

April 19, 1938.

E. A. RULLISON ET AL

2,114,970

CARBURETOR

Filed Jan. 28, 1936

3 Sheets-Sheet 1

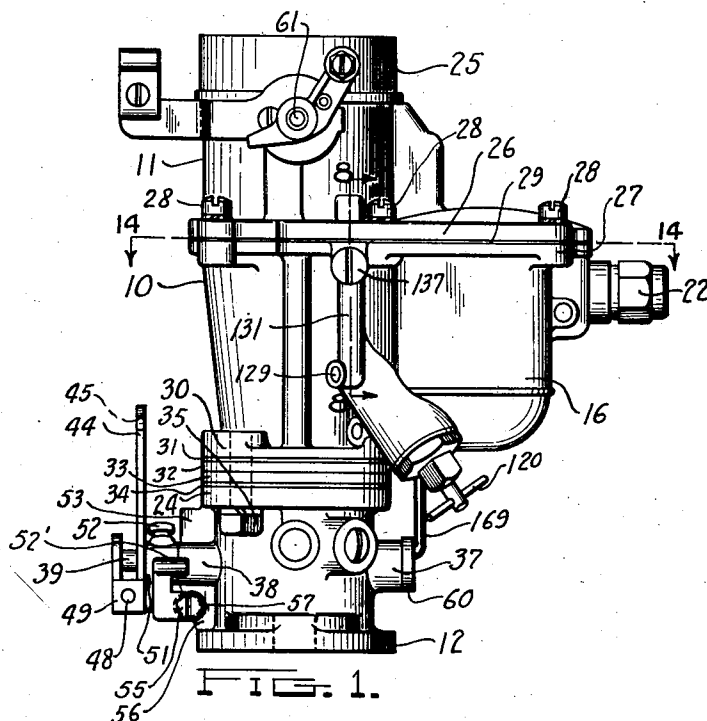


FIG. 1.

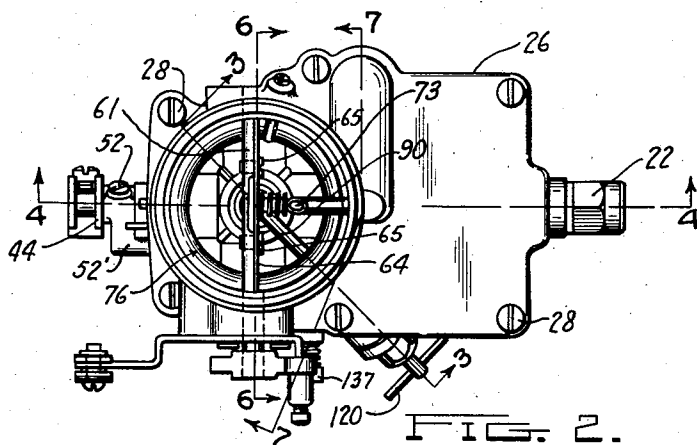


FIG. 2.

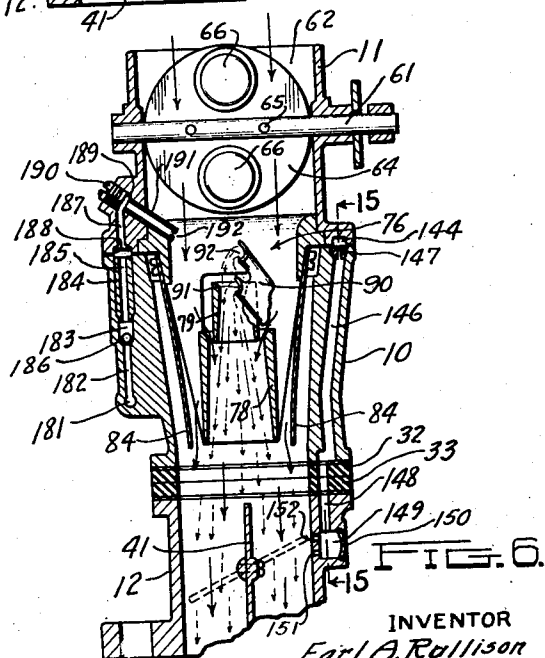
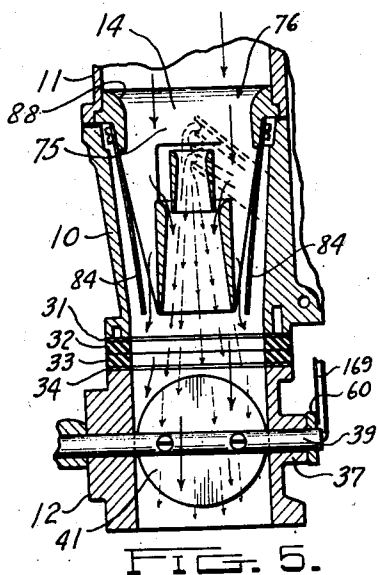
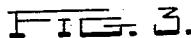
INVENTOR
Earl A. Rullison
Howard B. Simmons

BY *Bruce W. Whitcomb*
ATTORNEYS

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3 Sheets-Sheet 2



INVENTOR
Earl A. Rollison
Howard B. Simmons

BY *Bruce, Whitcomb & Davies*
ATTORNEYS

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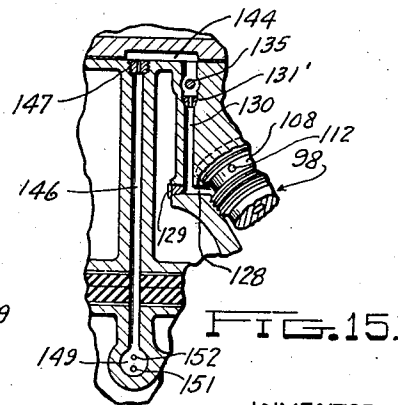
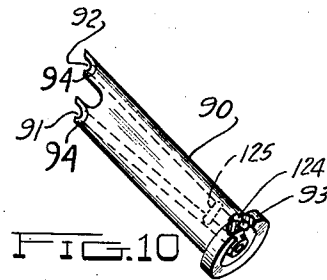
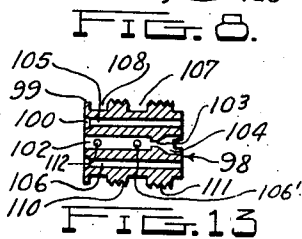
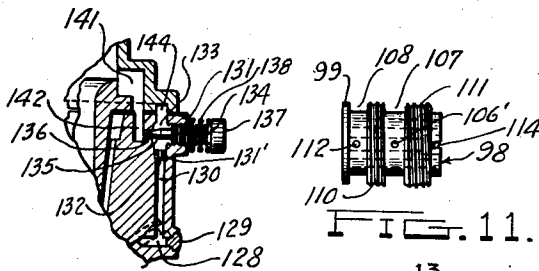
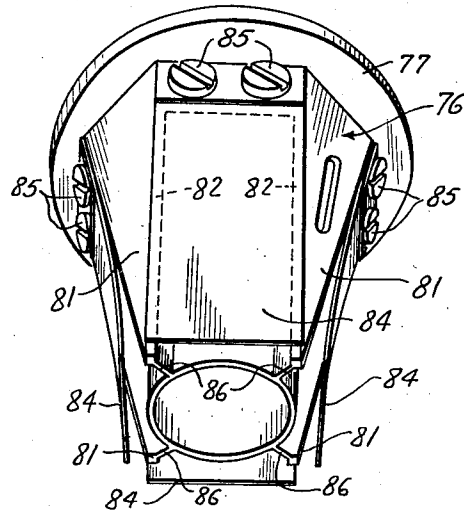
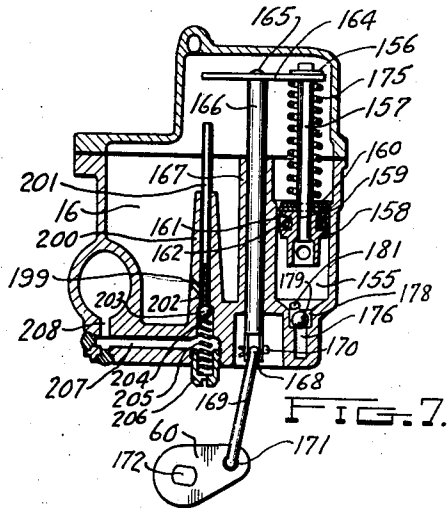
E. A. RULLISON ET AL

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CARBURETOR

Filed Jan. 28, 1936

3 Sheets-Sheet 3



INVENTOR
Earl A. Rullison
Howard B. Simmons

BY *Braselt, Whitcomb & Davis*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,114,970

CARBURETOR

Earl A. Rullison and Howard B. Simmons, Toledo, Ohio, assignors to The Tillotson Manufacturing Company, Toledo, Ohio, a corporation of Ohio

Application January 28, 1936, Serial No. 61,197

13 Claims. (Cl. 261-54)

This invention relates to carburetion devices and more particularly to carburetors incorporating variable or flexible air controlling means.

The invention embraces a provision of a carburetion device embodying a Venturi tube or series of Venturi tubes and flexible means for regulating the amount of air passing through the carburetion device in proportion to the requirements of the engine with which the device may be utilized whereby the efficiency of an arrangement of this character is greatly increased.

The invention contemplates the provision of a carburetor having a mixing passage embodying flexible walls which automatically provide a substantially constant high air velocity.

Another object is the provision of a multi-jet construction of carburetors wherein more than one jet is contained in a removable element, the outlets or jets being arranged to obtain a maximum outlet area and at the same time presenting a minimum restriction in the air stream.

Another object is the provision of a carburetor having a plurality of venturis and an arrangement of air passage having flexible walls whereby the carburetor may be used with various sizes of internal combustion engines without the necessity of major changes in the construction, thus enhancing interchangeability of devices as well as to extend the utilization of the arrangement to various kinds and sizes of internal combustion engines.

Another object is the provision of a carburetor of this character wherein the arrangement of venturis and flexible walls in combination with the jets are so positioned as to obtain a high efficiency of atomization of the fuel extruded into the air stream resulting in a more uniform fuel and air mixture.

Still a further object of the invention is the incorporation in a carburetor of this character of a simple and effective accelerating pump and power jet arrangement, the latter arranged to extrude additional fuel into the engine when the throttle is opened or nearly opened to its maximum position, the accelerating jet being independent of the other fuel orifices leading into the mixing passage.

Still another object of the invention is the provision of multiple jets contained in one element while the several fuel channels necessary to convey fuel to the several fuel orifices are fabricated in a removable element, thus simplifying the arrangement of the various fuel passages.

Another object of the invention is the provision of a carburetor wherein the wall portion of the

mixing passage surrounding the venturi and principal fuel orifices is fabricated of flexible elements so as to maintain a high velocity of the air passing through the mixing passage and at the same time centralizing the air stream about the axis of the venturis and the outlets of the main fuel orifices so as to maintain under all conditions of operation a maximum suction upon the fuel orifices.

Still a further object is the provision of a carburetor wherein the float bowl is vented interiorly of the mixing passage thereby eliminating any tendency to overenrichening of the mixture should there be any substantial restriction in the air horn of the carburetor, as for example, clogged air cleaners or the like, tending to decrease the pressure within the mixing passage, and further that such internal venting of the float bowl assures the passage of clean air to the bowl as such air taken interiorly of the carburetor has been cleaned by the air cleaner and foreign particles such as dust which might otherwise clog the small fuel orifices have been removed from the air.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which:

Figure 1 is a side elevational view illustrating one embodiment of the carburetor of my invention;

Figure 2 is a top plan view of the carburetor illustrated in Figure 1;

Figure 3 is a vertical sectional view of the primary and secondary fuel orifices showing the arrangement of main and supplemental venturis;

Figure 4 is a vertical sectional view taken substantially on the line 4-4 of Figure 2 showing the flexible walled passage of our invention and illustrating the passage of fuel and the position of the flexible walls when the primary jet is in operation;

Figure 5 is a view similar to Figure 4 showing the position of the flexible walls of the mixing passage when both primary and secondary jets are in operation at higher air velocity arising by reason of increased engine speeds;

Figure 6 is a vertical sectional view taken substantially on the line 6-6 of Figure 2;

Figure 7 is a vertical sectional view taken substantially on the line 7—7 of Figure 2;

Figure 8 is a view taken substantially on the line 8—8 of Figure 1;

5 Figure 9 is an isometric view showing the arrangement of flexible walls of the mixing passage forming a part of our invention;

Figure 10 is an isometric view showing the primary and secondary fuel jet construction forming an element of the invention;

Figure 11 is a side elevational view of an element embodying fuel passageways forming a part of the invention;

Figure 12 is an end view of the element shown in Figure 11;

Figure 13 is a vertical sectional view through the element taken substantially on the line 13—13 of Figure 12;

Figure 14 is a top plan view of the intermediate body portion of the carburetor, the view being taken on line 14—14 of Figure 1;

Figure 15 is a vertical sectional view taken substantially on the line 15—15 of Figure 6 illustrating the channels leading to the idling orifice.

25 The carburetion device of our invention is inclusive of a body structure, in the present embodiment composed of three principal sections, a middle portion 10, a separable upper portion 11 carrying a choke control valve arrangement and a lower portion 12, supporting the throttle valve arrangement. The portions 10, 11 and 12 have aligned large openings forming a mixing passage 14, the portion 10 being formed with a laterally extending fuel chamber or reservoir 16 in which is positioned a float 17 pivoted as at 18, an upwardly projecting arm 19 carried by the float adapted to engage a valve member 20 which engages a valve seat 21 to regulate the supply of fuel entering through the fuel inlet tube 22.

40 The upper body portion 11 of the carburetor is formed with a cylindrical air horn or air entrance 25 and formed integrally with portion 11 is a plate-like extension 26 which forms a cover for the fuel chamber 16. The lower end of body portion 11 and extension 26 are formed with a flange which is secured to a mating flange 27 on the body portion 10 by means of screws 28, there being a suitable gasket 29 interpositioned between the flanges providing an effective seal between the parts.

50 The intermediate body portion 10 is formed with a flange 30 and the lower body portion 12 is formed with a mating flange 24 which are held together by means of screws 35, one of which is shown in Figure 1. Positioned adjacent each of the flanges are gaskets 31 and 34 and positioned intermediate gaskets 31 and 34 are annular members 32 and 33 formed of fibre or other suitable heat resisting material. The purpose of these members is to aid in preventing heat from being transferred from the intake manifold of the engine to the fuel chamber 16 of the carburetor, thus decreasing the tendency of the fuel to "boil" in the fuel chamber.

65 The lower portion 12 of the carburetor is formed with laterally projecting aligned bosses 37 and 38 which are bored to receive a shaft 39, the shaft passing diametrically through the mixing passage. In the embodiment illustrated, the central portion of the shaft 39 is provided with a slot which receives and accommodates a disk valve 41 which is secured in place by means of screws 42. The valve 41 serves to control the flow of mixture to an internal combustion engine with which the device may be utilized. A projecting

end of the shaft 39 receives a lever 44 in the form of a U-shaped member, the furcations of which have aligned openings through which the shaft 39 projects, the lever being split longitudinally as at 46, a clamping screw 48 engaging nut 49 serving to draw the split portions of the lever together so that it is caused to grip the shaft to hold the parts in adjusted position. Positioned intermediate the boss portion 38 and the lever 44 is a member 51 carried by the shaft 39 and held in position thereon by means of a screw 52 which passes through a transverse bore in the lever shaft 39 to hold the member to the shaft. Member 51 is formed with an L-shaped projection 52' which is adapted when the throttle is moved to 15 wide open position to determine the maximum extent of movement by its engagement with the web 53 formed on the carburetor body. The lower portion of the projection 51 is bored and threaded to receive a screw 55, the end of the screw being adapted to engage a web portion 56 which determines the idling position of the engine by fixing the minimum throttle opening of the valve disk 41. A coil spring 57 is interposed between the head of the screw 55 and the member 51 which exerts friction upon the screw to hold the latter in adjusted position. By regulating the position of screw 55, a change may be effected in the idling speed of the engine by regulating the position of the screw 55 with respect to the pad 30 portion 56 formed on the body portion 12 which acts as stop means with the screw 55 to determine the "idle" position of the throttle valve. The upper extremity of the lever 44 is provided with an opening 45 adapted to receive linkage (not shown) for manipulating the throttle valve. The end of the shaft projecting through boss portion 37 receives an arm 60 which is held in place by swaging or upsetting the extremity of the shaft. The upper part 11 of the carburetor body is provided 40 with a transversely extending bore which receives a shaft 61, the shaft extending across the air passage 62 and carries a choke valve 64 which is held in place on the shaft by means of screws 65. Positioned at either side of the shaft 61 are small circular valves 66 of mushroom configuration which normally close openings 67 in the disk 64. Each disk is secured to a headed member 69 and surrounded by a comparatively weak coil spring 70 which serves to maintain the valves 66 normally in contact with the surface of disk 64 closing the openings 67. The purpose of the spring mounted valves 66 is to permit entrance of a small amount of air immediately upon starting of the engine into the air passage of the carburetor 55 when the choke valve 64 is in closed or substantially closed position as the suction of the engine will overcome the slight pressure of the springs 70 to admit air into the passage.

The portion 11 of the carburetor is provided 60 with a vertically arranged chamber 72 as illustrated in Figure 4 which communicates with the air entrance passage through the medium of a tube 73. The chamber 72 and tube 73 permit the equalization of pressure in the float bowl chamber 16. Another purpose of an internal venting of the fuel chamber is that under certain conditions an air cleaner or dust eradicator connected to the air passage of the carburetor may become clogged, and thus set up resistance 70 to the passage of air through the carburetor, and yet the pressure in the float bowl and the mixing passage is substantially equalized by means of the internal channel.

The portion of mixing passage 75 contained 75

in the body 10 of the carburetor incorporates a member or cage 76 illustrated particularly in Figure 9 which has a flanged annular portion 77 at its upper end and a pair of centrally aligned Venturi tubes 78 and 79. The member 76 in the embodiment illustrated is formed with a plurality of spaced, depending, triangular, integral portions 81, each of the portions 81 having a pair of uniplanar surfaces 82, each surface forming with a corresponding uniplanar surface of its adjacent projection a support for a flexible member or reed valve 84. In the embodiment illustrated, there are four projections 81 which form the supports and valve seats for four equally spaced reed valves or members 84. These valves 84 are secured at their uppermost extremities to the member 76 by means of screws 85 leaving the lower portions of the reeds in position to be readily flexed by the decreased pressure coupled with the velocity of air passing through the carburetor. The venturi 78 is formed as an integral part of member 76, being supported by means of webs 86 connecting portions 81 integrally with the venturi 78. The venturi 79 arranged above and in axial alignment with venturi 78 is formed as an integral part of member 76 being supported by means of webs 87 connecting the venturi 79 with the venturi 78. The interior surface of the flanged portion 77 formed on member 76 is curved as illustrated at 88 in Figures 4 and 5, so that when the reeds 84 are flexed outwardly as illustrated in Figures 5 and 6, they form in effect a third venturi resulting in an increased air velocity at the depending portions of the reeds. The reed valves and supporting structure are preferably arranged so that the reeds are equally spaced from the axis of the venturis 78 and 79 so that substantially the same amount of air passes on one side between the venturis and a flexible reed as passes between the venturi and any of the other reed valves. The reed valves are therefore in effect placed concentric with the axis of the venturis 78 and 79 so that the axis of these venturis is substantially the central axis of the air stream passing through the carburetor.

In the embodiment illustrated, the arrangement includes primary and secondary nozzles for the injection of fuel into the mixing passage. The nozzle structure is shown per se in Figure 10 and in assembled relation in the carburetor in Figures 2 and 3. As illustrated, the arrangement comprises a member 90 generally rectangular in cross section and having a primary nozzle 91 and a secondary nozzle 92 formed therein, the lower portion of the member 90 being circular and flanged as at 93. The extremities of member 90 adjacent the nozzles 91 and 92 are tapered or form an apex by the intersection of angularly arranged surfaces 94 as shown in Figures 10 and 14 in such manner as to virtually increase the area of the nozzle outlet facilitating the flow of fuel. The nozzle structure 90 passes through an opening in the side wall of the carburetor body and through a slot 95 in member 76. It is to be noted that the extremity of the primary jet 91 terminates substantially at the axis of the Venturi construction while the secondary jet 92 terminates slightly out of alignment with the axis of the venturis, as particularly exemplified in Figure 3, the purpose of which will be hereinafter explained.

The opening in the side wall of the carburetor which receives nozzle portion 90 terminates in a cylindrical bore 96, the inner extremity of which

serves to properly position the nozzle structure 90 by means of engagement with the enlarged portion 93 thereof. A portion of the bore 96 is threaded as at 97 to receive a barrel-like member 98 which is provided at its upper end with a flange 99 and an annular recess 100. The member 98 is formed with a central bore 102 extending partially through the member and terminating in a restricted opening 103, which in turn communicates with an enlarged bore 104 in the other end of the member 98, the innermost portion of bore 104 being conical in configuration in its connection with the restricted bore 103 as illustrated in Figure 13. The member 98 is formed with two longitudinally extending, laterally spaced bores or channels 105 and 106 extending entirely through the member 98. Member 98 is also provided with circumferential spaced grooves 107 and 108, the portions of member 98 on either side of groove 107 being threaded as at 110 and 111. There is also provided a comparatively small transverse channel 112 leading from the recess 100 into the central bore 102. The groove 107 is in communication with the central bore 102 by means of transverse channel 106'. The lower extremity of member 98 is formed with a laterally extending kerf or slot 114 adapted to receive a suitable tool in order to assemble the member 98 into the threaded bore 96 of the carburetor. Threaded into the extremity of the bore 96 is a member 115 which has a central threaded bore 116 adapted to receive a metering pin or valve 117 having a needle shaped extremity 118, the latter being adapted to project into the restriction 103 in member 98. The member 115 is provided with a stuffing gland 119 so as to prevent leakage of fuel from the chamber 96. The metering pin 117 is provided with a transversely extending portion 120 serving as suitable manipulating means for adjusting the metering pin to regulate the amount of fuel passing to the main or primary nozzle 91. The space between the member 115 and member 98 forms a chamber 122 adapted to receive fuel from the float bowl 16 through a channel 123 as shown in Figures 3 and 14. It is to be noted that the channel leading to the secondary nozzle 92 is provided with a restricted entrance 124 for a purpose to be hereinafter explained. The tubes or channels leading to the nozzles 91 and 92 are in communication by means of a transverse channel 125.

The arrangement of providing a mixture for idling of the engine will now be described. It is to be noted that the groove or annular channel 108 is filled with fuel from the float bowl, it being in communication therewith by means of opening 112, passageway 102 and restricted opening 103 which is in communication with chamber 122, the latter receiving its fuel direct from the float bowl by means of passage 123. The recess or annular channel 108 is in registration with horizontal channel 128' which is formed by drilling into the side of the carburetor body, the opening being closed by means of a plug 129 as illustrated in Figures 8 and 15. The channel 128' is in communication with a vertical channel 130 which is contained within a vertical boss portion 131 illustrated in Figure 1. The upper end of the channel 130 is provided with a bushing 131' having a restricted opening 132 which admits fuel to a small chamber 133, the latter being a threaded bore in the side of the carburetor body and is closed by means of a threaded member 134 having a needle or metering pin 135 which projects into an opening 136 as illustrated in Figure 8. The

threaded member 134 is provided with a knurled head portion 137 for adjusting the position of the needle 135 in the opening 136, a spring 138 being interposed between the head 137 and the boss portion on the carburetor body to exert a degree of friction upon the threaded member so that the same will be frictionally held in adjusted position.

The air supply for forming the idling mixture is obtained from the interior of the main air passage through the medium of a slot 141 contained in the side wall of the portion 11 of the carburetor body which registers with a vertical bore 142 in the portion 10 of the carburetor body, this arrangement being shown in detail in Figure 8.

The chamber 133 in which the fuel and air are brought together to form an idling mixture communicates with one end of a laterally extending channel 144 the other end of the channel being in communication with a substantially vertical channel 146 as illustrated in Figure 6, there being a bushing 147 at the entrance of channel 146 having a comparatively small opening therein acting as a restriction to the flow of fuel mixture through channel 146. The channel 146 in body portion 10 of the carburetor is in registration with a channel 148 contained in portion 12 of the carburetor body which terminates in a chamber 149 formed by a bore in the side wall of the body portion 12, the chamber being closed by means of a Welsh plug 150. The chamber 149 is in communication with the main mixing passage through the carburetor by means of two openings 151 and 152, the opening 151 being smaller in diameter than opening 152, the arrangement of opening 152 being such that when the throttle valve disk 41 is in idling or nearly closed position, the peripheral edge of the valve partially covers the opening 152. The idling mixture passes through orifice 151, a further partial opening of the throttle valve 41 causes the opening 152 to supply additional fuel and air mixture from the chamber 149 into the main mixing passage until the velocity of the air passing through the main mixing passage has reached a sufficient value under the influence of the acceleration of the engine to cause the main or primary jet 91 to discharge fuel into the main mixing passage. The bushing 147 forming the restriction by means of an opening smaller than the channel 146 and channel 144 is utilized to aid in breaking up the particles of fuel in the idling mixture, thus further atomizing the fuel to provide a better and more homogeneous idling mixture for delivery from the orifices 151 and 152. The screw 134 may be adjusted so that the needle 135 will control or regulate the amount of air admitted to the chamber 133 where it is mixed with fuel from channel 130 through restriction 132 to provide the fuel mixture to be supplied through orifices 151 and 152 as above set forth.

It is desirable in a carburetor of this character to incorporate means for momentarily injecting additional fuel into the mixing passage when the internal combustion engine is accelerated. To this end, there is provided a cylindrical chamber 155 formed adjacent the float bowl 16 in which is reciprocally positioned a piston rod 157 having at its lower extremity a member 158 which is snugly fitted upon a reduced portion 159 of the rod 157. Interposed between member 158 and a washer 160 which is positioned on rod 157 is a piston 161 fabricated of leather or other suitable material. In order to cause the leather piston to remain in close contact with the walls of the chamber 155, an annular groove 162 is formed

in member 158 and a circular coil spring is inserted in the groove 162 and urges the piston leather outwardly into contact with the walls of the cylinder. The upper extremity of the piston rod 157 projects through an opening in a cross arm 164, the cross arm being riveted as at 165 to an actuating shaft 166 reciprocally mounted in a bore in a vertically positioned boss 167 formed in the float bowl chamber. The upper portion of the piston rod 157 is provided with an annular groove (not shown) which receives a hairpin clip 156 so as to maintain a cooperative relationship between the cross arm 164 and the spring 175 in a manner to be hereinafter explained. The lower end of the shaft 166 is bored to receive the end 168 of a link 169, the link being pivotally connected to the shaft by means of a cotter pin 170. The lower end of the link 169 is bent at right angles and projects through an opening 171 formed in the end of the arm 60, the latter being fixedly secured to the polygonal extremity 172 of the throttle supporting shaft 39 as illustrated in Figures 1 and 7. Interposed between the disk 160 and the arm 164 and surrounding piston rod 157 is an expansive coil spring 175 which serves to normally urge the piston 161 away from the cross arm 164 and serves to cause a flow of fuel to an accelerating jet or orifice in a manner hereinafter to be explained.

The lower end of the cylinder 155 terminates in a channel 176 which communicates with the float bowl by means of a channel 177 shown in Figures 4 and 14. The upper portion of the channel 176 is enlarged as at 178 and accommodates a ball check 179 which serves to close the channel 176 when piston 161 is forced downwardly but serves to admit the passage of fuel from the float bowl through channels 176 and 177 into the well 155 to fill the latter with fuel when the piston is moved upwardly on its return stroke.

Communicating with the lower portion of cylinder or accelerating well 155 is a transversely arranged channel 181 which intercepts a vertical channel 182, (see Figures 6 and 7) the latter terminating in a slightly enlarged chamber 183 in the upper portion of which is positioned a bushing 184 having a channel 185 therethrough, a ball check 186 being arranged in chamber 183, these channels being contained within body portion 10 of the carburetor. The channel 185 in bushing 184 is in registration with a passage 187 at the entrance of which is interposed a fine mesh screen 188 for the purpose of preventing foreign particles that may be present in the fuel from reaching the discharge orifice. The passage 187 communicates with a chamber 189 formed in the upper portion 11 of the carburetor body, the walls of which are threaded and receive a closure or plug 190 as illustrated in Figure 6. The side wall of the mixing passage of portion 11 of the carburetor body is bored to receive a tubular member 191 which is pressed or otherwise secured in the bore in the side wall of the mixing passage, the tube depending angularly and having at its extremity a small opening forming a restricted fuel discharge orifice 192, the orifice terminating adjacent a restricted portion of the main mixing passage, viz., at a point of high air velocity adjacent the flange 77 so that an effective suction is present serving to withdraw fuel from the orifice 192. Thus, when the engine is to be accelerated the throttle is moved to an open position depressing shaft 166, cross arm 164, which compresses the spring 175 tending to urge the 75

piston 161 downwardly. Under the loading of the pressure in the spring 175, the piston moves downwardly forcing fuel from the chamber 155 through channels 181, 182, 183, 185, 187 and 191, thence through orifice 192 and is discharged into the mixing passage to supply the added fuel necessary for accelerative movements of the internal combustion engine. When the throttle is moved toward closed position, the connection between the cross arm 164 and piston rod 157 causes the piston to be drawn upwardly, thereby withdrawing fuel from the float bowl into chamber 155 past the ball check 179. The ball check 186 serves to normally check the return of fuel in channels 181 and 182, also prevents air from entering the fuel chamber 155, so that upon subsequent accelerating movement of the throttle these channels are already filled with fuel so that practically instantaneous extrusion of fuel through the orifice 192 takes place under the spring pressure exerted upon the piston 161 whenever slight downward movement of the cross arm 164 and shaft 166 takes place by slight opening movement of the throttle.

To obtain full power at open or nearly open throttle position it is desirable that the carburetor deliver additional fuel to the mixing passage in excess of the amount which will pass through the primary or main jet 91 and the secondary jet 92. To obtain this result the carburetor of our invention is formed with a boss portion 200 vertically bored to receive a shaft 201, the latter being reciprocally mounted in the bore. The lower portion of shaft 201 is reduced in size to form a tenon 202, which normally contacts with a ball check member 203 arranged in the upper end of an enlarged bore or chamber 204, the ball check 203 being held in its uppermost position under the influence of an expansive spring 205, the spring being held in place and the lower entrance to the chamber being closed by means of a threaded plug 206. The chamber 204 is in communication with a transversely extending channel 207 which communicates with a channel 208 leading into the chamber formed by recess 107 in the fitting or member 98. Diametrically opposed openings 106' permit the fuel in recess 107 to flow into the main or primary jet 91.

When the throttle has been moved to open or nearly open position, the cross arm 164 is thereby depressed and engages the upper extremity of the shaft 201 depressing the latter, the tenon 202 of which pushes the ball check 203 away from its seat and permits fuel to flow through channel 199 leading from the float bowl into the chamber 204, channels 207 and 208, recess 107, openings 106', thus supplying additional fuel direct from the float bowl through the above mentioned channels direct to the main nozzle 91. Such an arrangement in effect by-passes the fuel channel controlled by the metering pin 118 so that when power is needed with the throttle toward well open position, the same is supplied in the form of additional fuel to the main jet through the arrangement above described. When the throttle is only partially opened, the by-pass of fuel from the float bowl direct to the main nozzle is closed as soon as the ball check 203 is seated in chamber 204 under the influence of the spring 205.

The general operation of the carburetor of our invention is as follows:

At low or idling speeds with the throttle in substantially closed or idling position the fuel for the idling mixture passes from the fluid chamber

16 through opening 123 to the chamber 122 thence past the metering pin 118 through channel 102, passage 112 to the annular channel 108, thence through channels 128 and 130 to chamber 133 where it is mixed with air entering through the slot 141, the mixture then passing through chambers 144 and 146 to the chamber 149, thence through the opening 151 into the mixing passage. In the idling position of the throttle valve, the fuel mixture is extruded through the lowermost opening 151. Upon slight partial opening of the throttle, both of the orifices 151 and 152 deliver fuel mixture to the mixing passage. As the throttle is further opened the engine speed is increased and the suction increases in the mixing passage and the primary or main jet 91 begins to deliver fuel into the mixing passage at the central axis of the small venturi 79. At the time the main jet 91 delivers fuel into the mixing passage, the reed valves, due to air velocity and decreased pressure within the mixing passage will be caused to open slightly so as to permit an increased amount of air to pass through the mixing passage and in this manner prevent an overenrichment of fuel mixture passing to the engine. As the speed of the engine increases, the suction increases and therefore the proportionate degree of opening of the reeds is increased to accommodate the flow of air and fuel through the mixing passages. During the operation of the engine at comparatively high speed, in order to maintain a proper mixture ratio, the secondary jet 92 is caused to come into operation and deliver additional fuel into the mixing passage in order to maintain a substantially balanced mixture ratio of fuel to air. As the reeds open they assume a curved configuration which they attain under the rapid passage of air as illustrated in Figure 4, which configuration provides in effect a third venturi, thus obtaining a maximum flow of air through the opening afforded by the flexure of the reed valves and at the same time maintaining a high air velocity. This type of carburetor because of the variable effective area of mixing passage makes possible the utilization of a single carburetor for various types and sizes of internal combustion engines as the flexible wall passage accommodates the varying volume of fuel mixture required.

The operation of the accelerating well and power jet have been hereinbefore explained.

It is apparent that, within the scope of the invention modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What we claim is:

1. In a carburetor, in combination, a mixing passage; a plurality of axially aligned venturis substantially centrally arranged in said passage; a fuel discharge nozzle terminating substantially in alignment with the axis of said venturis, the extremity of the nozzle being an apex formed by intercepting angularly arranged surfaces; a plurality of flexible reed valves positioned adjacent said venturis and substantially equally spaced from the axis of said venturis, said valves adapted to flex to permit additional amount of air to pass through said mixing passage.

2. In a carburetor, in combination, a mixing passage; a plurality of axially aligned concentric venturis arranged in said passage; a plurality of flexible reed valves positioned adjacent said venturis and substantially equally spaced from the axis of said venturis, said valves normally re-

stricting the flow of air around said venturis, said valves adapted to flex to permit additional amount of air to pass around said venturis through said mixing passage.

5 3. In a carburetor, a mixing passage, a member positioned in said passage; a plurality of venturis positioned in said mixing passage and supported on said member, said venturis having substantially a common axis; and a plurality of converging flexible reeds positioned adjacent to and substantially equally spaced from the axis of said venturis, said reeds being secured to said member.

4. In a carburetor, in combination, a mixing passage; a plurality of venturis substantially centrally positioned in said mixing passage; a plurality of reed valves positioned exteriorly of said venturis and substantially equidistant from the central of one of said venturis; and a fuel ejecting nozzle angularly positioned with respect to the axis of one of said venturis and terminating adjacent thereto.

5. In a carburetor, in combination, a mixing passage; a plurality of axially aligned venturis in said passage; a plurality of flexible reed valves positioned surrounding said venturis and equidistant from the axis of said venturis, the relatively movable ends of said valves terminating at the extremity of one of said venturis, said valves normally restricting the flow of air to around said venturis, said valves adapted to flex to permit additional air to pass through said mixing passage.

6. In a carburetor in combination a fuel supply chamber; a mixing passage; a removable member normally supported in said mixing passage, said member including a plurality of axially aligned Venturi tubes of different sizes; a plurality of fuel discharge nozzles terminating adjacent the axis of said venturis; a plurality of converging surfaces spaced about the axis of said venturis carried by said removable member; and a plurality of flexible reed valves normally contacting with said converging surfaces for restricting the amount of air passing through said mixing passage.

7. In a carburetor, in combination, a mixing passage; a venturi positioned in said mixing passage; a second venturi into which said first venturi delivers; a plurality of flexible plates surrounding said venturis; a plurality of fuel discharge nozzles terminating in said mixing passage; one of said nozzles terminating in substantial alignment with the axis of said venturis and means for regulating the flow of fuel to one of said nozzles.

8. An air controlling means for a carburetor mixing passage including in combination a member having a skeleton structure formed with converging portions projecting in the direction of the central axis of said mixing passage; a venturi supported by portions of said member within said converging portions; a plurality of flexible walls secured at their upper extremities to said skeleton structure, each of said walls adapted to engage some of said converging portions; said flexible walls adapted to be flexed outwardly whereby an increased amount of air is enabled to pass around said venturi.

9. In a carburetor, in combination, a mixing passage; a frame positioned in said mixing passage; a venturi substantially centrally positioned in said mixing passage supported by said frame; a plurality of flexible valves carried by said frame and arranged outside of said venturi, said valves being spaced equally from said axis of said venturi; primary and secondary fuel discharge nozzles projecting through said frame and terminating adjacent said Venturi axis; and means for regulating the flow of fuel to said primary nozzle.

10. In a carburetor, in combination, a fuel supply chamber; a mixing passage; a removable frame structure normally supported in said mixing passage; said frame structure including a plurality of aligned Venturi tubes of different sizes; a plurality of fuel discharge nozzles terminating substantially adjacent the axis of said venturis, said fuel nozzles receiving fuel from the fuel supply in said chamber; said frame structure including a plurality of sets of converging uniplanar surfaces spaced about the axis of said venturis; and a plurality of flexible reed valves adapted to contact with said sets of uniplanar surfaces for regulating the amount of air passing through said mixing passage.

11. In a carburetor, in combination, a body formed of at least three connected sections; a plurality of heat resisting elements interposed between two sections; a fuel supply chamber adjacent to said central sections, said sections having hollow aligned portions forming a mixing passage; a tube communicating between said fuel supply chamber and an upper section of said carburetor body whereby said fuel supply chamber is vented from said mixing passage; an air regulating valve journaled in the upper section of said carburetor body; a venturi positioned in an intermediate section of said carburetor body; a fuel nozzle adapted to discharge fuel adjacent said venturi, said nozzle adapted to receive fuel from said fuel chamber; a plurality of flexible valves positioned about the axis of said venturi and adapted to flex; and a throttle valve journaled in a section of said carburetor body.

12. In a carburetor in combination of a mixing passage; means for delivery of fuel into said mixing passage comprising a primary and secondary unitary jet construction including a member having a substantially rectangular cross section, said member terminating at one extremity in a flanged portion; a pair of juxtapositioned channels in said member, the extremities of said channels opposite the flanged end of said member forming fuel delivery outlets for said mixing passage.

13. In a carburetor, a mixing passage; a member arranged in said mixing passage; a venturi arranged in said mixing passage and integrally formed with said member; a plurality of convergently arranged flexible reed valves positioned adjacent to and substantially equally spaced from the axis of said venturi, one end of each of said reed valves being fixedly secured to said member the other end of each of said reed valves terminating at the extremity of said venturi.

EARL A. RULLISON.
HOWARD B. SIMMONS.