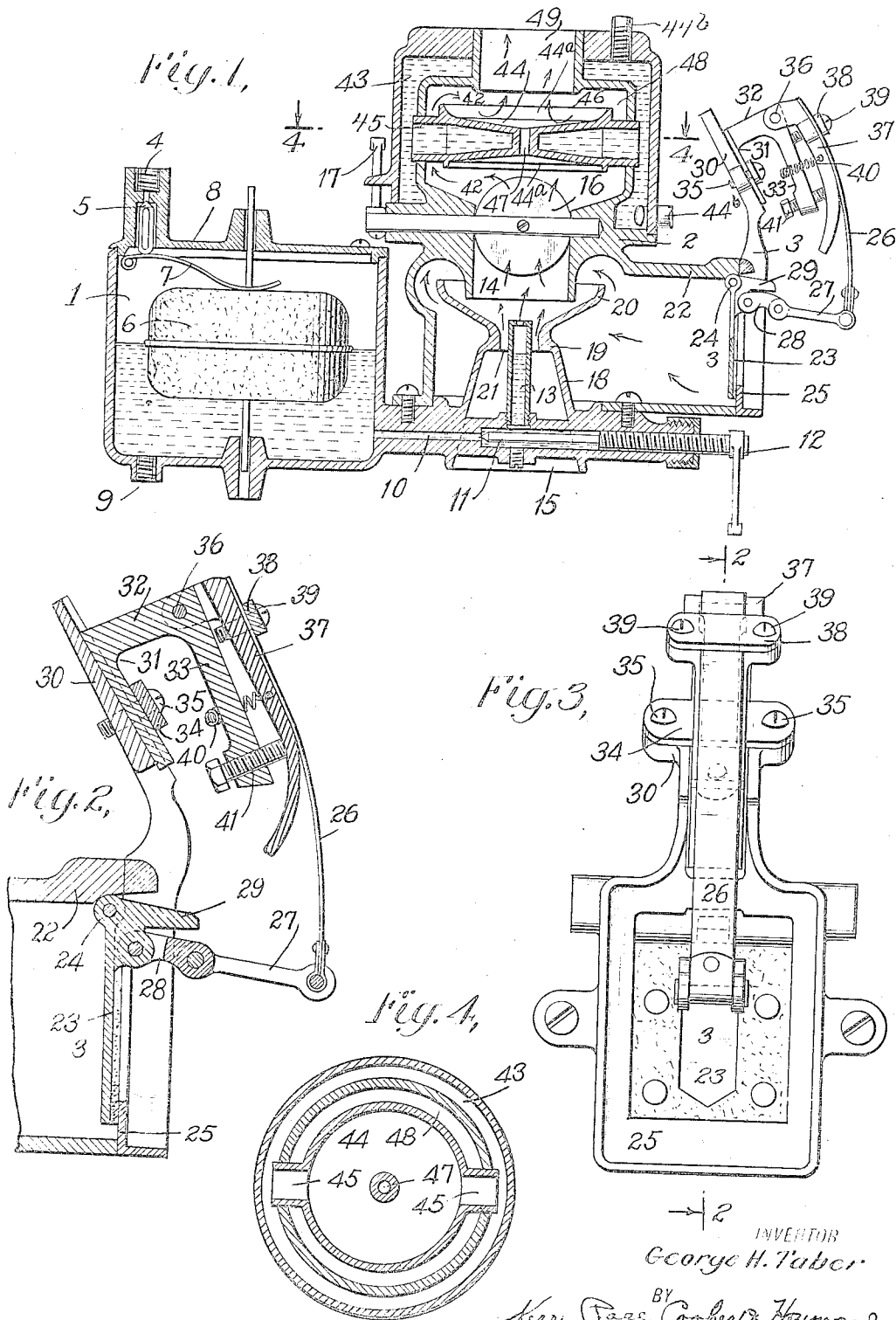


C. H. TABER.
CARBURETER VALVE.
APPLICATION FILED MAY 8, 1915.

1,225,076.

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INVENTOR
George H. Taber

BY
Sey, Page, Cooper & Hayward
ATTORNEYS

UNITED STATES PATENT OFFICE.

GEORGE H. TABER, OF BINGHAMTON, NEW YORK, ASSIGNOR TO THE TABER CARBURETER COMPANY, INC., OF BINGHAMTON, NEW YORK, A CORPORATION OF NEW YORK.

CARBURETER-VALVE.

1,225,076.

Specification of Letters Patent.

Patented May 8, 1917.

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To all whom it may concern:

Be it known that I, GEORGE H. TABER, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Carbureter-Valves, of which the following is a full, clear, and exact description.

The objects of my invention are, to attain a more perfect mixture of the gasoline or other liquid fuel with air, to provide a more exact proportioning of the fuel and air in the mixture, to control and regulate the admission of air to the mixing chambers, to automatically control the proportion of liquid fuel to air by means of a proper resistance to the admitted air regardless of the throttle opening, to provide means for adjustably regulating this resistance of admitted air for throttled position, intermediate and high engine speeds to provide an additional chambered space for proper mixing and completely vaporizing the constituents of the explosive fuel, to fashion the walls of the mixing chambers so as to attain the best results, and to provide surfaces at the proper point and in the proper relation to the advancing stream of mixing constituents to attain better results than have been possible hitherto. In connection with these main objects, I have perfected details and proportions of parts, all as will be pointed out hereafter.

Certain features of my improved valve herein shown and described are claimed generically in my copending application Serial No. 63,183, filed November 24th, 1915.

In the drawings,

Figure 1 is a vertical central section through my carbureter.

Fig. 2 is a section on the line 2—2 of Fig. 3.

Fig. 3 is an end view of the air valve and its attached and cooperating parts, and

Fig. 4 is a section on the line 4—4 of Fig. 1.

The carbureter comprises three main parts: a float-chamber 1, a mixing-chamber-structure 2, and an air valve structure 3. The float chamber 1 is of ordinary construction, gasoline or other suitable liquid fuel being fed from the tank or container through a supply pipe to a suitable inlet 4, which is controlled by a valve 5, adapted to be opened and closed by the rising and

falling of a float 6 through the agency of a spring 7, in the ordinary manner. The float chamber may be provided with a removable cover 8, as shown, and with a drain hole 9, closed by a screw-plug. From the lower part of the float chamber the liquid fuel is led by a passage 10 into the mixing-chamber-structure 2, the flow being controlled by a needle valve 11 operated by an external lever 12, as is common. From the passage 10 a vertical nozzle 13 projects into the primary mixing chamber 14, where it is entrained with air drawn through the lower opening 15 by the suction of the engine piston, and the air and fuel receive their preliminary mixing as they pass upward through the cylindrical opening controlled by the throttle valve 16, which is operated by the external lever 17.

A downwardly extending skirt, with a restricted waist 19, forms the passage for the air for the preliminary mixture, and a flaring upper part or cup 20 forms the lower boundary of the preliminary mixing chamber, and also partitions it off from the air entrained through the lateral port of the air valve structure 3, as will be explained presently. At the meeting line of the restricted waist 19 and the flaring skirt 18 is an interior, circular lip or flange 21, upon which will collect in drops any residual liquid gasoline in such position that the entering air will pick it up and carry it forward into the mixing chamber.

The air-valve structure 3 is mounted upon a lateral passage 22 of the mixing-chamber structure 2, so that the flap-valve 23 will, normally, close the end thereof. The flap-valve 23 is hinged or pivoted at 24 so as to swing inwardly under suction from the engine-pistons, and when released flies closed against its seat, under the tension of a flat spring 26 which is connected to the upper side of the valve as by two links 27, 28, the inner link 28 being hinged to the valve 23, as shown, at a point just beneath an outwardly projecting finger or lever 29 that is integral with the hinge or mounting of the valve 23 upon the pivot 24. The relation of these parts is such that, as the valve 23 is drawn inwardly, the finger 29 is pressed down upon the inner link 28 near the outer end of pivot thereof, so as to depress the latter and the connecting end of the outer link 27 and thereby give this link a down-

ward thrust or pull as the valve is drawn inwardly, thus giving a constantly increasing tension upon spring 26 as the valve is opened. This proportionate increase of spring-tension I have found to be a matter of great importance in the proper operation of the carbureter; for as the suction of the engine increases, the wider is the flap valve 23 opened and the more air drawn in; and at the same time the greater is the draft of liquid fuel through the pipe or nozzle 13, due to the proportional increased resistance to said air; hence automatically regulating said resistance of the air so that its increase and decrease are directly proportional to the suction, due to pistons. This results in supplying the proper proportions of air and gasoline at every engine speed.

The valve structure 3 and its operating parts are all designed to attain the most perfect results by securing exact adjustment adapted to all engine speeds, and it comprises the following parts and details: A fixed standard 30 is mounted upon or cast as a part of the carbureter casing, and preferably is inclined toward the carbureter, as indicated. This standard is provided with a grooved face in which is slidably mounted one arm 31 of a three-armed bracket 31, 32, 33; the arm 31 being secured in place by a bridge-piece 34 detachably secured to lugs on the standard 30, as by screws 35. Upon loosening these screws, the bracket 31, 32, 33 may be slid up or down in the grooved face of standard 30 to any desired position. Pivoted to the middle arm 32 of the bracket, as by pivot 36, is a downwardly extending and inwardly curved member 37 upon the broad face of which is secured the flat or leaf-spring 26, the means of attachment of the spring being a bridge-piece 38, detachably secured to lugs on the face of 37, as by screws 39; by loosening the latter, the flat spring 26 may be slid endwise in either direction. Since the spring is attached to the flap valve 23 through the mediate connections of the links 27, 28, the positions of the latter and the tension or spring-resistance upon the flap valve 23 may be adjusted by this forward and backward sliding of the spring 26.

The lower and curving end of the member 37 is held against the bracket-arm 33, as by a spring or other resilient connection 40, and an adjusting screw 41 mounted in the bracket-arm 33 and bearing against 37, is employed to raise and lower the latter, and thereby increase or diminish the bowing or compression of valve-spring 26.

The arrangement of the link 28 and its associated parts is such that the pressure or pull exerted upon it is transferred to the flap-valve in a line perpendicular to the face or plane of the latter.

The supplemental air valve or flap valve

with its mounting is, by the means just described, made adjustable in three ways: The flat spring 26, held at its rear end by clamp 38, as shown, may, by slightly raising the latter, be moved end-wise in either direction. If pulled downward the effect is to lengthen the distance between the point of attachment of the spring upon the link 27 and its point of contact with the curved plate or backing 37; which means a weakening of the effective action of the spring and consequently less resistance to the suction of the engine, hence less suction on the gasoline or other liquid fuel. This adjustment is the adjustment for high speed or full opening.

The next adjustment is of the spring and its mounting as a whole toward or away from the projecting lever or finger mounted on the pivot of the flap valve. This consists of the bridge or clamp 34, held by screws 35 or other suitable fastenings, and which holds the bracket arm 31 in the stationary valve frame or standard 30. By loosening this bridge piece the pedestal, with all its attached parts, may be slid toward or away from the finger piece or projecting lever 29 of the flap valve 33, thus varying the distance between the point of the projecting finger and the secondary pivot point or link 28. If this distance is decreased the valve has more leverage upon the spring than upon the second pivot, hence the resistance of the spring is increased, when, upon sucking in of valve 23, the projecting finger picks up the secondary link 28; and on the contrary, when the pedestal or bracket-arm 31 is adjusted toward the projecting lever or finger, the distance of the latter from the secondary pivot is increased; thereby decreasing the resistance of the spring. The adjustment thus described is for the middle range of motor-speeds.

The third kind of adjustment provided for is the adjustment of the curved plate or backer 37 for the flat spring 26. This is the adjustment for slow speed of motor—i. e., when the motor is "throttled down." As shown in the drawing by the position of air valve, as throttle in drawing is open, this curved piece is pivoted at its rear end 36 to the bracket-arm 32, so that when the screw 41 is adjusted forwardly, it tends to raise the curved piece 37, and hence to pull the links 27, 28 outwardly or away from the pivot of the flap valve; and when the adjusting screw 41 is adjusted rearwardly, it tends to reduce the pull of the link upon the flap valve 23. In this way the tension of the spring upon the flap valve, in its completely closed position, is increased and diminished.

The curved plate 37 is, in effect, an adjustable and compensating fulcrum for the flat spring—in so far as the latter acts as a lever.

The air entering when the flap-valve 23

is opened, is drawn upward by the engine suction and passes in the direction of the arrows around and above the cup-shaped part 20, which incloses the lower part of the preliminary mixing chamber 14, thence up past the open throttle-valve 16 into the upper or supplementary mixing chamber 42. This chamber is provided with a water-jacket 43, which is connected, as by pipes 44^b, with a circulatory heating system (not shown), including a small pump, if desired. The water jacket is extended to the middle part of the upper mixing chamber, by placing in the latter a flat, cylindrical member 44, whose upper and lower ends are provided with dished caps or plates 44^a provided with peripheral flanges, the casting for this member being so constructed as to leave a relatively narrow central vertical opening 47 and a peripheral opening 48 from the lower to the upper part of the mixing chamber 42; also with passages 45, 45 connecting the inner with the outer part of the water jacket. At 49 is attached the pipe leading to the engine cylinders.

The parts being in the positions shown in Fig. 1, the movement of the engine-pistons creates suction in the passage 49, which draws air through the opening 15 and liquid fuel out of the pipe 13; these are mixed in the preliminary mixing chamber 14 and drawn upward into the supplementary mixing chamber 42. As the engine speed increases the flap valve 23 is drawn inwardly and air entrained through the port 22, and as it passes up into the supplementary mixing chamber 42 an increasing amount of gasoline is entrained with it, and is vaporized in 42. The vaporizing action is greatly promoted and perfected by impingement against the heated lower cap or deflecting plate 44^a, and by passing up and around the passages through the heated water jacket, the action of which is to supply heat to the vapor at the very instant that it has been cooled by the process of expansion.

The various parts of the valve structure 3 having been adjusted by calculation or test for the requirements of the particular engine with which the carbureter is associated (as heretofore described), the proportions and amounts of fuel and air are supplied to a nicety in the normal operation of the device, which thereupon is self regulating for all engine speeds.

I do not intend to limit myself to details of construction, for the parts and arrangement are susceptible of much variation in form and application.

What I claim is:

1. In an air valve structure for carbureters, comprising, in combination, an auxiliary air inlet of rectangular cross section and substantially uniform area, a swinging flap valve of rectangular section hinged

at one edge of the rectangular air inlet and having the two sides extending closely to the walls of the rectangular inlet whereby on opening the valve all of the air passes between the bottom of the valve and the bottom of the rectangular inlet, and means in operative association with said moving flap valve for increasing the resistance to inward opening proportionally to engine suction.

2. In air valve structure for carbureters, comprising, in combination, an auxiliary air inlet of rectangular cross section and substantially uniform area, a swinging flap valve of rectangular section hinged at one edge of the rectangular air inlet and having an opening movement of substantially 90°, and means in operative association with said swinging flap valve for increasing the resistance to inward opening proportionately to the increase in engine suction.

3. An air valve structure for carbureters, comprising, in combination, a swinging air valve, a blade spring for holding said valve to its seat and resisting the inward movement of said valve under the influence of engine suction, a plurality of adjusting means for said spring, one device adjusting the spring for excessive engine suction, a second device adjusting the said spring for medium degrees of engine suction, said device comprising a slidably adjustable spring mounting, the said mounting being adapted to be slid up and down along on base disposed in a plane at an angle to the plane of the flap valve when closed, and a third device adjusting the spring for low engine suction.

4. An air valve for carbureters comprising, in combination, an inwardly opening flap valve, a seat therefor, a blade spring for retaining the flap valve in normally closed position, and means for increasing the spring tension after the valve has opened to a predetermined extent, said means comprising a pair of pivotally connected links connecting the valve and the spring, and a finger projecting outwardly from the valve and adapted to impact against said links and to thereby compound their action whereby the spring tension is increased substantially as described.

5. An air valve structure for carbureters comprising in combination a hinged, inwardly swinging flap-valve, a pressure finger or lever projecting outwardly therefrom, a pivoted connection to the outer side of said valve, and means for causing said connection to transmit pressure or pull applied to it in a direction perpendicular to the face of the valve.

6. An air valve structure for carbureters, comprising a hinged, inwardly swinging flap-valve, a spring operatively associated therewith and tending to hold the same in closed position, and means for causing the

tension of the spring to be applied to said valve in a direction progressively shifting as the valve is swung inwardly, but always in a direction substantially perpendicular to the plane of the face thereof.

7. In a valve structure for carbureters, the combination of a flap-valve pivotally mounted to swing inwardly, a link pivotally mounted upon the outer face of said valve, a finger projecting from the upper part of said valve and adapted as the valve is opened to impinge against the outer end of the link and depress the same.

8. In a valve structure for carbureters, the combination of a flap-valve pivotally mounted to swing inwardly, a link pivotally mounted upon the outer face of said valve, a finger projecting from the upper part of said valve and adapted as the valve is opened to impinge against the outer end of the link and depress the same, and means for adjusting the distance between the outer end of said link and said projecting finger when the valve is in closed position.

9. In a valve structure for carbureters, the combination of a flap valve having a pivot mounting substantially at one edge thereof, a swinging connection attached to the outer end thereof, a spring attached to said swing-

ing connection, and means for adjusting the effective length of said spring.

10. In a valve structure for carbureters, the combination of a flap-valve, a flat spring operatively associated therewith, a curved plate upon which said spring is mounted, means including a supplementary spring for holding the curved plate in definite relation to the plane of the flap-valve, and means for varying such angular relation to adjust the action of the valve.

11. In a valve structure for carbureters, the combination of a flap-valve, a member pivotally connected to the outer face of said valve, a spring operatively associated with said member, a mounting for said spring, and means for varying the distance between said mounting and the point of attachment of said member, said means being adapted to shift the said mounting along a plane disposed at an angle to the plane of the valve seat.

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

GEORGE H. TABER.

Witnesses:

A. WARD FORD,
HAZEL M. KNISE.