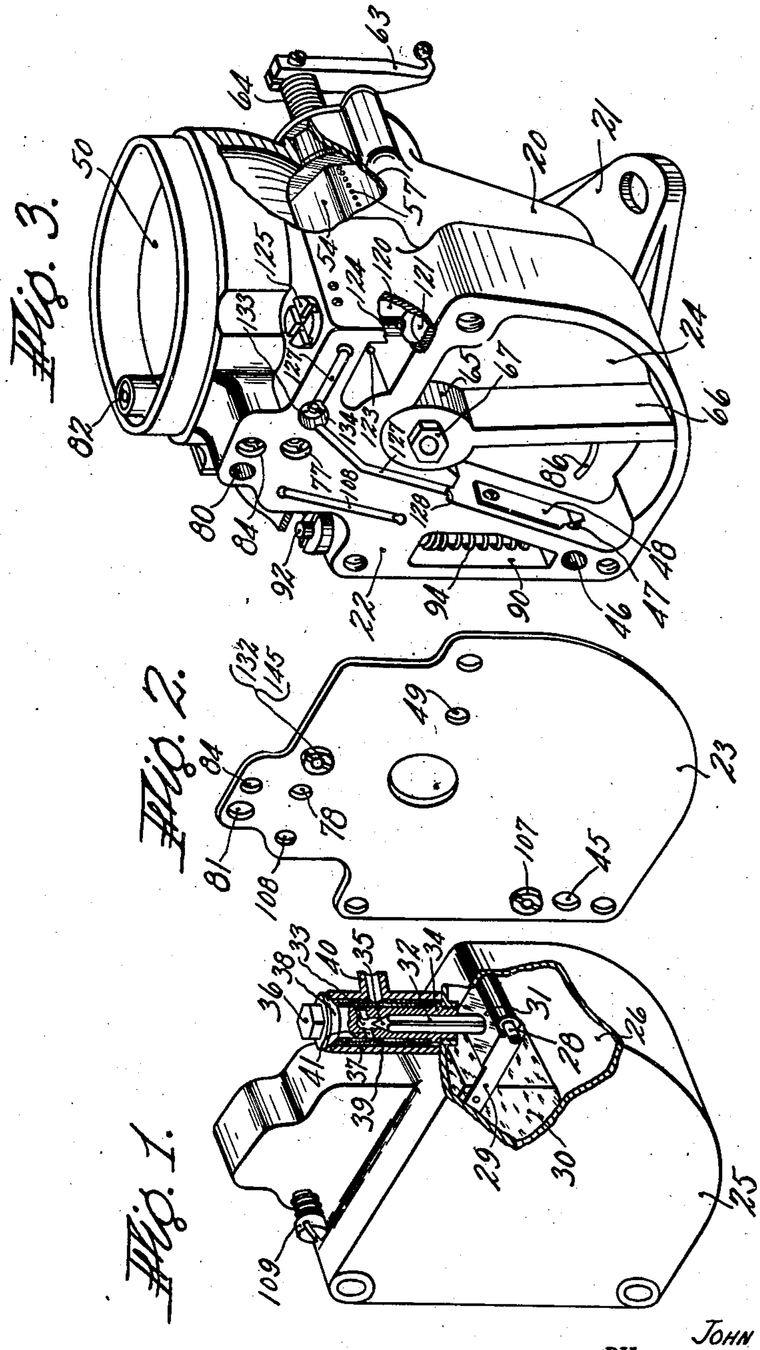
April 1, 1941. J. R. FISH 2,236,595

CARBURETOR

Filed July 31, 1933 4 Sheets-Sheet 1



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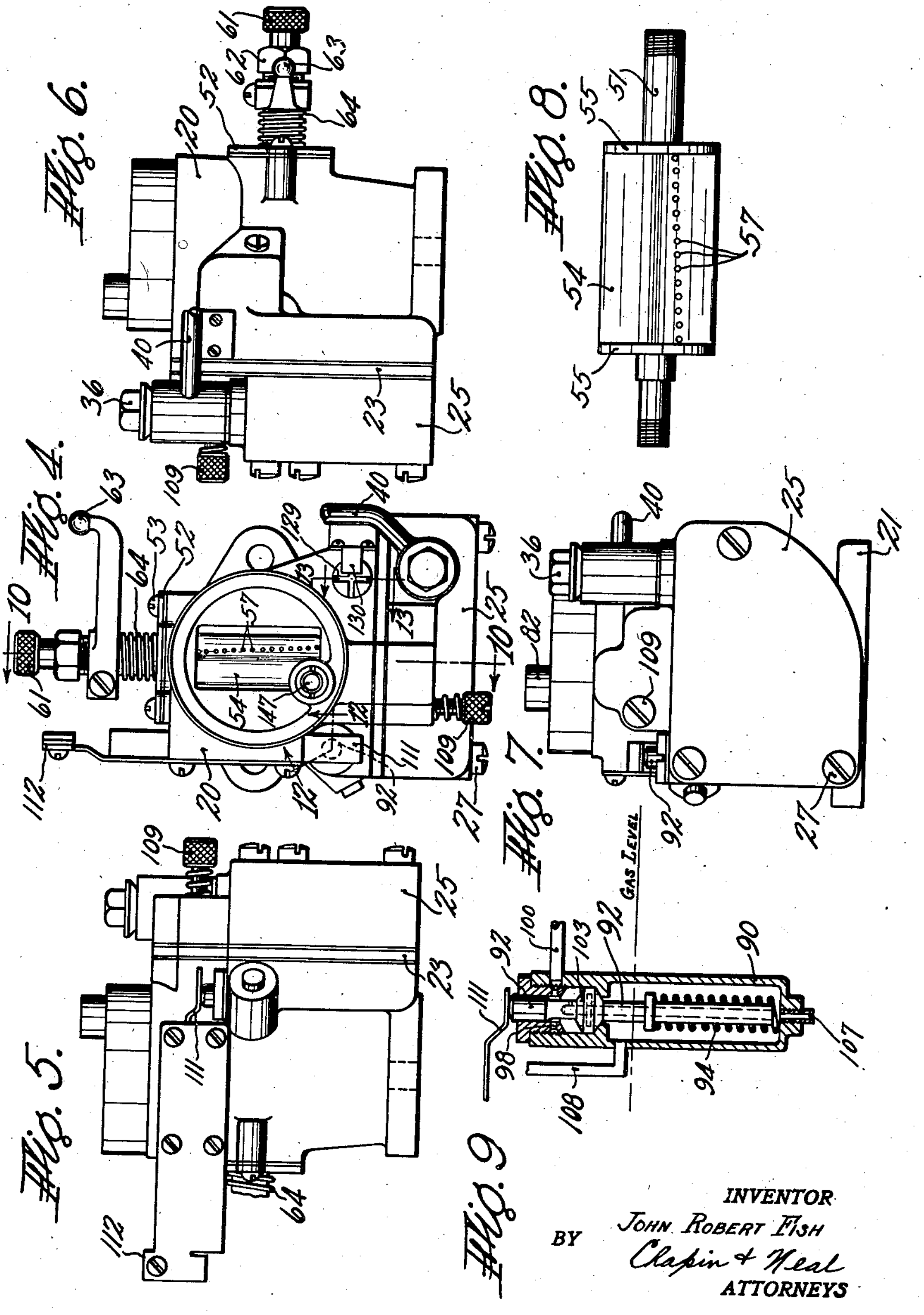

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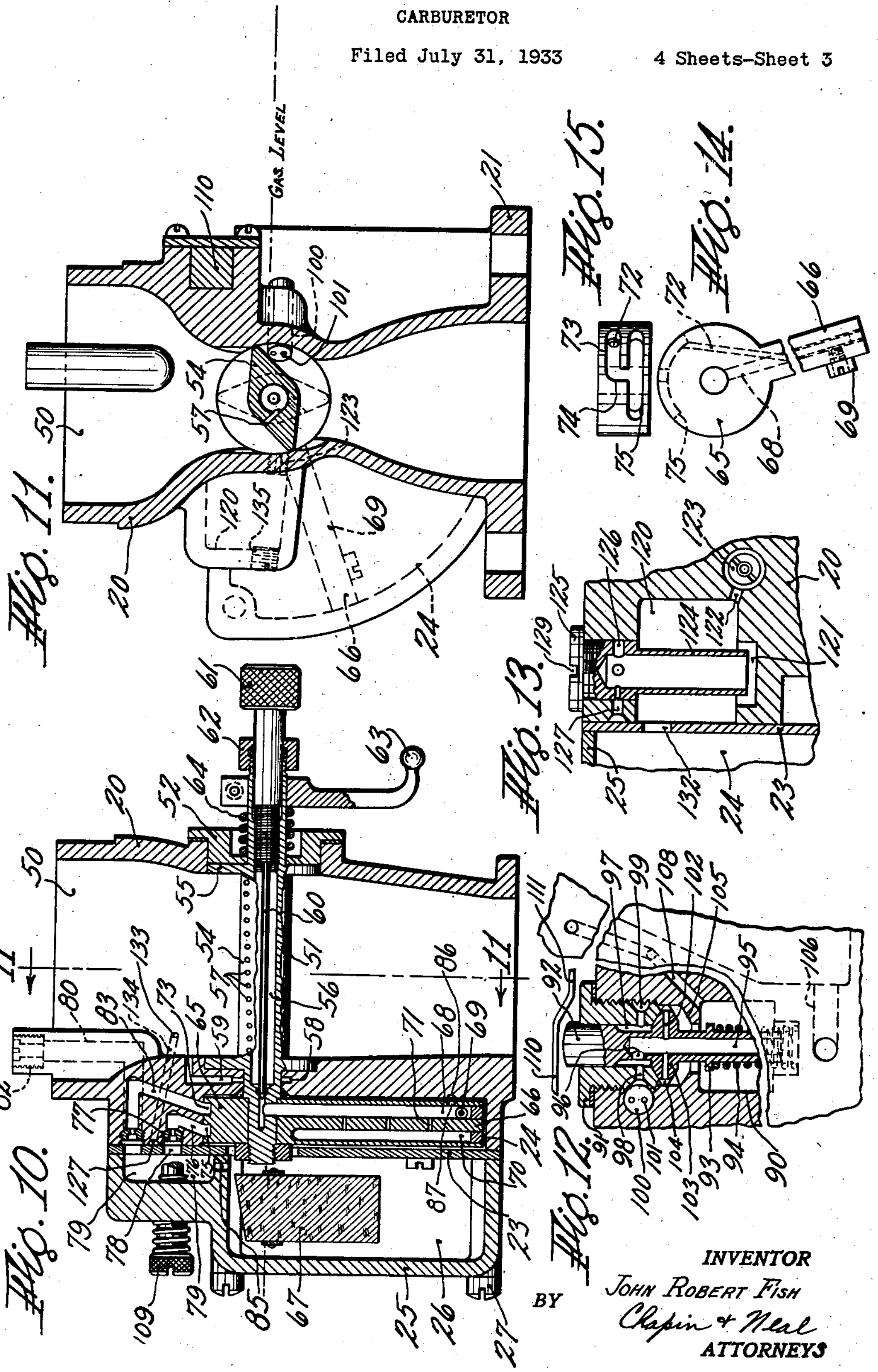
4 Sheets-Sheet 3



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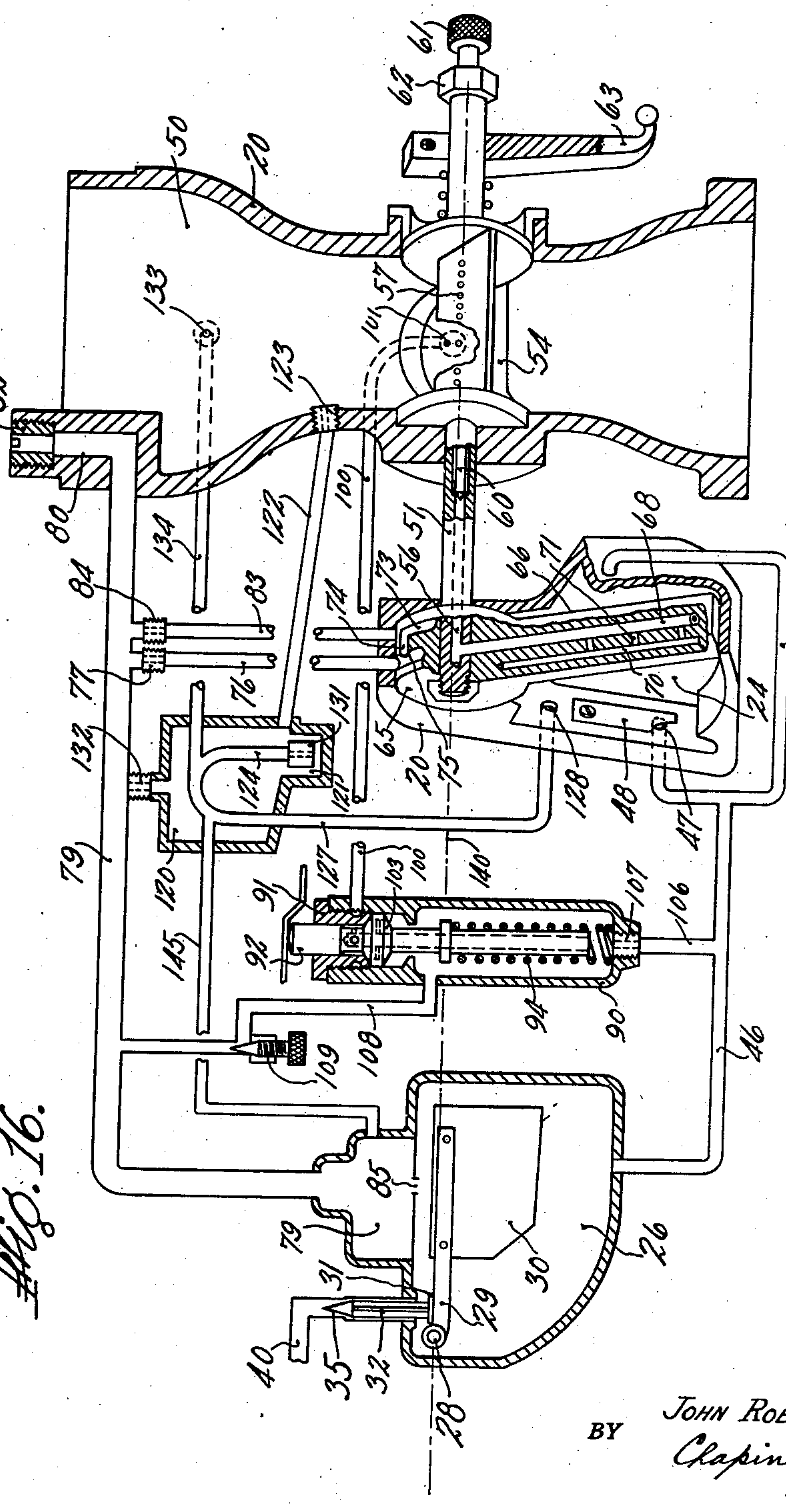

Fig. 16.

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CARBURETOR

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Application July 31, 1933, Serial No. 682,980

9 Claims. (Cl. 261—34)

This invention relates to carburetors, particularly such as are adapted for use on the internal combustion motors employed on automobiles. One object of the invention is to produce a carburetor which will accommodate itself to the varying mixture requirements automatically and without the use of mechanically varying nozzles or valves. Another object is to improve the distribution and atomization of the fuel in the air stream. Another object is to provide a carburetor which will produce a richer mixture when the throttle is opened to cause motor acceleration, and which will cause this enrichment of the mixture to persist for a period sufficient to permit full acceleration of the motor. Another object is to provide a carburetor which will automatically reduce the fuel flow when the throttle is shifted to cause deceleration of the motor. Another object is to provide a device for controlling the mixture for starting a cold motor in which efficient starting conditions will be maintained and in which there will be no danger of flooding the motor in case the starting control is inadvertently left in operation. Another object is to provide a carburetor having an improved idling system. Additional objects will appear from the following description and claims.

Referring to the drawings,

Fig. 1 is a perspective view of the float chamber of the carburetor, this chamber being shown as removed from its normal position, and this view together with Figs. 2 and 3, forming a composite view of the entire carburetor;

Fig. 2 is a perspective view of a plate dividing the float chamber from the main part of the carburetor;

Fig. 3 is a perspective view of the main part of the carburetor with the float chamber and the dividing plate removed;

Fig. 4 is a top plan view of the carburetor;

Fig. 5 is a side view of the carburetor, looking from the starting control side;

Fig. 6 is a side view of the carburetor, looking from the gasoline admission side;

Fig. 7 is a view of the float chamber end of the carburetor;

Fig. 8 is a detail of the throttle valve;

Fig. 9 is a diagrammatic detail of mechanism used mainly in the starting operation, the parts being shown in different positions than in Fig. 16;

Fig. 10 is a section through the carburetor on line 10—10 of Fig. 4;

Fig. 11 is a section on line 11—11 of Fig. 10;

Fig. 12 is a section on line 12—12 of Fig. 4;

Fig. 13 is a section on line 13—13 of Fig. 4;

Fig. 14 is a detail of the fuel feeding arm;

Fig. 15 is a top plan view of the arm shown in Fig. 14; and

Fig. 16 is a diagrammatic view illustrating the connection of the several parts and their manner of functioning.

For simplicity the specific mechanism constituting the preferred embodiment of the invention will be described first with little reference to the way in which the several mechanisms cooperate. It will be understood, however, that the detailed forms of these parts may be varied without departing from the invention as set forth in the claims, and that the description of mechanical structure with considerable minuteness is for purposes of clarity and not by way of limitation. The carburetor is shown as built around a body portion 20 having a flange 21 by which it may be secured to the intake manifold of an internal combustion motor. One side of the body is flattened off at 22 to receive a separating plate 23 which forms a side wall of a gasoline chamber 24, the purpose of which will be described below. Upon the other side of the plate is a casting 25 hollowed out to form a float chamber 26. The casting 25, the plate 26, and the body 20 are held together by screws 27, the heads of which are preferably ground in place in order to avoid the use of gaskets.

Within the float chamber 26 is a transverse pivot pin 28 supporting spaced arms 29. Between these arms are fixed a float 30 and a plate 31. A needle 32, preferably angular in cross-section to permit flow of gasoline along its sides, slides freely in a central bore 33 formed in a nozzle 34, and has a tapered end 35 bearing against a constriction in the bore. The needle rests loosely upon the float, and is raised and lowered by the vertical movement of the latter so as to regulate the rate of flow of gasoline into the float chamber and maintain the level therein. The nozzle 34 is screwed into the top of the casting 25, and has a nut-shaped top 36 by which it may be turned. A sleeve 37 surrounds the nozzle, seating at its bottom on a suitable gasket placed on the casting, and engaged at its top by a conical flange 38 on the nozzle which may seat with a ground joint. A cylindrical screen 39 is placed in the space between the sleeve and the nozzle if desired, so as to filter the incoming gasoline. Gasoline is led from the fuel pump or tank into the sleeve by a pipe 40, passes through the screen, and enters the bore 33 through a plurality of holes 41 situated above the constricted portion. This valve mechanism operates in general like the usual float valve, but has the advantage of being removable without disassembling the carburetor. Regulation of the level of gasoline within the float chamber is obtained by changing the thickness or number of gaskets underneath the sleeve 37.

A hole 45 is formed in the plate 23 to permit gasoline to pass from the float chamber into a passage 46 formed in the body portion and communicating at 47 with the chamber 24. The opening 47 is covered by a feather valve or spring plate 48 which functions as a check valve, permitting flow out of the float chamber but preventing flow in the opposite direction. A second passageway 49 between the float chamber and the chamber 24 is provided in the plate 23 for a purpose to be described later.

The body 20 is formed with an air passage 50 here shown as centrally contracted as best shown in Fig. 11 to form a constriction or venturi. Extending transversely through this constriction is a shaft 51, journaled at one end in the body portion 20 and at the other end in a removable gland 52 held in place as by screws 53. The central portion of this shaft is formed with a throttle 54 here shown as having the general form of a double wedge placed between flanges 55 running in circular recesses in the wall of the air passage, although its shape may be varied in accordance with the shape of the air passage. A fuel passage 56 runs through the center of the shaft, and is connected by holes 57 with one of the surfaces of the throttle. The average automobile engine is set on somewhat of a slant, and for this reason it is sometimes preferable to arrange the holes 57 on a slanting line, as shown in Fig. 8 and Fig. 10, so that they will lie on a level line when the carburetor is in position. The hydrostatic head at the opening of each of the holes is by this means made equal. In order to prevent leakage between the air passage 50 and the fuel chamber 24, a groove 58 is preferably formed around the shaft 51 connected to the atmospheric side of the air passage 50 by a duct 59. While it is not essential, and in many installations will not be used, a needle valve 60 having an adjusting head 61 and passing through a packing gland 62 may be threaded into the passage 56 so as to bear adjacent a reduced portion thereof, and thus regulate the supply of fuel to the holes 57. The position of the throttle can be adjusted by means of the usual control arm 63, a compression spring 64 placed between this arm and the gland 52 serving to hold the fuel feeding arm 66, described below, against the inner surface of the fuel chamber 24, sealing it against leakage.

Over a portion of the shaft 51 at its end remote from the throttle arm is fitted the cylindrical head 65 of a fuel feeding arm 66, held in place as by a nut 67. A passage 68 extending longitudinally through the arm connects at its upper end with the passage 56 and at its lower end communicates through a removable nozzle 69 with the side of the arm adjacent the feather valve 48. Communication is thus established between the holes in the throttle and the fuel in the chamber 24. An additional passage 70 in the arm preferably communicates with the passage 68 through a series of small holes 71, and at its upper end is joined by a passage 72 (Fig. 14) with an arcuate groove 73 formed in the surface of the cylindrical head 65. This passage 72 is joined by a cross groove 74 with a second arcuate groove 75 of greater length. A passage 76 in the body 20 mates with the long groove 75 throughout the swinging movement of the fuel feeding arm, this passage communicating through a jet 77 and a hole 78 in the plate 23 with an air chamber 79 formed in the casting 25. A passage 80 leading from this air chamber through a hole 81 in the plate 23 is connected to the atmosphere through a jet 82. Air is admitted to the shorter groove 74 through a passage 83 connected to the chamber 79 through a jet 84. A passage 85 joins the chamber 79 to the float chamber 26. The float chamber and the air chamber are thus maintained under substantially atmospheric pressure. The supply of air to the arm passage 70 varies in different positions of the throttle, air being received from both the passages 76 and 83 until the throttle is about half way open, when the passage 83 connecting with the short groove is cut off. The purpose of this construction will be described below. An alternative way of enriching the mixture as the throttle is opened is to provide one or more grooves 86 in the side of the chamber 24, with which a hole 87 in the arm 66 is adapted to register in certain positions of the throttle. The hole 87 communicates with the passage 68 to provide an additional fuel orifice. By varying the length and location of the grooves 86 the fuel flow may be adjusted as may be required at different throttle openings.

The section of the device now to be described relates mainly to the functioning of the carburetor in starting the motor, although it has a modified action after the motor is running. A well 90 formed in the body 20 and closed at one side by the plate 23 is closed at its top by a gland 91, furnishing bearing for a plunger 92. A flange 93 on the reduced lower end of this plunger serves as an abutment for a spring 94 by which the plunger is normally held in an elevated position. The plunger is not long enough to reach the bottom of the well in either its elevated or depressed positions, and has a central hollow passage 95 through which gasoline may pass upwardly from the well. There are two sets of openings from the upper end of this central passage. One set comprises preferably a single hole 96 entering a circumferential groove 97 in the plunger which communicates through a passage 98 with a similar groove 99 in the gland 91. The latter groove is joined by a passage 100 with a nozzle or jet 101 positioned within the constricted portion of the main air passage at a point just below the rear side of the throttle when in closed position, as shown in Fig. 11. (For convenience the side of the throttle not containing the fuel feeding holes 57 will be referred to as the rear side.) The second set comprises a series of holes 102 extending radially through an enlargement 103 of the plunger and terminating in longitudinal notches 104. The enlargement 103 is doubly frustoconical in form and is adapted to rest against the beveled lower end of the gland 91 when the device is in position for normal engine running, and to bear against the beveled upper side of a flange 105 when the plunger is depressed into the motor starting position. Flange 105 does not reach to the plunger 92, an air space being left by which, when the plunger is elevated, the upper part of the chamber 90 is communicating through the notches 104 and thus into the upper part of the passage 95 and hole 96. Flange 105 does, however, extend inwardly beyond the notches 104, so that when the plunger is depressed these notches are cut off from communication with the chamber 90. The chamber 90 is fed with gasoline by a passage 106 leading from the float chamber and entering the chamber 90 by a removable jet 107. By changing this nozzle the rate of flow of gasoline into the chamber may be controlled. An air passage 108, the flow through which may be controlled by a needle valve 109, joins the chamber 90 with the air chamber 79 previously described. Operation of the plunger may be controlled by any suitable device, either thermostatically or from the dash. In the case shown, a slide 110 is mounted in ways formed in the carburetor body, and bears a cam-shaped end 111 which acts to depress the plunger when the slide is moved. A clamp 112 (Fig. 4) is also mounted on the body to receive the usual Bowden wire tube, the wire of which is connected to the slide so that it may be operated from a distance.

The last mechanical assembly to be described has a desirable additional function in accelerating the engine when the throttle is quickly opened, and may be omitted if not needed for particular installations. A chamber 120, provided with a well 121, is formed in the carburetor body, and is joined by a duct 122 to a jet 123 entering the air passage 50 at a point just above the front side of the throttle when the latter is closed. Dipping into the well 121, although stopping clear of its bottom, is a tubular member 124 having a head 125 rotatable within a hole in the body 20. A plurality of holes 126 of different sizes selectively connect the interior of the tube to a duct 127 connected to the gasoline chamber 24 at 128. The head 125 is provided with slots 129 into which a spring detent 130 fits so that the member 124 may be held with any desired one of the holes 126 in register with the duct 127. The tubular member thus acts as an adjustable nozzle 131 (Fig. 16) by which the inflow of gasoline from the chamber 24 is regulated. Substantially atmospheric pressure is maintained in the upper portion of the chamber 120 by a duct 132 leading to the chamber 79. It will be apparent that if the fuel arm 66 be moved towards the feather valve 48 (as it is when the throttle is suddenly opened), the feather valve will close, and gasoline will flow through the duct 127 into the chamber 120, discharging therefrom through jet 123. If the fuel arm be quickly moved in the reverse direction, as in closing the throttle, a suction effect will be produced, serving to siphon out the gasoline remaining in the chamber. It is also preferable to have the duct 127 connected directly with a nozzle 133 in the air passage wall (Figs. 10 and 16) by a duct 134 for a purpose to appear. Access to the replaceable jet 123 may be had through a removable plug 135 in the outer wall of the chamber 120.

Consideration of the operation of the carburetor will be begun on the assumption that the motor is to be started when cold. The action of the present carburetor is fundamentally different from that of the usual carburetor choke control. For the starting operation the plunger 92 is depressed, bringing the enlargement 103 against the flange 105 and cutting off direct communication between the top of chamber 90 and the notches 104. The throttle is nearly or entirely closed, bringing the holes 57 above the fuel line 140 and thereby cutting off flow of gas through them. The nozzle 101 is, however, situated below the throttle, in the region of low pressure created by the motor as it is turned over. The differential pressure acts through the duct 100, causing gasoline to pass through the plunger 92 and the lateral hole 96. It will be remembered that the upper part of chamber 90 is kept at substantially atmospheric pressure by the duct 108. A slug of raw gasoline will be moved through the duct 108, mingling with what air passes the throttle. This condition will be only temporary, since the hole 96 will pass gasoline faster than it is admitted to the chamber through the nozzle 107. This causes the fuel level in the chamber to fall until it reaches the bottom end of the plunger. The quantity of fuel passed by this means will be just sufficient for the first few explosions, serving to get the motor started. After this air enters the hollow plunger along with the gasoline, reducing the richness of the mixture and automatically preventing flooding.

After the motor has warmed up the plunger is released, bringing its enlarged portion against the bottom of the gland 91. Under this condition the air from duct 108 can pass the notches 104 and enter the radial holes 102 so as to emulsify the fuel rising through the plunger. A large part of the suction exerted by the motor through the duct 100 is thus satisfied, and the richness of the mixture passing through nozzle 101 is further reduced, and the gasoline still more fully mingled with the air. By reducing the effective fuel feeding pressure by this means it is possible to make hole 96 larger than would otherwise be the case, avoiding the danger of plugging. As the throttle is opened the amount of gasoline entering the air passage 50 through the nozzle 101 is reduced so that under normal running conditions it is negligible. While the motor is idling, however, the chamber 90 supplies most of the mixture required. The amount of air reaching the chamber, and therefore the richness of the mixture leaving it, is regulated by the needle valve 109.

If the throttle is partly opened, as it is in medium speed running conditions, a different balance of operations exists. The constricted portion of the carburetor throat 50 is shaped differently at the two sides of the throttle, the front side (the side where the holes 57 are located) being cut away more than the rear side of the throat, which fits the edge of the throttle closely until the latter has been opened some little distance. Under moderate throttle openings the air can be treated as if passing the front throttle edge only. Instead of the holes 57 being above the gasoline level 140, as they were when the throttle was substantially closed, these holes are brought to or below that level. This causes the gasoline to discharge through the holes and to flow down the face of the throttle where it mingles with the incoming air. The effect of gravity is added to by the differential pressure existing between the low pressure at the Venturi throat and the substantially atmospheric pressure existing in the float and fuel chambers. As the throttle is more fully opened the holes 57 descend further and further into the constricted portion of the venturi, so that this differential effect is increased both by the change in position of the holes and by the increase in the differential pressure resulting from increased air flow, and at the same time the gravity effect is increased by the lowering of the holes. The quality of the mixture can be controlled by the addition of the air which flows down the back side of the throttle to that which comes down the front side, both sides of the throttle passing air after the throttle has opened a predetermined amount, which can be regulated by the relative shapes given to the throttle and to the restricted part of the air passage 50. The air passing down the rear side of the throttle acts both to lean the mixture directly and to satisfy some of the suction effect of the motor so that the differential fuel feeding pressure at the holes 57 is reduced.

The gasoline reaching the throttle through the passage 56 is mixed with air from the air duct 70 in the fuel arm, if this duct is employed. It will be recalled that this duct is coupled to the fuel passage 68 by holes 71, and is joined to the air ducts 76 and 83 by grooves 73 and 75 in the cylindrical hub of the fuel arm. Both of these grooves are active during the lesser ranges of throttle opening, but groove 75, and consequently nozzle 77, act alone when the throttle is more widely open, thus enriching the mixture to full power quality. The air coming through the duct 70 has two functions. It acts to satisfy somewhat the suction effect of the venturi, and thus serve as a regulator for the richness of the mixture. To accomplish this regulation the nozzles 77 and 84 may be made adjustable, similarly to the needle valve 109, or they may be replaceable screws having fixed holes. In its second aspect, the air entering the fuel duct through passage 70 serves to emulsify the gasoline, making it lighter and assisting in its vaporization.

If the throttle be suddenly opened, as when it is desired to cause sudden acceleration of the motor, additional effects come into play. It will be observed that an opening movement of the throttle causes the fuel arm to move toward the feather valve 48. The valve is thereby closed, and a slug of the trapped gasoline will be forced up the passage 68 and out through the fuel openings in the throttle, thus richening the mixture and providing for wetting of the manifold walls as required for the added power called for from the motor. Instead of using an additional nozzle as in the usual accelerating pump, the gasoline is by this means driven out the usual fuel openings with a velocity dependent upon the speed with which the throttle is opened, and with no appreciable time lag after the opening of the throttle. The main fuel feeding system is instantly at full discharge. At the same time gasoline is forced by the fuel arm up the duct 127 into the chamber 120 in an amount corresponding to the degree to which the throttle is opened and by the size of the aperture in the nozzle 131. The gasoline from this chamber discharges into the air stream through the nozzle, producing an enrichening of the mixture throughout a period normally sufficient to permit the motor to pick up to the speed desired, and acts as a device aiding the transition from the normal economy mixture to a power mixture. In this respect the action differs from the usual acceleration pump, which is operative only so long as the throttle is being opened. The length of this period is regulable by the amount of gasoline put into the chamber 120, controlled by the size of the nozzle 131 and by the size of a bypass 145 (Figs. 2 and 16) to the float chamber. The added richness of the mixture during the transition period is controlled by the sizes of the nozzle 123 and the vent 132. In case the throttle is closed before the gasoline in chamber 120 is exhausted, the movement of arm 66 away from opening 128 causes a reverse flow of gasoline in duct 127, siphoning the gas out of the chamber 120 and preventing the functioning of this device after the reason for calling it into action has gone. A further reduction in the richness of the mixture during sudden closure of the throttle is accomplished by a tendency of the gasoline to be drawn back through duct 68 as the arm 66 is moved away from the valve 48, cutting off the wasteful flow of fuel due to momentum acquired during high speed operation. If it is desired to secure more initial richening of the mixture, or wetting of the manifold walls, than can be accomplished through the throttle openings, the direct connection 134 from the duct 127 to nozzle 133 may be used. This is effective only during the filling of the chamber 120 and does not affect the continued action of the latter.

During the running of the motor with small throttle openings, the rear side of the throttle does not pass any substantial amount of air. An eddying of the mixture passing the front side of the throttle occurs below the throttle which assists in the adequate mixing of the gasoline and air. This effect is reduced as the rear side of the throttle passes more and more air during further opening, so that the resistance offered by the eddy currents is reduced. At the same time the volume of air flow through the venturi increases, the openings 57 are lowered more and more into the low pressure zone of the venturi, and the differential pressure between this low pressure zone and the atmosphere increases because of the added velocity at high speeds. If the motor is running slowly at full throttle, the pressure differential is not as great as at high speed, but the gravity flow through the lowered openings 57 has a much greater relative effect, automatically producing the richer power mixture called for under these conditions. When properly adjusted for a particular engine the carburetor will give much better economy than is possible with existing commercial carburetors, and at the same time the richer power mixture will be produced whenever the motor load warrants it. It will be observed that this is accomplished automatically without the use of nozzles which are varied in setting during the operation of the motor. When once adjusted, all openings are constant, but due to balancing of pressures and change in the position of holes 57, the varying mixtures required are produced automatically.

It will be observed that the air space above the fuel in the float chamber is connected to the atmosphere through the passage 79 and a nozzle 82. Air supplied to the various parts through passages 108, 132, 76, and 83 is obtained through this same chamber, and the pressure of air in the float chamber is thus a reflection of the engine manifold pressure modified by the effect of the nozzle 82. As the load on the engine drops the manifold pressure will be reduced, causing a decreased pressure of air in the float chamber. This operates to decrease the richness of the mixture when the motor is not under load, irrespective of throttle position, and causes an automatic change in the richness of the mixture as the power requirements of the motor fluctuate. The carburetor is also through this means made substantially independent of changes in atmospheric pressure due for example to altitude.

I claim:

1. A carburetor having a constricted air passage, a throttle located in the constricted portion of the passage and provided with fuel distributing openings located in its surface, a segmental fuel chamber, an arm secured to the throttle and movable arcuately in said chamber about the axis of the throttle, a passage through said arm connecting with said fuel openings in the throttle and opening into said chamber, and means for supplying said chamber with fuel.

2. A carburetor having a constricted air pas-

sage, a throttle located in the constricted portion of the passage and provided with fuel distributing means, a fuel chamber, an arm secured to the throttle and movable in said chamber, a check valve opening into said chamber on the side to which the arm moves as the throttle is opened, fuel metering means opening from the arm into the chamber on the side of the arm adjacent the check valve, a duct connecting said means with the openings in the throttle, and means for supplying said chamber with fuel.

3. A carburetor having a constricted air passage, a throttle located in the constricted portion of the passage, and provided with fuel openings in its surface, a fuel chamber, an arm secured to the throttle and movable in said chamber, a passage through said arm connecting with the fuel openings in the throttle and opening into said chamber, means for admitting air to the passage in the arm whereby it may mingle with the fuel therein, and means for supplying said chamber with fuel.

4. A carburetor comprising a mixing passage, a float chamber, a fuel chamber, a throttle in the mixing passage, an arm in the fuel chamber and coupled to the throttle for movement therewith, connections between the float chamber and the fuel chamber on opposite sides of the arm, a check valve interposed in the connection on that side of the fuel chamber towards which the arm moves on opening the throttle and operating to prevent flow from the fuel chamber to the float chamber, and a fuel passage through the arm opening at one end into the fuel chamber on the side containing the check valve, and opening at the other end into the mixing passage, whereby fuel may pass during normal operation through the arm to the mixing passage, and an additional amount will be forced through the arm into the mixing passage on sudden opening of the throttle.

5. A carburetor comprising a main air conduit adapted to be coupled to the intake manifold of an internal combustion motor, a rotatable throttle in the air conduit, the conduit and throttle being relatively so shaped as to produce a constriction in the air passage where the air passes the throttle, a float chamber, a segmental fuel chamber, an arm fitting snugly in the fuel chamber and connected to the throttle for oscillation coaxially therewith, a connection between the float chamber and the fuel chamber on the side towards which the arm moves on opening the throttle, a check valve interposed in said connection and operating to prevent flow from the fuel chamber to the float chamber, and a fuel passage through the arm opening at one end into that side of the fuel chamber towards which the arm moves on opening the throttle, and opening at the other end onto the surface of the throttle, whereby fuel may pass during normal operation through the arm to the main air conduit and an additional amount will be forced through the arm into the mixing passage on sudden opening of the throttle.

6. A carburetor comprising a main air conduit adapted to be coupled to the intake manifold of an internal combustion motor, a rotatable throttle in the air conduit, the conduit and throttle being relatively so shaped as to produce a constriction in the air passage where the air passes the throttle, a float chamber, a segmental fuel chamber, an arm fitting snugly in the fuel chamber and connected to the throttle for oscillation coaxially therewith, a connection between the float chamber and that side of the fuel chamber towards which the arm moves on opening the throttle, a check valve interposed in said connection and operating to prevent flow from the fuel chamber to the float chamber, a fuel passage through the arm opening at one end into that side of the fuel chamber towards which the arm moves on opening the throttle, and opening at the other end onto the surface of the throttle, whereby fuel may pass during normal operation through the arm to the main air conduit, and an additional amount will be forced through the arm into the conduit on sudden opening of the throttle, a metered air inlet opening into the float chamber, a second passage in the arm connected by holes with the first passage, and means for admitting air to the second passage.

7. A carburetor comprising a main air conduit, a throttle in said conduit, a constant level fuel supply chamber, a fuel chamber connected thereto, an arm in said fuel chamber connected to the throttle for movement therewith, a main fuel connection between the fuel chamber and the mixing passage, and a well having a gravity connection to the mixing passage and connected to the fuel chamber on the side thereof toward which the arm moves on opening the throttle, whereby on opening the throttle rapidly a supernormal amount of fuel will be ejected into the mixing passage through the main fuel connection by the movement of the arm, and a quantity of fuel will also be forced into the well to enrich the mixture for a substantial time after opening of the throttle.

8. A carburetor comprising a main air conduit, a throttle in said conduit, a constant level fuel supply chamber, a fuel chamber connected thereto, an arm in said fuel chamber connected to the throttle for movement therewith, a main fuel connection between the fuel chamber and the mixing passage, and a well having a gravity connection to the mixing passage and connected to the fuel chamber on the side thereof toward which the arm moves on opening the throttle, whereby on opening the throttle rapidly a supernormal amount of fuel will be ejected into the mixing passage through the main fuel connection by the movement of the arm, and a quantity of fuel will also be forced into the well to enrich the mixture for a substantial time after opening of the throttle and whereby the well will be drained and a subnormal flow of fuel through the main fuel connection will be brought about by a reverse movement of the arm due to a rapid closing of the throttle.

9. A carburetor having, in combination, a body member forming a main fuel and air passage and a fuel supply chamber adjacent said passage, a throttle, a shaft rotatably mounted in said body member carrying said throttle and having one end thereof extending into said fuel chamber, means for supplying fuel to said main passage comprising a passageway in said shaft, and a tubular member carried on said shaft in said fuel chamber adapted to swing therewith and extending downwardly into the fuel, means providing a metering inlet port for limiting the flow of fuel to said passageway, means forming a supplemental inlet port, a valve normally closing said supplemental inlet port, and means for opening said valve when the throttle reaches a predetermined point in its opening movement.

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