48 will be at a maximum so that fuel is drawn from both of these points into the mixing passageway 26.

The jet passageway 48 serves to supply fuel for the engine during an idling operation but is rendered substantially ineffective to supply any substantial amounts of fuel to the passageway 26 when the throttle valve 27 is open due to the fact that the air will then rush through the center of the passageway rather than follow the internal surface of the walls defining the passageway 26. In other words, the passageway 48 in reality is adapted to deliver a throttle controlled jet of fuel into the mixing chamber 26.

The tube 23 supplies gas vapor to the mixing chamber 26 for the operation of the engine at relatively low speeds. As the throttle of the engine is opened to increase the speed of the engine to an amount whereby the automobile can be operated at twenty or more miles an hour, the high speed jet 86 comes into operation to deliver a charge of fuel into the mixing passageway 26 from the cylinder 74.

If the throttle should be moved suddenly from an idling position to a wide open position so as to immediately speed up the engine, the cam 65 forces the rod 83 downwardly within the cylinder 74 thereby allowing the spring 82 which is normally compressed to move the piston 73 downwardly in the cylinder thus forcing an extra jet or charge through the high speed jet 86 into the mixing chamber 26. This extra charge of fuel augments the acceleration of the engine connected to the carburetor thus enabling the carburetor to promptly meet the demands of the engine.

On the other hand, if the throttle valve 27 should be moved suddenly from its wide open or high speed position to an idling or substantially closed position the piston 73 is moved upwardly so quickly within the cylinder 74 by the action of spring 83 which was compressed during the lowering of the piston as to create a vacuum in the cylinder greater than that acting upon the discharge end of the jet 86 whereby the ball valve 91 is drawn down on its seat thus immediately cutting off the passage of further fuel into the jet 86. This action gives a decelerating effect since it enables the high speed jet 86 to be quickly rendered inoperative as far as delivering further fuel in the mixing chamber 26 is concerned.

It is to be noted that when the throttle valve 27 is opened slowly the cam 65 is moved downwardly slowly thus gradually lowering the piston 73 in the cylinder 74. Under such conditions the piston delivers little or no extra fuel into the jet 86 which is desirable for the reason that it has been found that when the throttle is gradually opened accelerating fuel is not only unnecessary but is apt to be a detriment to the smooth operation of the engine. Similarly when the throttle is gradually moved to a closed position the piston 73 is moved upwardly slowly within the cylinder 74 and hence does not create a great enough suction within the cylinder to draw the ball valve 91 to its seat.

It will be noted that when the piston 73 is forced down quickly within the cylinder the ball valve 78 is quickly forced to its seat so as to trap a charge of fuel within the lower part of the cylinder. Due to the fact that the piston 73 is loosely mounted on the guide rod 71, the piston is free to move downwardly under the effects of the compressed spring 82 and hence independently of the rate of movement of the guide rod by the throttle valve. Then, too, since the piston is loosely mounted on the rod provision is thereby made for the venting of gas pressure from the lower part of the cylinder as the piston is moved downwardly. Also, gas pressure accumulating in the upper part of the cylinder is allowed to escape therefrom through the extension 81 around the guide rod which is loosely fitted therein.

In Figure 4 I have illustrated a modified form of carburetor embodying the features of my invention in which I employ a pivotally mounted pumping cylinder as I will more fully explain hereinafter. Positioned in a heating chamber 100 is a float chamber 101 which chambers are formed in a single casting 102. Fastened to the top of the casting 102 is a cover plate 103 which has formed integral therewith an upwardly extending venturi 104 disposed in communication with the float chamber 101.

Positioned in the float chamber 101 is a float 105 secured to a U-shaped arm 106 pivotally secured to a bracket 107 fastened to the under side of the cover plate 103. The upper leg of this U-shaped element 106 is arranged to engage the lower end of a needle valve member 108 cooperable with the lower end of passageway 109 in plug 110 threaded into the cover plate 103. The upper end of the passageway 109 communicates with the bore of a tube 111 having its lower end anchored to the top of plug 110 by means of a cap 112. The upper end of the tube 111 is anchored to a tubular plug 113 by means of a cap 114. The plug 113 is formed integral with a pipe 115 adapted to be connected directly to a source of fuel such, for example, as the gasoline tank on an automobile thereby eliminating the necessity of a vacuum tank or the like. This pipe 115 has formed integral with it a nozzle 116 threaded into a hollow casting 117 which defines the outlet or mixing chamber 118 of the carburetor. The nozzle 116 is disposed in communication with the portion of the mixing chamber 118 directly below the throttle valve 120 by means of idling jet passageway 116'. This throttle valve 120 is secured to a shaft 121 journalled in and rotatably carried by the casting 117.

The casting 117 comprises a hollow cylindrical tube 122 which defines a mixing chamber 118 and an outer curved wall 123 spaced from the tube 122 so as to define an air circulating chamber 124. This air circulating chamber 124 is disposed in communication with an air passageway 125 formed in tube 126 which is integral with casting 117. Disposed in the air passageway 125 is a choke valve 130 secured to a shaft 129 rotatably carried by the tube 126. The valve 130 may comprise a static or spring air control device. That is to say this valve may be a conventional spring urged valve having a spring adjusted to allow the valve to open in accordance with the suction prevailing in tube 122 and tube 126.

The air circulating chamber 124 is aligned with an annular space 131 formed by an annular depression 132 in the cover plate 103. Also it will be apparent that the venturi 104 extends up into the inside of tube 122. This arrangement allows any overflowing fuel to gravitate into the space 131 on top of the depression 132 where such fuel can be picked up by the air circulating in chamber 124 from the passageway 125. Obviously, in order for the air from the passageway 125 to enter the mixing chamber 118 it is necessary for such air to circulate through the spaces 124 and 131 over the top surface of the depression 132 and under the lower edge of the tube 122. During this circulation of the air being drawn into the intake manifold such air will of necessity pick drops of fuel accumulating on the depression 132 as the result of an overflow or the like.

The throttle valve 120 has secured to its under side an eye 135 to which is pivotally attached the upper end of a guide rod 136 having its lower end extending through an opening 137 in the top plate 138 of a pump cylinder 139 in which is disposed a movable piston 140. The piston 140 is slidably and loosely mounted on the guide rod 136 and is adapted to be supported by a head 141 formed on the lower end of the guide rod 136 as shown on the drawings. Surrounding the guide rod 136 and disposed between the cap 138 and the piston 140 is a normally compressed spring 142 which when the throttle 120 is in the position shown in Figure 4 is adapted to urge the piston 140 in a direction toward the bottom of the cylinder 139.

The lower end of the cylinder 139 is provided with an extension 143 pivotally attached to the bracket 144 secured to the wall of float chamber

101. This extension is provided with an enlarged recess 145 communicating at its upper end with the interior of cylinder 139 and at its lower end with a reduced fuel passageway 146 through which the flow of fuel is controlled by a ball valve 147 arranged to seat in the upper end of the passageway 146. Upward movement of the ball is limited by a pin 148 extending into the recess 145. It will be evident from this description that fuel from the float chamber 101 can pass through the passageway 146 into the interior of cylinder 139 by raising the ball 147 off its seat. However, whenever an excessive pressure is exerted upon the top side of the ball 147 it will result in this ball being forced to its seat thus shutting off the flow of fuel into the interior of cylinder 139.

One side of the cylinder wall is enlarged as indicated at 149 and has rigidly fastened to it an upwardly extending high speed nozzle or jet 150 which has its upper end bent to terminate under the throttle valve 120 as indicated at 151. The lower end of the jet 150 is disposed in communication with a vertical passageway 153 through which the flow of fuel from the interior of cylinder 139 is controlled by means of a ball valve 154. Upward movement of the ball valve is limited by a pin 155 extending into the passageway. The lower end of the passageway 153 communicates with a recess 156 disposed in communication with the bottom of the chamber within cylinder 139.

The operation of this modified form of carburetor is substantially like that of the preferred form previously described with the principal exception that a pivotal mounting is provided for the pump cylinder whereby the guide rod associated with the piston may be secured directly to the throttle valve so as to oscillate therewith.

The flow of fuel into the float chamber 101 is controlled by the float 105 in the usual way so that a predetermined level of fuel is maintained in the float chamber at all times. The pipe 115 which is used to supply fuel to the chamber 101 is also used to supply fuel to the idling jet 116 from which the flow of fuel into the mixing chamber 118 is controlled by the throttle 120 in a manner well known to those familiar with the art. When the throttle valve 120 is in the position shown, the air allowed to flow into the mixing chamber 118 from the passageway 125 flows along the walls of tube 122 and in that way draws gas into the mixing chamber 118 from the jet 116. On the other hand, when the opening of the throttle valve is increased less of the air will flow along the inside surface of the tube 122 and hence less fuel will be drawn from the idling jet 116. In fact, when the throttle valve is wide open this jet may be designed to be substantially inoperative since the fuel required for combustion will then be supplied by the venturi 104 and the high speed jet 150.

As the throttle valve 120 is moved to accelerate the engine the venturi is brought more into play to deliver vapor into the mixing chamber 118. That is to say, the air flowing into the tube 122 will then suck a greater amount of vapor from the surface of the heated fuel in the float chamber 101 through the venturi 104 into mixing chamber 118.

At high speeds the suction in the intake manifold connected to the mixing chamber 118 is sufficient to bring the high speed jet 150 into operation whereby fuel is sucked from the cylinder 139 through the jet 150 into the mixing chamber 118.

The pump mechanism comprising the piston and the cylinder 139 operate to deliver an accelerating charge of fuel into the mixing chamber 118 through the jet 150 whenever the throttle valve is quickly moved to a wide open position in exactly the same way as the pumping mechanism in my preferred form of carburetor operates. Similarly, when the throttle valve is quickly moved to a closed position the pump mechanism will exert a decelerating effect in exactly the same way as the pump mechanism of my preferred form of carburetor operates.

Attention is directed to the fact, however, that the return of the piston 140 to its uppermost position in the cylinder 139 is accomplished by the throttle valve itself due to the fact that the guide rod 136 is connected directly to the throttle valve. This arrangement eliminates the necessity for the use of a spring such as the spring 83 of my other form of this invention. Also, it will be observed that as the throttle valve 120 is actuated the cylinder 139 will pivot back and forth about its pivotal mounting at the bracket 144.

Now, I desire it understood that although I have illustrated and described in detail the preferred forms of my invention, the invention is not to be thus limited but only insofar as defined by the scope and spirit of the appended claims.

I claim as my invention:

1. In combination with a carburetor including a fuel discharge passageway for supplying fuel during normal high speeds and a throttle, an accelerating and decelerating device comprising auxiliary fuel pumping means in direct communication with said passageway for receiving a charge of fuel therefrom, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation when said throttle is opened to allow said pumping means to pump fuel independently of said throttle to discharge an accelerating charge of fuel into said passageway, said pumping means being arranged upon a closing movement of said throttle to receive its charge of fuel from said passageway to give a decelerating effect by temporarily withdrawing the fuel from said passageway.

2. In combination with a carburetor including a fuel discharge passageway and a throttle, an accelerating device comprising auxiliary fuel pumping means in direct communication with said passageway for receiving a charge of fuel therefrom, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into said passageway, said pumping means including a spring urged piston, a guide member upon which said piston is mounted and a connection between the piston and said member for allowing said piston to move on said member.

3. In combination with a carburetor including a throttle, an accelerating device associated with said carburetor and including a cylinder, a cylindrical element movable in said cylinder and a guide member upon which said element is bodily

movable, and a connection between said cylindrical element and throttle for restraining fuel pumping movement of said cylindrical element while the throttle is closed and for automatically releasing said cylindrical element for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into the fuel discharge of the carburetor.

4. In combination with a carburetor including a throttle, an accelerating device comprising auxiliary fuel pumping means connected to said carburetor and including a cylinder member and a cylindrical member in said cylinder member and a guide element on which one of said members is bodily movable longitudinally thereof, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into the fuel discharge of the carburetor.

5. In combination with a carburetor including a fuel discharge passageway and a throttle an accelerating and decelerating device comprising auxiliary fuel pumping means in direct communication with said passageway for receiving a charge of fuel therefrom and including a cylinder, a piston therein and a guide member upon which said piston is movable, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation when said throttle is opened to allow said pumping means to pump fuel independently of said throttle to discharge an accelerating charge of fuel into said passageway, said cylinder of said pumping means being connected directly to said passageway so that upon a closing movement of the throttle said pumping means will draw a charge of fuel directly from said passageway into said cylinder to give a decelerating effect.

6. In combination with a throttle controlled carburetor an accelerating device comprising auxiliary fuel pumping means including a chamber and a reciprocable spring urged piston therein, a connection between said throttle and said pumping means for controlling the operation of the same, and means for enabling said piston to operate independently of said throttle upon the opening of the throttle including a guide member upon which said piston is movable whereby fuel is discharged from the pumping means to the carburetor immediately after the throttle is opened, said connection including a cam connected to said throttle for depressing said guide member.

7. In combination with a carburetor including a throttle, an accelerating device comprising auxiliary fuel pumping means connected to said carburetor and including a cylinder member and a cylindrical member in said cylinder member, a guide element on which one of said members is bodily movable longitudinally thereof and resilient means for returning said movable member to its original or starting position after each operation thereof, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into the fuel discharge of the carburetor.

8. In combination with a carburetor including a high speed discharge nozzle for supplying fuel during normal high speeds and a throttle, an accelerating device disposed in a direct communication with said discharge nozzle but arranged so as not to interfere with the normal discharge of said nozzle and comprising spring operated fuel pumping means and means actuated by the throttle for storing energy in the spring during the closure of the throttle and means for disconnecting the pumping means from the throttle on opening the throttle whereby fuel is gradually discharged from the pumping means directly into said high speed nozzle immediately after the throttle is opened to augment the fuel discharge of said nozzle.

9. In combination with a carburetor including a high speed discharge nozzle for supplying fuel during normal high speeds and a throttle, accelerating means disposed in direct communication with said discharge nozzle comprising a spring operated pumping means, means actuated by the throttle for compressing the spring of said pumping means, and means for releasing the compressed spring when the throttle is quickly opened whereby the spring pumping means gradually discharges fuel directly into said high speed nozzle under the action of said compressed spring to augment the fuel discharge of said nozzle.

10. In combination with a carburetor including a throttle, an accelerating device associated with said carburetor and including a cylinder, a cylindrical member movable therein, a guide member on which said cylindrical member is bodily movable in said cylinder, a spring for enabling said cylindrical member to move on said guide member independently of the movement of said throttle, and means for returning said cylindrical member to its original or starting position after each operation thereof, said means including a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into the fuel discharge of the carburetor.

11. In combination with a throttle controlled carburetor an accelerating device comprising auxiliary fuel pumping means including a chamber and a reciprocable spring urged piston therein, a connection between said throttle and said pumping means for controlling the operation of the same comprising a shaft having means connected thereto for setting said pumping means into action, and linkage between said throttle and said shaft for enabling them to be operated together, and means for enabling said piston to operate independently of said throttle upon the opening of the throttle including a guide member upon which said piston is movable whereby fuel is discharged from the pumping means to the carburetor immediately after the throttle is opened.

12. In combination with a throttle controlled carburetor an accelerating device comprising auxiliary fuel pumping means including a chamber and a reciprocable spring urged piston therein, a connection between said throttle and said pumping means for controlling the operation of the

same, and means for enabling said piston to operate independently of said throttle upon the opening of the throttle including a guide member upon which said piston is movable whereby fuel is discharged from the pumping means to the carburetor immediately after the throttle is opened, said guide member having an end thereof provided with an enlargement for normally holding the piston against displacement and adapted to limit the independent movement of said piston.

13. In a carburetor a fuel discharge passageway, a throttle valve in said passageway, float chambers, an idling jet connected to one of said chambers to discharge in said passageway adjacent said throttle valve, a high speed discharge jet connected to another of said chambers and arranged to discharge fuel into said passageway and an accelerating device comprising fuel pumping means connected and operable with said throttle valve and disposed in direct communication with said high speed jet so as to receive its charge of fuel from said jet and to discharge said charge into said jet upon the quick opening of said throttle.

14. In combination with a throttle controlled carburetor an accelerating device comprising auxiliary fuel pumping means including a chamber and a reciprocable spring urged piston therein, a connection between said throttle and said pumping means for controlling the operation of the same, and means for enabling said piston to operate independently of said throttle upon the opening of the throttle including a guide member upon which said piston is movable and a connection between said member and piston for allowing said piston to move on said member whereby fuel is discharged from the pumping means to the carburetor immediately after the throttle is opened, and entirely independent of the movement of the throttle so that no substantial pumping of fuel is effected on the opening movement of the throttle in itself, said pumping of the fuel being caused primarily by the independent movement of said spring-urged piston after the opening of the throttle.

15. In combination with a carburetor including a fuel discharge passageway for supplying fuel during normal high speeds and a throttle, an accelerating and decelerating device comprising auxiliary fuel pumping means in direct communication with said passageway for receiving a charge of fuel therefrom, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation when said throttle is opened to allow said pumping means to pump fuel independently of said throttle to discharge an accelerating charge of fuel into said passageway, said pumping means being arranged upon a closing movement of said throttle to receive its charge of fuel from said passageway to give a decelerating effect by temporarily withdrawing the fuel from said passageway, said connection between said throttle and pumping means causing substantially all of the fuel pumped to be dependent upon actuation of the opening movement of the throttle but in a manner that there is no substantial hydraulic resistance to the opening of the throttle.

16. In combination with a carburetor including a fuel discharge passageway and a throttle, an accelerating device comprising auxiliary fuel pumping means in direct communication with said passageway for receiving a charge of fuel therefrom, and a connection between said pumping means and throttle for restraining fuel pumping movement of said pumping means while the throttle is closed and for automatically releasing said pumping means for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into said passageway, said pumping means including a spring urged piston, a guide member upon which said piston is mounted and a connection between the piston and said member for allowing said piston to move on said member, the movement of said throttle in itself being ineffective to pump fuel so that there is no substantial hydraulic resistance to the opening of the throttle and the pumping of the fuel by said pumping means follows as a result of such opening movement but is not motivated thereby.

17. In combination with a carburetor including a throttle, an accelerating device associated with said carburetor and including a cylinder, a cylindrical element movable in said cylinder and a guide member upon which said element is bodily movable, and a connection between said cylindrical element and throttle for restraining fuel pumping movement of said cylindrical element while the throttle is closed and for automatically releasing said cylindrical element for a fuel pumping operation to allow it to pump fuel independently of said throttle to discharge an accelerating charge of fuel into the fuel discharge of the carburetor, said pumping means being effective to pump fuel entirely independently of the force expended in the movement of the throttle so as to not cause the fuel being pumped to resist movement of the throttle.

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