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2 SHEETS—SHEET 1.



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APPLICATION FILED OCT. 21, 1910.

1,129,864.

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2 SHEETS—SHEET 2.

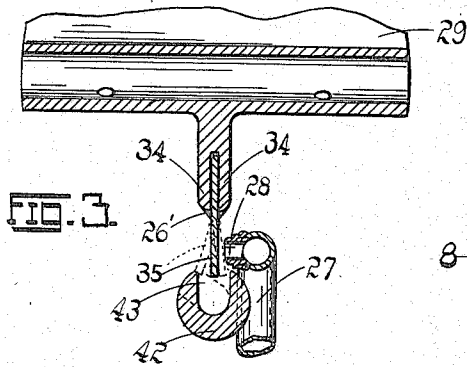


FIG. 3.

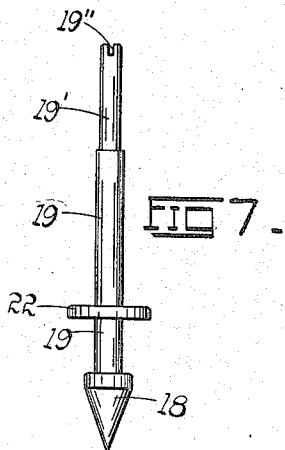


FIG. 7.

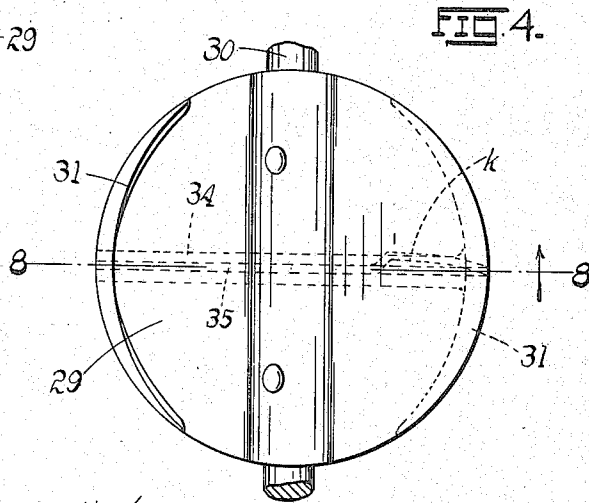


FIG. 4.

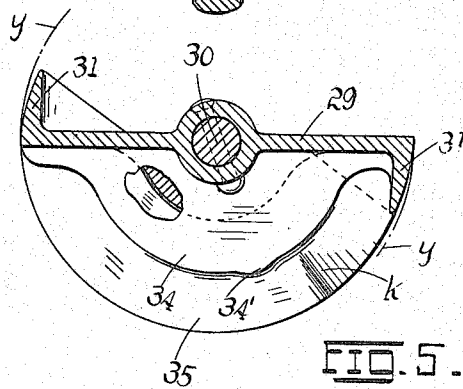


FIG. 5.

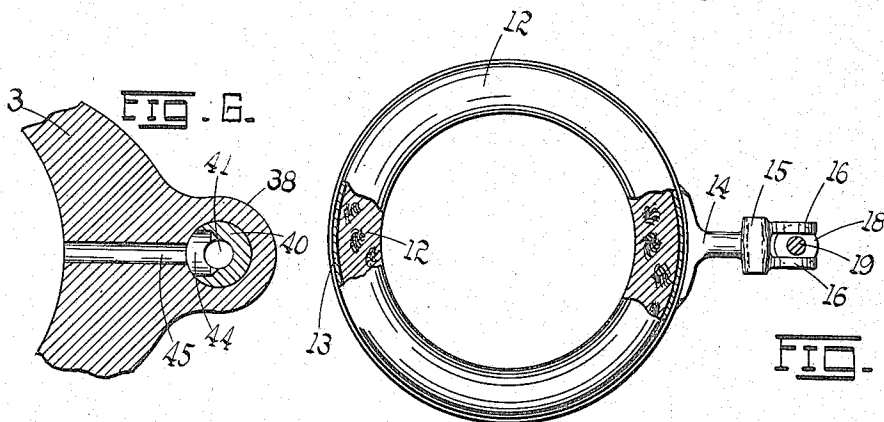


FIG. 6.

FIG. 8.

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To all whom it may concern:

Be it known that I, CYRUS A. HAAS, citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Carbureters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in carbureters; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a top plan of the carbureter; Fig. 2 is a vertical section on the line 5—5 of Fig. 1; Fig. 3 is a section on the inclined line 6—6 of Fig. 2; Fig. 4 is plan view of the throttle-valve; Fig. 5 is a vertical section on the line 8—8 of Fig. 4; Fig. 6 is an enlarged cross-sectional detail on the line 9—9 of Fig. 2; Fig. 7 is an elevation of the feed-valve; and Fig. 8 is a top plan of the float controlling the feed-valve, parts being in section.

The present invention is an improvement on the carbureter forming the subject-matter of my U. S. Patent numbered 932,465, dated August 31, 1909; and while contemplating the several objects, possessing the same advantages, and fulfilling the same purposes as the patented construction, it eliminates certain features and in lieu thereof substitutes others more accessible to, and thereby better controllable by, the operator, and on the whole resulting in a material simplification of the carbureter and in a reduction of the number of parts of which the same is composed.

Among the features introduced in the improved carbureter may be mentioned (1) an automatic spring-controlled poppet-valve responding to the suction of the engine during the movements of the throttle for regulating the supply of air to the mixing chamber; (2) a throttle-valve provided with means for so adjusting or regulating the flow of the gasoline to the mixing chamber as to insure the formation of a "perfect" mixture (of gasoline and air) for any position of the throttle, it being possible to produce any number of jets whose character may be varied with the successive positions of the throttle, from a closed to a full open position, an adjustment effected for any one position being independent of, and in no wise interfering with, that effected for any

other position of said throttle. There thus result a series of selective individual adjustments, a given adjustment corresponding to, and being identified with, a given position of the throttle, and permitting the discharge into the mixing chamber of the proper complement or jet of gasoline to mingle with the air and form therewith the "perfect" mixture aforesaid; (3) a throttle-valve provided with means for so regulating the flow of gasoline to the mixing chamber as to effect a proper "priming" mixture; (4) means for raising the efficiency of the carbureter to a maximum; (5) adjusting devices readily accessible to the operator while the motor is running; and (6) further and other mechanical features the advantages of which will be more fully apparent from a detailed description of the invention, which is as follows:—

Referring to the drawings, *p* represents a gasoline supply-pipe leading from the gasoline-tank on the automobile (not shown), as well understood in the art.

The carbureter forming the subject-matter of the present invention is made preferably in three sections and comprises an outer float chamber 1 confined to the middle and top sections which are united by screws *r* passing through lugs *t* (Fig. 2), the upper section being provided with a central extension 2 terminating in a flange 3 for bolting to the base of the intake manifold pipes. The extension 2 engages the inner vertical cylindrical pipe or flue 4 cast with the middle section, the said flue 4 terminating at the bottom (and below the float-chamber) in an exteriorly screw-threaded flange or extension 4' to which is screwed the bottom section 5 of the carbureter, through which section the air is admitted into the mixing chamber. The bottom of the section 5 is provided with a large intake opening 6 bounded by an inwardly-projecting flange 6 forming a valve-seat for the terminal disk or head 7 of the spring-controlled reciprocating air, or poppet-valve which regulates the supply of air admitted into the mixing chamber. The flange or valve-seat 6 is provided with marginal grooves, depressions, or scallops which admit the necessary quantity of air for a seated position of the valve, said seated position corresponding to a low speed of the motor or engine. The valve 7 is guided in its reciprocations by the hollow sleeve 7' carried thereby and forming an integral part thereof, said sleeve riding along a guide-

stem 8 depending from and secured to, a boss 9 cast on the gas-nozzle or aspirator 10. The controlling compression spring 11 enveloping the sleeve 7' bears with one end against the disk or valve 7 proper, the opposite end of the spring bearing against the boss 9. In the present improvement the air-valve or poppet-valve 7 is mechanically disconnected from the throttle, but the carbureter parts are so proportioned, and a spring 11 is previously selected with just the proper degree of tension as to make the valve automatically responsive to the movements of the throttle for increasing or decreasing the volume of air admitted according to the speed attained by, or to be imparted to, the motor, and hence to the vehicle driven thereby.

Located within the float-chamber 1, and loosely encompassing the pipe 4 (which together with the bottom section 5, and the upper extension 2 below the gas-valve or throttle may be regarded as the mixing or carbureting chamber) is a float 12 made of cork (the dotted line x indicating the normal highest level of the gasoline on which it floats), the cork ring being provided with an outer metallic band 13 from which projects radially a terminally forked arm 14, the arm being provided with a hollow boss or bearing 15 at the base of the fork members 16 thereof, for the reception of a spindle or pin 17 about which the arm 14 is free to oscillate with the fall or rise of the float 12. In lieu of cork a hollow metallic float may be substituted. The pin 17 is mounted as shown (Figs. 1, 2), across what may be considered a float-chamber extension 1' in which the gasoline feed-valve is located. The feed-valve proper is a conical head 18 provided with a stem 19 which terminates in a reduced guide extension 19' passing loosely through a nut or bearing 20 closing the top of the extension 1', the portion 19' being protected against access of dust by a bonnet or hood 21 which is of sufficient capacity to admit of the necessary reciprocations to which the stem 19 and its extension 19' are subjected with any movements of the valve due to a rise and fall of the float. The stem 19 is provided at the proper point with a collar 22 resting on the fork members 16 of the lever arm 14, the stem 19 passing freely between the fork members so that the friction between the parts is reduced to a minimum. The valve 18 is normally forced to its seat at the upper end of the port or passage-way 23 formed in the nipple 24 at the base of the extension 1', by a compression spring 25 coiled about the stem, one end of the spring bearing against the collar 22, and the opposite end against the roof of the cavity n formed in the nut 20. With any fall of the float 12, due to a lowering of the level of the gasoline in the float-chamber,

the forked end of the arm 14 will be raised or oscillated upwardly, lifting the valve 18 against the tension of the spring 25 (which it compresses) and allowing more gasoline to flow from the tank through the pipe p (coupled to the nipple 24) into the float chamber. As the float lifts again, the reverse of the operations takes place, the spring 25 forcing the valve to its seat. All this is quite obvious from Fig. 2 of the drawings. The float chamber is provided with a drain cock D as usual. The terminal of the stem extension 19' is provided with a split 19'' for insertion of a tool or screw-driver to occasionally rock the valve for grinding the same to its seat.

Inserted to a convenient depth into the passage-way of the aspirator or nozzle 10, and shouldered therein as shown in Fig. 2, and secured in addition by a tight solder-joint 26, at the nozzle end, is an extension tube 27, the passage whereof is substantially the same bore as the passage of the nozzle, said tube curving upwardly and away from the axis of the pipe 4 and terminating in a lateral jet-nozzle 28, the upper end of the tube proper being closed (Fig. 1). Before explaining fully the action of the jet-nozzle, a detailed description of the throttle-valve and the parts identified therewith will be first given. The throttle or gas-valve comprises a disk 29 mounted rotatably on a diametrically disposed pin or shaft 30, and provided with oppositely directed marginal flanges 31, 31, with sides tapering toward the axis of the valve, the outer faces of the flanges being convex, and interior and tangent to, the arc y described by the edge of the disk about the axis thereof as a center. Formed in the walls of the mixing chamber along superposed planes are substantially semi-annular pockets 32, 32, deepest at the middle as shown, to allow for a rapid flow of gas into the motor with a "backward" stroke of the throttle, or that stroke which causes the flanges 31 to traverse a path across the pockets, as contra-distinguished from a "forward" stroke in which the traverse of the flanges is in the opposite direction or away from the pockets. In the particulars thus far described, the throttle in no wise differs from that forming the subject-matter of my patent aforesaid, a "quick" opening releasing the rich priming mixture into the motor (for cranking purposes or starting "on the spark") with a backward stroke of the throttle, and a slow or gradual opening releasing the "perfect" mixture (or that availed of for general service) with a forward stroke of the valve.

In the present improvement the throttle is actuated from the throttle lever (not shown) through suitable connections leading from the arm 33 carried at one end of the shaft 30 of the valve. The latter how-

ever, is supplemented by other details which are as follows:—Formed with the disk 29, and disposed in planes parallel to the plane of rotation of the valve are parallel wings 5 34, 34, spaced apart by cutting a slit in the single wing as originally cast with the valve, into which slit is subsequently tightly inserted, and in addition held by a sweated solder joint 26' (Fig. 3) a pliable extension 10 wing or deflector 35, the outer edge of which is substantially semi-circular and merges tangentially with the outer faces of the flanges 31, 31, (Fig. 5). One face of this member 35 sweeps across the path of projection of the gasolene jet issuing from the 15 jet-nozzle 28 (Fig. 3) so that the gasolene permanently impinges against the adjacent face of the deflector. Where this face is parallel to the plane of rotation of the valve, that is to say where it is at right angles to 20 the axis of projection of the jet as shown in the full position in Fig. 3, the space through which the gasolene (after leaving the nozzle 28) is allowed to escape into the 25 mixing chamber is substantially one-half of the cross-sectional area of the opening of the nozzle. It is obvious however, that the member 35 may be crimped, or bowed laterally (or across the general plane of its 30 rotation) at any point between the flanges 31, 31, (Fig. 5) so that at one point it may be crimped away from the discharge mouth of the nozzle 28 (see left hand dotted position Fig. 3) and at another point toward the 35 nozzle (see right hand dotted position Fig. 3). If these crimps or bows are of sufficient number, and some should be in one direction and some in the opposite direction, it is obvious that the outer edge of the deflector 35 40 would present a more or less wave-like appearance. The maximum bow or crimp in the member 35 away from the nozzle 28 would leave a discharge space between the nozzle and member substantially equal to 45 the full area of the cross-section of the nozzle; a maximum crimp toward the nozzle might nearly close the mouth of the nozzle. Of course, these extremes are not and need not be resorted to in practice, and to the extent 50 that they are resorted to, the crimping is scarcely perceptible to the eye. The only pronounced crimp or bow marked *k* in the drawings (Figs. 4, 5) and the only one illustrated, is one which is so positioned on the 55 deflector 35 as to come opposite the jet-nozzle 28 when the throttle has been turned "backward" past the pockets 32 to admit the priming mixture to the motor as already explained. This crimp *k* is of course, away 60 from the nozzle 28 so as to afford a free passage for the gasolene and provide for an unobstructed jet of the hydrocarbon into the mixing chamber for priming purposes. In order to form a "perfect" mixture 65 within the mixing chamber available for

general service under all conditions, and for all positions of the throttle from its closed to its full open (forward) position, the proper complements of air and gasolene must be delivered to said chamber. With 70 the admission of air we need not concern ourselves in the present invention; the air-valve 7 automatically responds to any draft or degree of vacuum by which the flow of air into the mixing chamber is induced. The 75 object therefore of the present construction is to take care of the gasolene complement, and this is accomplished by the deflector 35 at any point of the stroke of the throttle; for it must be apparent that we may crimp 80 (or bow) the member 35 along, and at any point of, the length thereof (between the flanges 31, 31) and either to or from the nozzle 28, and to any degree, so that for any particular position of the throttle, the jet of 85 gasolene may be so regulated or adjusted as to form a proper complement for the air drawn in through the opening 0 past the valve 7 (the latter unseating according to the extent to which the throttle is closed or 90 opened). By bowing or crimping the member 35 toward the nozzle 28 (to the right in Fig. 3) the jet of gasolene is reduced in volume; by bowing it away from the nozzle 95 (or to the left, in Fig. 3) the jet is increased in volume, since a greater freedom is accorded the stream issuing from the nozzle. It is obvious that an adjustment effected by a crimp on the member 35 for one position of the throttle, is entirely inde- 100 pendent of and is unaffected by an adjustment produced by a crimp at some other point. It follows therefore, that we may have any number and character of jets projected into the mixing chamber, to be 105 availed of at different points of the stroke of the throttle, thus producing in effect a multiple jet carbureter, wherein the number of said jets may be increased to such a maximum as to afford us a perfect mixture under all conditions of service. The member 110 35 serves still another purpose and that is, that the jet impinging against it causes the gasolene to scatter and spray in all directions so that it may more intimately mingle 115 with the air before passing on into the vacuum chamber 36 beyond the throttle.

The crimp adjustment on the deflector 35 is effected through the medium of an adjuster readily accessible to the operator or 120 mechanic, and one which permits a low-hung carbureter, permitting a free flow of gasolene when climbing a very steep hill. The adjuster comprises a rotatable stem 37 mounted in a bearing 38 above the float 125 chamber, the outer end of the stem carrying a nut 39 adapted to be seized by a key-wrench in the hands of the mechanic. If a wrench is inconvenient, a screw-driver may be applied to the groove 39' at the end of 130

the nut. The stem 37 forms the upper reduced terminal of a tubular member 40 mounted in, and shouldered against the bearing 38, the upper end of the longitudinal passage 41 of said member terminating at, and being closed by, the stem 37 which is solid. The inner end of the member 40 terminates in a conical portion 40' the passage 41 extending therethrough, and at the tip or narrow end of the taper portion 40' is formed a head 42 provided with a recess 43 directed laterally from the axis of the passage-way 41, the recess virtually converting the head 42 into a key or wrench-head, the wall of metal left on each side of the recess forming a jaw. The parts are so proportioned that the member 35 comes between the jaws and extends to a sufficient depth, that upon a rotation of the stem 37 in either direction, one or the other of the jaws will engage the edge of the member 35 and crimp or bow it to one side or the other from its normal or central position (shown in full illustration in Fig. 3). It is obvious that by applying a key to the head 39 the stem 37 and hence the head 42 may be rocked in either direction thus bowing or crimping the edge of the deflector to or from the jet-nozzle 28 as may be found desirable. As best seen in Fig. 2, the head 42 and the nozzle 28 are substantially on the same radial line from the axis of rotation of the throttle, this arrangement making it possible to dispose any crimp symmetrically about the axis of the nozzle, a relation which will be maintained each time the throttle is subsequently swung to bring this particular crimp opposite the nozzle. Should it be desirable to form a crimp slightly forward of a closed or low throttle position of the valve, the wings 34 have formed a slight lobe 34' so as to reduce the width of the deflector at that point and stiffen the same. This precaution is taken that any crimp at that point may not overlap an adjacent crimp, the stiffer metal at this point more effectively resisting the crimping action of the head 42. Communication between the chamber 36 and passage 41 is established through a large port 44 formed in the wall of the tubular member 40 and a connecting passage 45 formed in the wall of the carbureter. The port 44 is of sufficient diameter to permit a constant communication between the passages 41 and 45, to whatever extent the member 40 be rocked to actuate the head 42 to effect a crimp in the deflector 35. The function of the passage 41, port 44, and passage 45 is identical with the corresponding passages in my patent aforesaid, constituting as they do a "vacuum by-pass" from the mixing chamber to the vacuum chamber 36 beyond the throttle 29.

The operation, which is essentially on the order of the carbureter described in my

patent may be briefly summarized as follows:—It will be remembered that in the present improvement the throttle-lever (not shown) controls and actuates only, the throttle or gas-valve 29, the air or poppet-valve 7 automatically responding to the vacuum in the mixing chamber as a result of any opening of the throttle, the valve when seated permitting a certain quantity of air to flow into the chamber through the depressions *i*. When it is desired to crank the motor with a priming or rich mixture the throttle 29 is swung "backward" until the crimp *k* comes opposite the head 42 or opposite the nozzle 28 (the parts 42, 28, being on the same radial line with the axis of the throttle) whereupon the gasolene will flow freely into the mixing chamber and thence quickly past the pockets 32, 32, into the vacuum-chamber 36, a proper quantity of air entering past the valve 7 and mingling with the gasolene. Or, if cranking be dispensed with, and the motor is to be started "on the spark" the valve 29 may be set to priming position (as described) just before the motor is stopped, whereby the engine cylinders are charged with a rich mixture by the momentum of the parts after the electric spark has been shut off, when by simply closing the electric circuit with the spark switch (not shown) the machine will "start on the spark." Once the motor is started by cranking or "on the spark" the operator brings the throttle lever to the "closed" notch on the sector whereby the throttle 29 is swung forward to closed or low throttle position, the engine now running at a slow speed, and the "perfect" mixture in the main (except what may leak past the valve) discharging into the chamber 36 through the passage 41, port 44, and passage 45, as in my patent aforesaid. By terminating the intake or lower end of the passage 41 below the nozzle 28, the mixture is more readily drawn up through the "vacuum by-pass" (41, 44, 45) since the mixture does not have to be lifted from the nozzle 28 of the aspirator. In this particular the present improvement possesses an advantage over the patented construction.

The feed of the gasolene to the float chamber (from the bottom of which leads the tubular nozzle 10) is accomplished by the fall or drop of the float 12 which raises or unseats the valve 18, the same as in my patent aforesaid, though by a different and preferable form of connection between the float and valve. The mixing chamber is obviously vertically disposed as in my patent aforesaid, and all the advantages flowing from this arrangement are inherent in the present improvement.

Having described my invention, what I claim is:—

1. In a carbureter, a carbureting chamber

provided with an air intake, a gas or throttle valve, an aspirator for delivering the gasoline to said carbureting chamber, a member on the valve adapted to have distributed thereon at predetermined points independent formations for regulating the flow from said aspirator, with any movement of the throttle.

2. In a carbureter, a carbureting chamber provided with a valve-controlled air intake, a throttle valve adapted to be controlled by the operator, an aspirator for delivering the gasoline to the carbureting chamber, and a member on the valve provided with independent formations distributed along the same for regulating the flow from the aspirator.

3. In a carbureter of the character described, a throttle valve, a deflector crimped along the free edge thereof, carried by said valve, and means for projecting a spray of fuel against the crimped edge, for any position of the throttle.

4. In a carbureter, a carbureting chamber provided with a throttle-valve, an aspirator delivering gasoline to said chamber, and a deflector disposed in a fixed plane and coupled to the valve and provided with crimps against which the jet from the aspirator impinges.

5. In a carbureter, a carbureting chamber, a rotatable throttle for the same, an aspirator discharging gasoline into the chamber, and a deflector carried by the throttle and rotating in a fixed plane across the path of the projection of the jet issuing from the aspirator and provided with crimps against which the jet impinges.

6. In a carbureter, a carbureting chamber, a rotatable throttle for the same, an aspirator discharging gasoline into the chamber, and a deflector capable of flexure at individual and independent points toward or from the discharge end of the aspirator, and rotating in a fixed plane across the path of projection of the jet issuing from the aspirator.

7. In a carbureter, a carbureting chamber, a throttle-valve for the same, an aspirator discharging into the chamber, and a member on the valve provided with formations distributed thereon and operating in conjunction with the valve for regulating the discharge from the aspirator for any position of the throttle.

8. In a carbureter, a carbureting chamber, a rotatable throttle for the same, an aspirator discharging into the chamber, a pliable deflector on the throttle oscillating in proximity to the discharge end of the aspirator and across the path of projection of the jet issuing therefrom, and means for crimping or flexing the edge of the deflector to or from the discharge end of the aspirator.

9. In a carbureter, a carbureting chamber,

a rotatable throttle for the same, an aspirator discharging into the chamber, a pliable deflector on the throttle oscillating in proximity to the discharge end of the aspirator and across the path of projection of the jet issuing therefrom, and a rotatable adjuster adapted to engage the deflector from either side and crimp or flex the same toward or from the discharge opening of the aspirator.

10. In a carbureter, a carbureting chamber, a rotatable throttle for the same, a vacuum-chamber beyond the throttle, an aspirator discharging into the vacuum chamber, a pliable deflector on the throttle oscillating in proximity to the discharge end of the aspirator and across the path of projection of the jet issuing therefrom, a rotatable adjuster adapted to engage the deflector from either side and crimp or flex the same toward or from the discharge opening of the aspirator, the adjuster being provided with a by-pass establishing communication between the mixing and vacuum chambers respectively.

11. In a carbureter, a carbureting chamber, a rotatable throttle for the same, an aspirator terminating in a jet nozzle discharging into the carbureting chamber, a pliable deflector carried by the throttle and oscillating in front of the nozzle and across the path of projection of the jet issuing therefrom, a rotatable adjuster controlled from the outside of the carbureter, an inner head on the adjuster provided with a recess the walls of which are disposed opposite the respective faces of the deflector, whereby a face may be engaged by a recess-wall and the deflector crimped or flexed toward or from said wall.

12. In a carbureter, a carbureting chamber, a rotatable throttle-valve therefor, an aspirator discharging into the chamber, a deflector on the valve oscillating in a fixed plane in front of the discharge opening of the aspirator, and means for bringing different portions of the edge of the deflector to different distances from the discharge opening whereby the jets issuing therefrom may be varied at will.

13. In a carbureter, a carbureting chamber, a rotatable throttle-valve therefor, an aspirator discharging into the chamber, a deflector member on the valve oscillating in a fixed plane across the path of projection of the jet issuing from the aspirator, the deflector being provided with a crimp or bow adapted to come opposite the jet projected from the aspirator, for a priming position of the valve.

14. In a carbureter, a mixing chamber, an aspirator discharging gasoline into said chamber, and a crimped deflector moving in a fixed plane transverse to the path of projection of the gasoline from the aspi-

rator, for scattering and spraying the liquid within the chamber.

15. In a carbureter, a mixing chamber, an aspirator discharging gasolene into said chamber, and a valve-controlled deflector movable in a fixed plane transverse to the path of projection of the gasolene from the aspirator, and provided with marginal crimps for scattering and spraying the liquid within the chamber.

16. In a carbureter, a mixing chamber, a throttle-valve therefor, an aspirator discharging a jet of gasolene into the chamber, and means on the edge of the valve capable of independent adjustments selective of a predetermined jet to be delivered to the mixing chamber.

17. In a carbureter, a carbureting chamber, a throttle-valve therefor, an aspirator discharging jets of gasolene into the chamber, and means on the valve and capable of independent individual adjustments at different points along the edge, selective of a predetermined jet to be delivered to the mixing chamber.

18. In a carbureter, a carbureting chamber, a rotatable throttle-valve therefor, an aspirator discharging a jet of gasolene into the chamber, and a pliable deflector on the

valve across the path of projection of the jet, and capable of being crimped or bowed at the edge to or from the jet nozzle whereby each crimp may determine the character and volume of jet to be selected for that position of the valve which brings the particular crimp opposite the nozzle.

19. In a carbureter, a mixing chamber, an aspirator discharging gasolene thereinto, a throttle-valve, and a deflector on the valve provided with marginal means for regulating the flow of the gasolene into the chamber.

20. In a carbureter, a carbureting chamber, a rotatable throttle-valve, an aspirator discharging into the carbureting chamber, a deflector on the valve against which the jet issuing from the aspirator impinges, and an adjuster terminating in a member engaging the deflector on a line radial from the axis of rotation of the throttle, the aspirator discharge being on said radial line.

In testimony whereof I affix my signature, in presence of two witnesses.

CYRUS A. HAAS.

Witnesses:

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JOS. A. MICHEL.