June 1, 1937. T. LINGA 2,082,293

CARBURETOR

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Fig. 1.

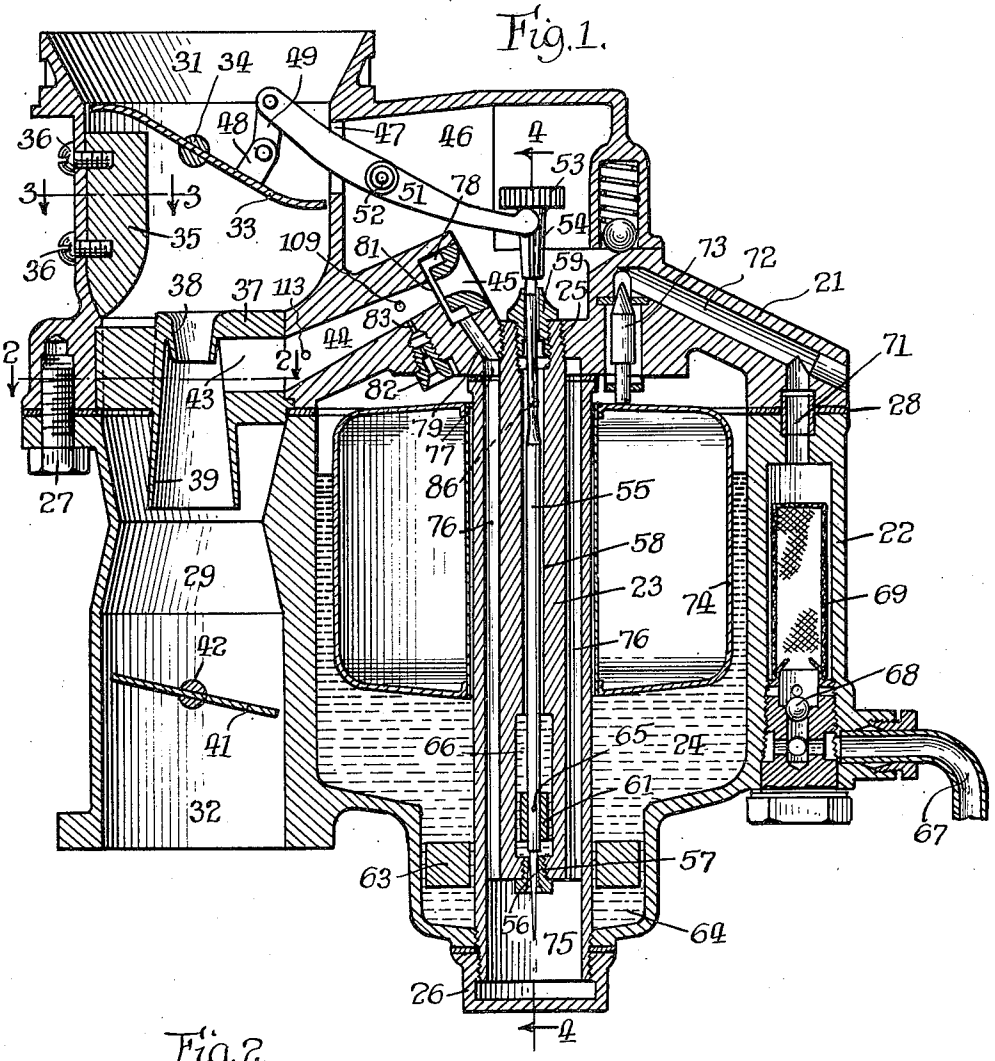


Fig. 2.

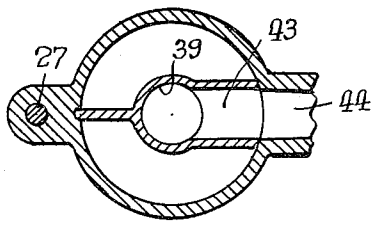
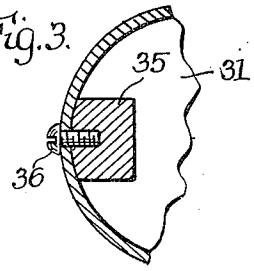


Fig. 3.



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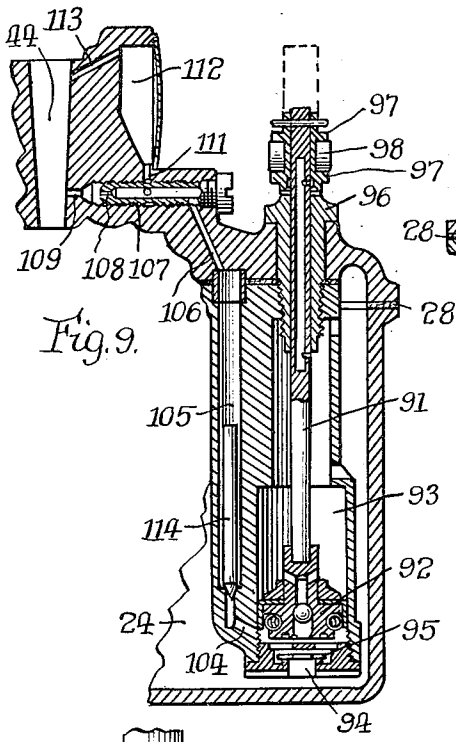

Fig. 9.

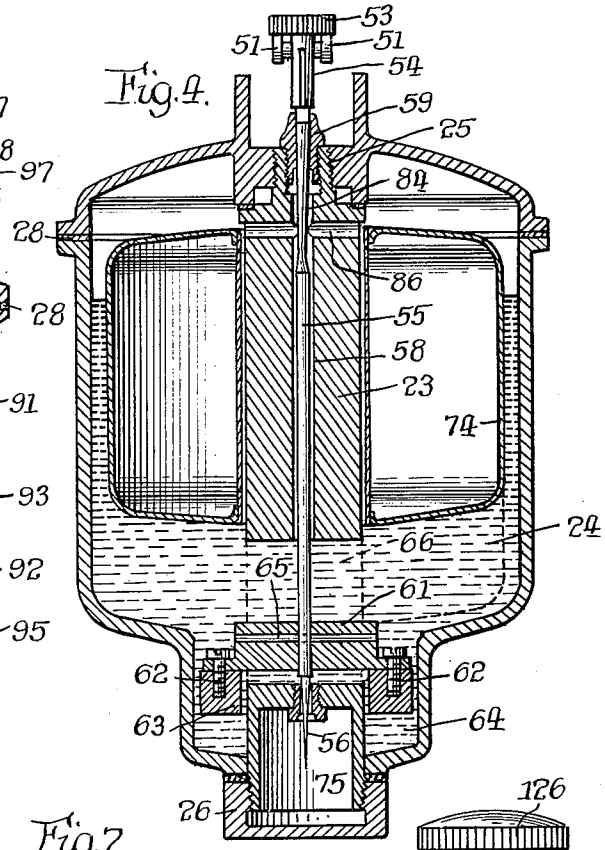

Fig. 4.

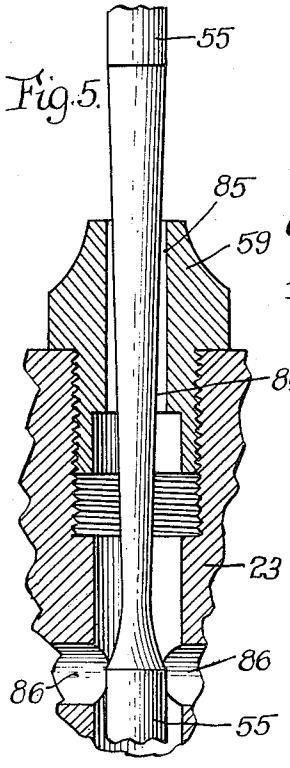

Fig. 5.

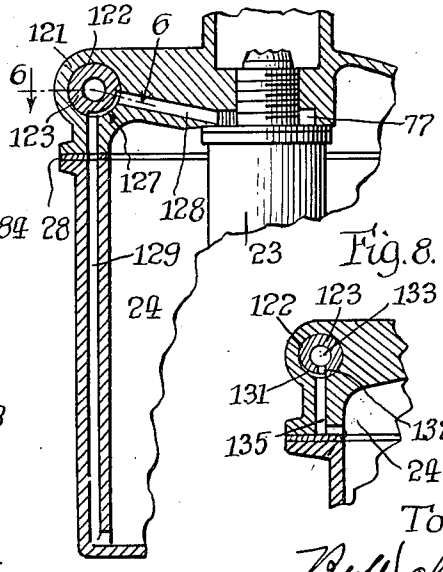

Fig. 7.

Fig. 8.

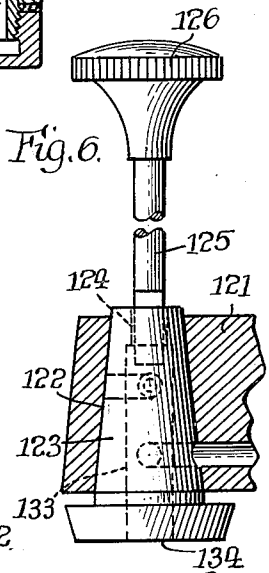

Fig. 6.

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Fig. 10.

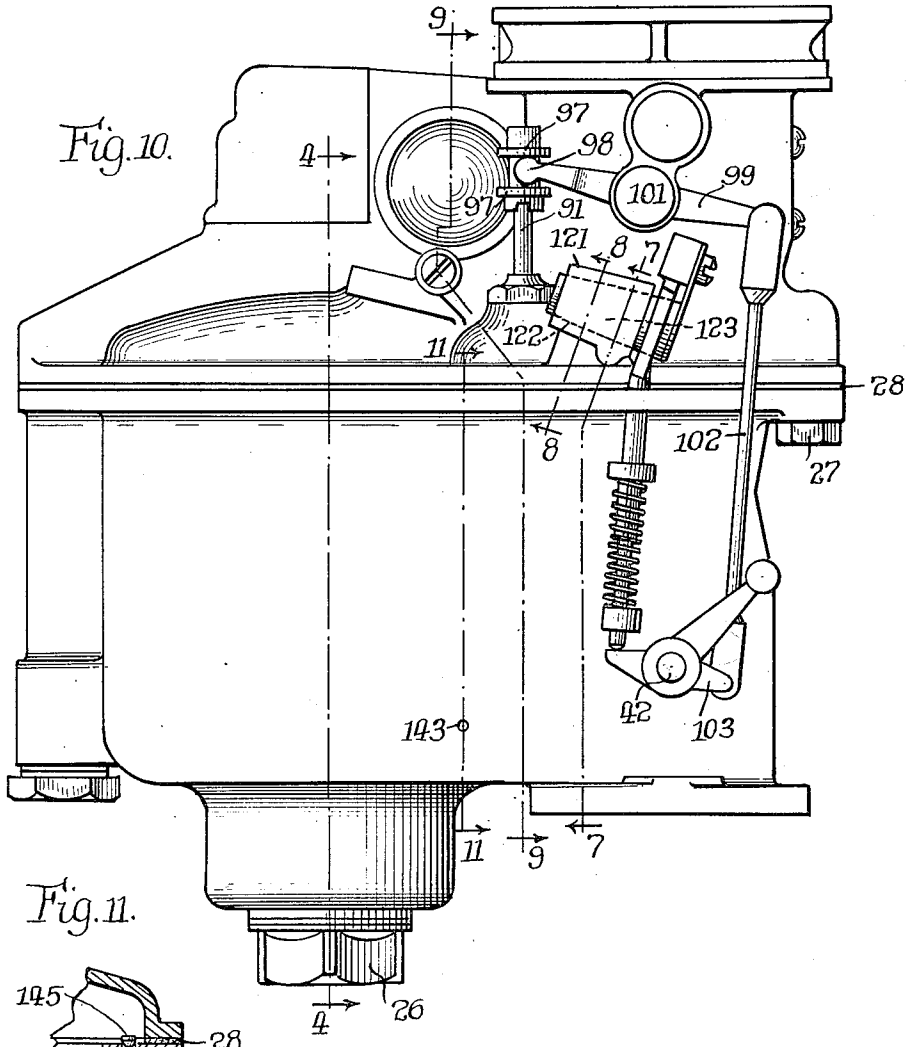

Fig. 11.

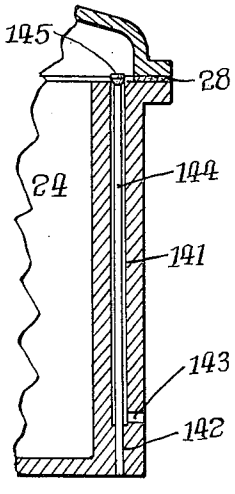

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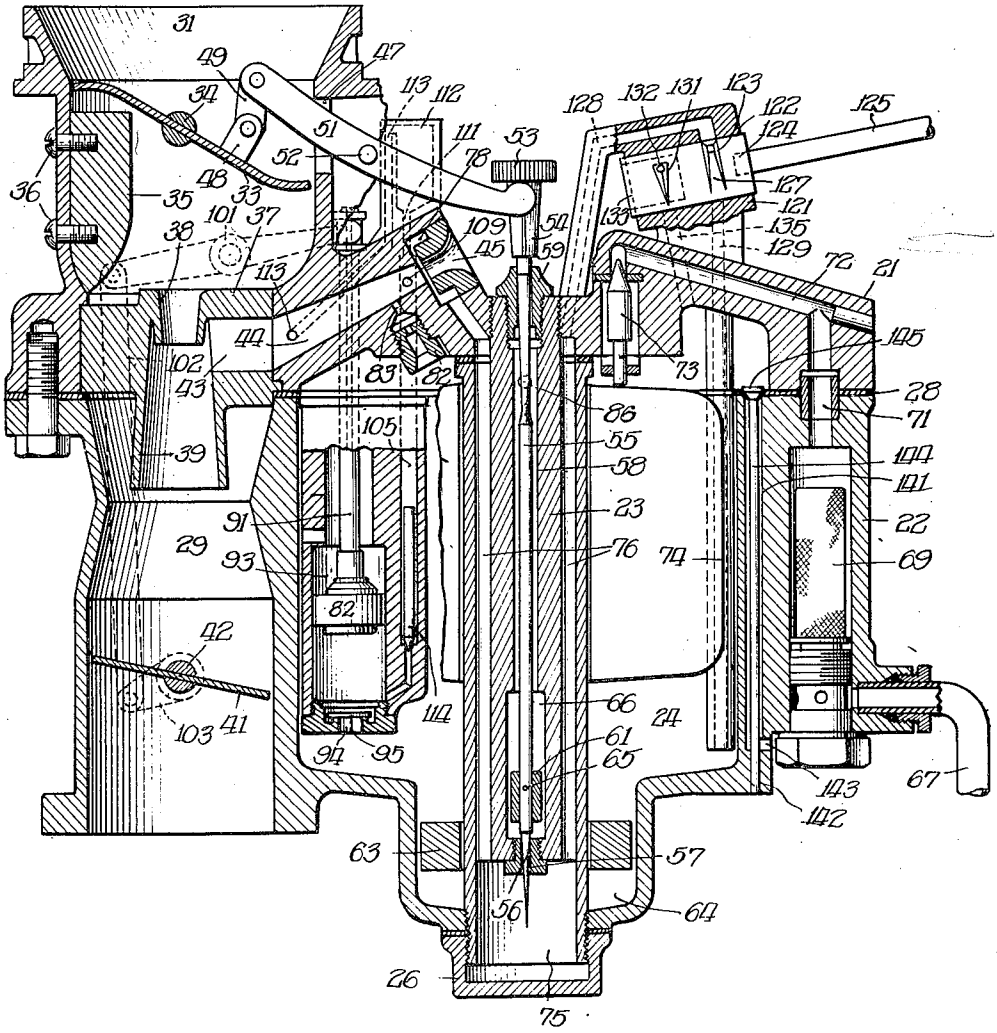
Fig. 12.



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UNITED STATES PATENT OFFICE

2,082,293

CARBURETOR

Torbjorn Linga, Kokomo, Ind.

Application June 12, 1935, Serial No. 26,187

17 Claims. (Cl. 261—34)

The present invention concerns carburetors and pertains more particularly to that type of construction into which the liquid fuel is elevated from a lower supply-tank by reason of the suction or subatmospheric pressure present in the carburetor.

A leading aim of the invention is to provide an improved structure of this kind which will more efficiently meet the strict and exact requirements of a carburetor of the fuel-lift style, and, to this end, various changes and betterments in the several parts of the appliances have been devised which singly and cooperatively aid in producing the result sought for.

These features of novelty and advantage are pointed out in the following detailed description and are set forth in the appended claims, but preliminarily it may be mentioned that they relate more particularly to an improved type of air-admission valve, an air deflector under such valve to reduce its Venturi effect, an air-bleeder to maintain the desired fuel-feeding head in the carburetor, a weight and associated float acting on the air-valve, an auxiliary air-bleeder to obtain fuel adjustment, a supplementary fuel-well functioning during acceleration, and a thermostatic means governing the action of the carburetor.

In order that those skilled in this art may readily understand the invention and the numerous benefits accruing from its employment, in the accompanying drawings, forming a part of this specification and to which reference should be had in connection with the following detailed description, a present preferred embodiment of the invention has been illustrated in detail, and, for simplicity, like reference numerals have been employed to designate the same parts throughout the several views.

In these drawings:—

Figure 1 is a vertical section through the carburetor;

Figure 2 is a horizontal section through the Venturi construction on line 2—2 of Figure 1;

Figure 3 is a fragmentary horizontal section on line 3—3 of Figure 1 showing the block or partial obstruction adjacent the air-valve of the main induction-passage;

Figure 4 is a vertical cross-section on line 4—4 of Figure 1;

Figure 5 is an enlarged detail section showing the tapered pin or rod controlling the admission of supplemental air into the upper portion of the float-chamber;

Figure 6 is a fragmentary section on line 6—6 of Figure 7 and illustrates the manually operable means for enriching the mixture, as during starting of the engine;

Figure 7 is a section through such enrichment structure on line 7—7 of Figure 10;

Figure 8 is another adjacent section on line 8—8 of Figure 10;

Figure 9 is a partial upright section on line 9—9 of Figure 10 depicting the means for enrichment of the mixture during acceleration, the portion of the venturi illustrated not being in its correct position;

Figure 10 is an elevation of the carburetor as viewed from the rear of Figure 1;

Figure 11 is a thermostatic control for the carburetor, and

Figure 12 is a diagrammatic view of the device showing in one illustration the various chambers, passages and valves entering into the construction.

Referring to these drawings, it will be perceived that the carburetor is composed of two main members 21 and 22 held together by a hollow post 23 located centrally of the float-chamber 24 and screwed at its top end at 25 into the upper element 21, its lower end being threaded and fitted with a tightening nut 26, the companion members of the carburetor being additionally secured together by an appropriate cap-screw 27, a gasket 28 being interposed between the parts 21 and 22 to make a substantially air-tight connection.

When thus assembled, the structure has a main induction-passage 29 open at its top end at 31 to the atmosphere and adapted to have its lower open end 32 connected to the internal-combustion engine with which the carburetor is designed to be associated.

Near the upper end of such induction-passage 29 it is fitted with an air-inlet valve 33 of the butterfly-type mounted on a rock-shaft 34, the latter being positioned somewhat off center or at one side of the axis of the passage, as illustrated in Figure 1, so that the valve is not in balance, whereby if the valve were free to turn, it would automatically open.

This air-admission valve is out of balance due to the fact that its shaft 34 is off center with the result that, when the internal-combustion engine is running, the pressure of the external atmosphere will be greater on the larger section of the top of the valve than on the other or companion smaller section, and consequently, the valve will open more or less according to the demand of the engine.

As is clearly illustrated in Figure 1, such valve is reversely curved somewhat at its opposite edges and the purpose for this is that unless that part of the valve at one side of the shaft, which is the larger of the two, is curved outwardly or upwardly as shown, the valve will not open fully without a greatly augmented difference in pressures between its upper and under sides.

The slight downward curvature of the edge portion of the smaller section of the valve is provided for a somewhat different object, namely, in a measure to decrease a certain aspirating effect or action which is created when the valve is partly open.

One side of the induction-passage **29**, directly under the smaller part of the air-inlet valve **33** at one side of its shaft, is fitted with a stationary lug, block or barrier **35** of the shape in vertical section presented in Figure 1 and fastened in place by securing screws **36**, **36**.

This block or member **35** is employed for a somewhat similar aim, that is, to decrease the Venturi action at the smaller part of the valve when it is partially open by acting as a baffle or impediment to churn up or mix the entering air and in a measure reducing the partial vacuum beneath that portion of the valve by reason of so doing.

Also mounted in the induction-passage below the air-inlet valve and its associated block **35** is a member **37** having a central, downwardly-directed, double or duplex venturi **38**, **39**, and below the latter the induction-passage is equipped with the customary throttle-valve **41** on its operating shaft **42**.

Element **37** below the smaller venturi **38** has a lateral passage **43** connecting the venturi **39** with the large lower end of a supplemental or auxiliary inclined smaller venturi **44**, **45**, the upper end of which is connected to the outer atmosphere through a chamber **46** and a slot **47** through its wall communicating with the passage **29** above the air-inlet valve **33**.

An upstanding lug **48** on the heavier, larger section of valve **33** is joined by a link **49** to the end of a lever **51** fulcrumed at **52** and accommodated in the slot **47**, the opposite bifurcated end of the lever being located beneath the head **53** of a nut **54** adjustably threaded on the top end of the long stem **55** of a fuel-metering valve **56** co-acting with its valve port or orifice **57**, the stem of the valve being located in the central bore **58** of the post **23** and the valve port being in the lower end of such post.

A nut **59** screwed into the upper end of the post has a calibrated central bore of such size that the elongated valve-stem **55** is just slidable through it without side play.

Near its lower end the valve-stem **55** extends through a vertical opening in a cross-bar **61** (Figs. 1 and 4) fastened at its ends by screws **62**, **62** to a ring-weight **63** adapted to travel up and down in a lower cylindrical portion **64** of the fuel-chamber **24**, the stem being pinned at **65** to such cross-bar, whereby the element **63** constitutes a weight mounted on the valve-stem and the parts **63**, **64** comprise a dash-pot preventing fluttering or chattering of the air-inlet valve **33**.

To accommodate such cross-bar, the post **23** is slotted vertically at **66** with the slot intersecting the post-bore **58**, thus providing means whereby the valve-stem and its weight may move up and down with respect to the fixed or stationary post.

From what precedes, it will be clear that when the air-admission valve **33** opens under the influence of the suction of the engine, it raises the fuel-metering valve **56** through the action of lever **51**, the object or purpose of the construction being to cause the valve **33** and the fuel-metering valve **56** to operate in direct conjunction or association with one another.

The liquid fuel, as presented in Figure 1, is admitted into the fuel-chamber **24**—**64** through an inlet-conduit **67**, ball-check valve **68**, screen **69**, passages **71**, **72**, and fuel-inlet valve **73** at the top of the chamber and which tends to open downwardly by its own weight but which is adapted to be raised and closed by a float **74** in the chamber **24** when it contacts therewith, the float surrounding and being guided in its vertical movements by the cylindrical post **23**. By this simple means the flow of fuel into the chamber **24** is efficiently controlled.

The fuel in the lower part of the float-chamber **24** has access through the slot **66** to the top portion of valve **56**, and, if such latter valve is open, the fuel flows down through the port **57** at a metered rate.

Orifice **57** communicates with a chamber **75** in the lower part of post **23**, the bottom of the chamber being closed as illustrated by the nut **26**, the top of such chamber communicating through two upright passages **76**, **76** in the post with an annular compartment **77** in casting **21**, such chamber **77** in turn being joined to another annular chamber **78** through a passage **79**, chamber **78** being in direct communication at **81** with the throat of the venturi **44**, **45**.

Thus the fuel delivered from the float-chamber **24** into the lower chamber **75** through the valve **56**, **57** is drawn up or sucked up through the passages **76**, **77**, **79** and **78** into the venturi **44**, **45**, the greatest degree of suction in the carburetor being at the point **81**.

In order to lift the fuel from its supply-tank, not shown, into the float-chamber **24**, it is, of course, necessary to apply suction or develop a subatmospheric pressure in the latter, and this is accomplished by mounting in the wall of the float-chamber a so-called jet or plug **82** having a metered orifice through it in direct connection with an aperture **83** opening into the Venturi passage **44** at a point somewhat distant from the Venturi throat **81**, so that the suction imparted by the venturi through the united openings **83** and **82** into the float-chamber is less than the suction communicated from the Venturi throat at **81** to the post passages **76**, **76**.

Opening or port **83** is so located with relation to the venturi **44**, **45** as to give a correct fuel-feeding head when the engine is idling, at which time the air-admission valve **33** and the fuel-metering valve **56** are approximately in the positions indicated in Figure 1.

As the air-inlet valve **33** and its correlated fuel-metering valve **56** open progressively more and more under greater engine demand more fuel is introduced into the Venturi throat **81**, causing a reduction of or deadening effect on the suction at such throat with but little effect, however, on the suction at orifice **83**, thus reducing the fuel-feeding head, and, to remedy or to compensate for this condition the stem of the fuel-metering valve **56** is properly tapered at its portion **84** which slides up and down through the calibrated opening or port **85** through the nut **59** (see Figs. 1 and 5).

The parts of the carburetor are shown in

engine-idling positions in Figure 1, the upper portion of the valve-stem 55 under such circumstances filling the bore of nut 59 snugly or closely enough so that very little air, if any, can leak into the fuel float chamber 24 between the elements 55 and 59.

When the increased engine requirement occurs, the fuel-metering valve 56 lifts automatically by reason of its mechanical connection with the opening valve 33, and its stem 55 may then occupy the position depicted in Figure 5, which permits an augmented volume of air to flow through the annular space 85 between the elements 55 and 59 into the upper portion of the float-chamber 24 through lateral holes 86, 86 connecting the central bore 58 of post 23 with the upper part of the float-chamber above the fuel-level.

By properly forming or calibrating the taper 84 of the valve-stem and the complementary orifice through the jet-member 82, the needed fuel-feeding head is maintained throughout the range of action of the carburetor.

This self-feeding carburetor is so constructed that there is always adequate suction in the float-chamber 24 to lift the fuel thereinto from a supply-tank or reservoir usually located at some distance below the carburetor in the modern automobile.

In addition to elevating the fuel from the tank or reservoir into the float-chamber, it is necessary to maintain a somewhat greater suction at the Venturi throat 81 in order to further lift the fuel from the float-chamber into the air stream flowing through such throat.

The greatest suction in the carburetor is created at throat 81 and it is communicated to the fuel-metering orifice or valve-port 57 through passages 78, 79, 76, 75, the actual or effective fuel-delivering head being, therefore, the suction at 81 less the suction in the float-chamber 24, minus the suction required to raise the fuel from the fuel-level in the float-chamber up into the throat 81 of the small venturi 44, 45.

In order to secure better acceleration of the automobile equipped with the carburetor, one side of the float-chamber 24 of the latter (see Fig. 9) is fitted with a fuel-pump comprising a stem or rod 91 carrying a piston or plunger 92 on its lower end which is adapted to slide in an upright cylinder 93 whose bottom end has a port 94 opening into the lower part of the float-chamber, such port being equipped with a disc check-valve 95.

Stem 91 extends up through and is slidable in the bore of a nut 96, and, above the latter, the stem has spaced collars or enlargements 97, 97 between which is accommodated a split or bifurcated, rounded end 98 of a lever 99 (see Fig. 10) fulcrumed at 101, the opposite end of the lever being joined by a link 102 to an arm 103 on shaft 42 of the throttle-valve 41.

Accordingly, when the throttle-valve is being closed the plunger 92 slides upwardly in its cylinder, drawing fuel from the float-chamber through the port 94 into the cylinder below the plunger, and, when the throttle-valve is opened, the plunger is forced downwardly to expel the contents of the cylinder below it.

The lower part of cylinder 93 is connected by passages 104, 105, 106 to the interior of a jet-member 107 having a metered orifice 108 communicating through a registering aperture 109 with the interior of Venturi passage 44 at about the same distance from the throat 81 as is the port 83.

As is clearly illustrated, the bore of member 107, through a passage 111 connects with the lower portion of a fuel well or storage compartment 112 joined at its upper portion to Venturi passage 44 by an opening 113.

Passage 104—105 has a check-valve 114 closing by gravity and opening when the pump-plunger descends to allow the flow of fuel upwardly past it.

From the foregoing, it will be apparent that, when the throttle-valve is opened, the pump-plunger descends forcing the liquid below it up through the passages 104, 105, 106, 108, 109 into the smaller venturi 44—45, the check-valve 114 closing as soon as the upward pressure on it terminates.

Some of such pumped fuel passes directly into the venturi to enrich the mixture, whereas a part of such fuel is forced into the well 112 from which it subsequently and gradually descends into the jet-member flowing out through openings 108, 109 into the venturi, thus prolonging the otherwise too short enrichment of the mixture.

The purpose of this particular construction is that it is not desirable to supply all of the accelerating fuel into the engine instantaneously, the best and most efficient enrichment being obtained when a shot of fuel is given to the engine momentarily upon the opening of the throttle valve and an enriched mixture is fed to the engine for a few seconds thereafter.

This protracted or lengthened fuel-enrichment from the well is capable of accomplishment because of the opening 113 between the venturi and the well, the suction at the passage 113 being less than that at the orifice 108 by reason of their different locations along the length of the venturi.

Obviously, when the throttle-valve is again closed, plunger 92 rises, valve 95 opens, and fuel flows from the float-chamber into the chamber 93 ready for the next descent of the plunger and its expulsion in the manner and for the purpose already set forth.

In a part 121 of the upper casting 21, a tapered bearing 122 is provided for the reception of a cone-valve member 123 having an opening 124 in its smaller end and into which fits the terminal portion of a rod 125 flattened for a part of its length on one side so that it may fit in the correspondingly-shaped opening 124 and be capable of turning the valve-member 123 in such bearing.

This rod or flexible shaft 125 is not shown in Figure 10 for the sake of clarity of illustration of the other parts of the appliance, but it is indicated in Figure 6 and it extends to a convenient point in the automobile within reach of the driver, and such end is fitted with a knurled knob 126 by means of which the rod and its valve-member may be readily turned manually.

The exterior of the larger portion of the convalve member 123 has an arcuate passage or port 127 (Figs. 6 and 7) adapted, in a certain position, to connect a passage 128 communicating with chamber 77 with an upright passage 129 opening at its lower bent end into the interior of the float-chamber 24.

When the valve-member 123 is in the position shown in Figure 7, the fuel mixture, as during starting of the engine in cold weather, is enriched by reason of the suction in compart-

ment 77 drawing additional fuel into such chamber by the connected conduits 128, 127, 129 and from which chamber it passes along with the other fuel into the subsidiary venturi 44, 45.

The smaller portion of valve-member 123 on its outer surface has a circumferential groove 131 (Fig 8) of graduated depth, its deeper end being connected by an aperture 132 to the hollow interior or bore 133 of the member 123 which at one end at 134 is open to the atmosphere.

Groove or channel 131 is in the plane of a right-angle passage 135 opening into the bearing or valve-seat at one end and connecting at its other end with the interior of the float-chamber 24 above the fuel-level therein, this construction affording a variable or adjustable air-bleed from the atmosphere into the float-chamber for the purpose of increasing the fuel-feeding head.

In its normal position, corresponding to ordinary running conditions of the coupled engine, the cone-valve member 123 is in such position that both the auxiliary fuel-delivery opening from the float-chamber to the venturi and the air-bleed from the atmosphere into the float-chamber are closed.

In starting and warming up the engine, however, the operator by turning the knob 126 correspondingly turns the valve-member 123 to first open gradually the air-bleeder passage from the outer air into the float-chamber to increase the fuel-feeding head, and, then by further turning, opening the supplementary associated fuel-conduits to deliver more fuel into the smaller venturi from which, of course, it flows down into the induction-passage.

Also, to compensate for colder and hotter weather as well as to improve the mixture during starting of the engine and during its initial warming-up period, the carburetor is equipped with a thermostatic appliance involving an upright passage 141 (Fig. 11) leading into the upper part of the float-chamber, its lower portion 142 being of reduced diameter, and the lower part of the larger passage is open to the outer air through a side aperture 143.

When air is bled into the float-chamber through the conduit 143, 141 the fuel-feeding head is correspondingly increased with accompanying enrichment of the mixture.

A cylindrical stem 144 has a conical valve-head 145 at its upper end, such stem having a different coefficient of expansion by heat from that of the metal surrounding it.

In installing the stem and its valve, the lower part of the stem is fitted into the bore 142 as a press fit, and it is forced down until its upper valve-head rests against its seat at the top end of passage 141.

This stem having less heat expansion than the encompassing metal, when the carburetor warms up in service it will, by engagement with the valve-head, slide the valve-stem in its tight bearing an amount determined, of course, by the degree of expansion of the carburetor body.

When the carburetor cools down, the valve remains somewhat open, thus admitting air into the float-chamber to enrich the mixture by increasing the fuel-feeding head, such enrichment being gradually reduced and finally terminated as the carburetor expands, causing the closing of the valve-port.

The valve and its stem having once been properly installed, they automatically assume and maintain their final position.

The operation of the carburetor is in general substantially as follows:

Assuming that the engine served by the carburetor is cold and is about to be started, the operator turns the handle or knob 126 and the shaft or stem 125 to bring the cone-valve 123 into the position shown in Figs. 7 and 8, wherein the supplemental fuel-conduit is put into direct connection with the chamber 77.

When the valve is in this position, the outside air connection is established through the united conduits 134, 133, 132, 131, 135 with the inside of the float-chamber above its fuel-level.

These two connections cause a substantial enrichment of the fuel-mixture, allowing the engine to start promptly, and after normal running conditions have been established, the valve handle 126 is turned back to its original position, closing the two enrichment connections referred to.

Of course, it is not necessary in all cases to make these two connections to their maximum extent, nor is it essential that both of them be made, since the one can be made operative without making the other substantially so.

Air-inlet valve 33 opens automatically more or less when the engine is running and in accordance with the engine demand, the opening action of the valve, through the mechanical connection shown, lifting the fuel-metering valve 56 to act in conjunction with the valve.

Weight 63 tends to close valve 33 and it is of such amount or size that certain predetermined suctions will be created in the two venturis 38—39 and 44—45, that of the latter being greater than that of the former, and applied to the float-chamber through port 83 and the orifice of member 82.

If the suction thus established or created in the chamber 24 is not sufficient to lift fuel from the lower-level fuel-reservoir into such chamber, the fuel-level in the float-chamber will gradually descend, and, the float will correspondingly lower until it rests on the cross-bar 61 of the weight, thereby adding all or a portion of its weight to the member 63, thus effecting an increased suction in the venturis and in the float-chamber until a point is reached which is adequate to elevate the fuel into the chamber.

Obviously, as the fuel-level in the chamber ascends, the float rises and relieves the member 63 from such supplemental or auxiliary weight, thus restoring the operation of the carburetor to that which it was originally.

From what precedes, it will be clear to any one skilled in the art that the structure is such and its manner of functioning is such that the fuel will be lifted into the carburetor in a way for the satisfactory performance of its usual operation regardless of the varying conditions under which it must function.

I claim:

1. In a carburetor having a main induction-passage, the combination of a fuel-chamber, means to feed fuel into said chamber, means to deliver fuel from said chamber into said induction-passage, a fuel-valve in said delivery means, an unbalanced air-admission valve for said passage mounted to turn about an off-center axis, the smaller section of said valve at one side of said axis being curved inwardly to reduce the aspirating effect of the valve when it is partially open, means restraining the opening turning of said air-admission valve, and means connecting

said air-admission and fuel valves whereby they open and close conjointly.

2. In a carburetor having a main induction-passage, the combination of a fuel chamber, means to feed fuel into said chamber, means to deliver fuel from said chamber into said induction-passage, an unbalanced air-admission valve for said passage mounted to turn about an off-center axis, the larger of the two sections of said valve at one side of said axis being curved outwardly to increase the opening effect of the atmosphere on the valve, the smaller of the two sections of said valve at the opposite side of said axis being curved inwardly to reduce the aspirating effect of the valve when it is partially open, and means restraining the opening turning of said valve.

3. In a carburetor having a main induction-passage, the combination of the fuel-chamber, means to feed fuel into said chamber, means to deliver fuel from said chamber into said induction-passage, a fuel-valve in said delivery means, an unbalanced air-admission valve for said passage mounted to turn about an off-center axis, the larger of the two sections of said valve at one side of said axis being curved outwardly to increase the opening effect of the atmosphere on the valve, the opposite smaller section of said valve on the other side of said axis being curved inwardly to reduce the aspirating effect of the valve when it is partially open, means restraining the opening turning of said air-admission valve, and means connecting said air-admission and fuel valves whereby they open and close conjointly.

4. In a carburetor having a main induction-passage, the combination of a fuel-chamber, means to feed fuel into said chamber, means to deliver fuel from said chamber into said induction-passage, an unbalanced air-admission valve for said passage mounted to turn about an off-center axis, a baffle in said passage inwardly from and substantially in register with the smaller section of said valve at one side of said axis, and means restraining the opening turning of said valve, said baffle being of such shape and location as to reduce the aspirating effect of said valve when partially open whereby to substantially equalize the dynamic effect of the air, flowing past the valve, on the surfaces of the valve on opposite sides of the valve axis and to permit said valve to be actuated as nearly as possible by the static pressures on it.

5. In a carburetor having a main induction-passage, the combination of a fuel-chamber, means to feed fuel into said chamber, means to deliver fuel from said chamber into said induction-passage, a fuel-valve in said delivery means, an unbalanced air-admission valve for said passage mounted to turn about an off-center axis, the larger of the two sections of said valve at one side of said axis being curved outwardly to increase the opening effect of the atmosphere on the valve, the smaller of the two sections of said valve at the opposite side of said axis being curved inwardly to reduce the aspirating effect of the valve when it is partially open, a baffle in said passage inwardly from and substantially in register with said smaller section of said air-admission valve at one side of said axis, said baffle being of such shape and location as to reduce the aspirating effect of said valve when partially open whereby to substantially equalize the dynamic effect of the air, flowing past the valve, on the surfaces of the valve on opposite sides of the valve axis and to permit said valve to be actuated as nearly as possible by the static pressures on it, means restraining the opening turning of said valve, and means connecting said air-admission and fuel valves whereby they open and close conjointly.

6. In a carburetor having a Venturi-equipped main induction-passage, the combination of a fuel-chamber, means to convey fuel into said chamber, an automatically-acting air-admission valve for said induction-passage, means to restrain the opening action of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, means connecting said air-admission and fuel valves whereby they open and close conjointly, and means actuated coincidentally with the movements of said air-admission valve to bleed air into said fuel-chamber in predetermined quantity varying with the position of said air-admission valve to maintain a suitable fuel-feeding head.

7. In a carburetor having a Venturi-equipped main induction passage, the combination of a fuel-chamber, means to convey fuel into said chamber, an automatically-acting air-admission valve for said induction-passage, means to restrain the opening action of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, a stem with varying cross-sectional area for said valve cooperating with a port and adapted to bleed air into said fuel-chamber to maintain a suitable fuel-feeding head, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, and means connecting said air-admission valve and the stem o fsaid fuel-valve whereby the two valves open and close conjointly.

8. In a carburetor having a main induction-passage, the combination of a fuel-chamber, means to convey fuel into said chamber, a float in said chamber, an air-admission valve for said induction-passage, means to restrain the opening action of said valve, a conduit for delivery of fuel from said chamber, means to increase the suction of said induction-passage and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, and means to apply the weight of said float more or less to oppose the opening action of said air-admission valve as the fuel-level in said chamber lowers.

9. In a carburetor having a Venturi-equipped main induction-passage, the combination of a fuel-chamber, means to convey fuel into said chamber, a float in said chamber governing the admission of fuel into the chamber, an air-admission valve for said induction-passage,

means to restrain the opening action of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, means connecting said air-admission and fuel valves whereby they open and close conjointly, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, and means to employ the weight of said float more or less to oppose the opening of said air-admission valve as the fuel-level in said chamber lowers.

10. In a carburetor having a Venturi-equipped main induction passage, the combination of a fuel-chamber, means to convey fuel into said chamber, a float in said chamber governing the admission of fuel into the chamber, an air-admission valve for said induction-passage, means to restrain the opening action of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, means connecting said air-admission and fuel valves whereby they open and close conjointly, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, means to employ the weight of said float more or less to oppose the opening of said air-admission valve as the fuel-level in said chamber lowers, and means actuated coincidentally with the movements of said air-admission valve to bleed air into said fuel-chamber to maintain a suitable fuel-feeding head.

11. In a carburetor having a Venturi-equipped main induction-passage, the combination of a fuel-chamber, means to convey fuel into said chamber, a float in said chamber governing the admission of fuel into the chamber, an air-admission valve for said induction-passage, a weight restraining the opening action of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, means connecting said air-admission and fuel valves whereby they open and close conjointly, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, and means to augment the action of said weight on said air-admission valve by imposing the weight of said float more or less on said valve as the fuel-level in said chamber varies.

12. In a carburetor having a Venturi-equipped main induction-passage, the combination of a fuel-chamber, means to convey fuel into said chamber, a float in said chamber governing the admission of fuel into the chamber, an air-admission valve for said induction-passage, a weight in said chamber restraining the opening action of said valve and forming a dash-pot with a portion of said chamber to preclude fluttering of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, means connecting said air-admission and fuel valves whereby they open and close conjointly, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, and means to impose the weight of said float more or less on said weight to increase the restraining action of the latter on the air-admission valve as the fuel-level in the chamber lowers.

13. The structure presented in claim 12 in combination with means actuated coincidentally with the movements of said air-admission valve to bleed air into said fuel-chamber to maintain a suitable fuel-feeding head.

14. In a carburetor having a Venturi-equipped main induction-passage, the combination of a fuel-chamber, means to convey fuel into said chamber and to limit its admission into the chamber, an automatically-acting air-admission valve for said induction-passage, means to restrain the opening action of said valve, a conduit for the delivery of fuel from said chamber, a fuel-valve in said conduit, means connecting said air-admission and fuel valves whereby they open and close conjointly, means to increase the suction of said venturi and to withdraw fuel by said increased suction from said chamber through said conduit and to deliver it into said induction-passage, means to apply a lesser increased suction to the interior of said fuel-chamber above the liquid-level therein to draw fuel into said chamber through said conveying means, and thermostatically-controlled means to bleed air into said fuel-chamber to vary the fuel-feeding head, said thermostatically-controlled means comprising a passage connecting the interior of said fuel-chamber to the outer air, and a valve controlling said passage and having a stem frictionally slidably held in a bearing in the carburetor and having a coefficient of expansion different from that of the carburetor body.

15. In a carburetor having a main Venturi-equipped induction-passage with means to admit air thereto, a second suction-increasing venturi connected to said first venturi, a primary means to supply fuel to said induction-passage, a throttle-valve, a fuel-well, a conduit connecting with said second venturi and with said fuel-well, a passage connecting the upper portion of said fuel-well to said second venturi at a point of less suction than the conduit connection therewith, and means operative in conjunction with the opening of said throttle-valve to force supplemental fuel through said conduit into said second venturi, induction-passage, and fuel-well, the fuel thus pumped into said well subsequently flowing into said second venturi through said conduit after the action of said forcing means has ceased to prolong the mixture enrichment.

16. In a carburetor having a main Venturi-equipped induction-passage, the combination of a fuel-chamber, means to admit fuel into said chamber, means to increase the Venturi-developed suction and to feed fuel from said chamber by said increased suction into said induction-passage, means to increase the Venturi-developed suction in lesser degree and to apply said lesser increased suction to the interior of said cham-

ber to lift fuel into said chamber through said fuel-admission means, an air-admission valve for said induction-passage, means restraining the opening of said air-admission valve, a fuel-valve controlling said delivery of fuel from said chamber into said induction-passage, means controlled by said air-admission valve governing the action of said fuel-valve, means actuated by the movements of said air-admission valve adapted to bleed air into said chamber to vary the fuel-feeding head, a supplemental means to bleed air into said chamber for the same purpose, and a valve controlling the action of said supplemental means.

17. In a carburetor having a main Venturi-equipped induction-passage, the combination of a fuel-chamber, means to admit fuel into said chamber, means to increase the Venturi-developed suction and to feed fuel from said chamber by said increased suction into said induction-passage, means to increase the Venturi-developed suction in lesser degree and to apply said lesser increased suction to the interior of said chamber to lift fuel into said chamber through said fuel-admission means, an air-admission valve for said induction-passage, means restraining the opening of said air-admission valve, a fuel-valve controlling said delivery of fuel from said chamber into said induction-passage, means controlled by said air-admission valve governing the action of said fuel-valve, a supplemental passage for delivery of fuel from said chamber for the same purpose, and valve-induction-passage, means actuated by the movements of said air-admission valve to bleed air into said chamber to vary the fuel-feeding head, a supplemental means to bleed air into said chamber for the same purpose, and a valve-means controlling said supplemental fuel-passage and said supplemental air-bleeding means.

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