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C. H. BRASELTON

1,625,787

CARBURETOR

Filed Feb. 24, 1919

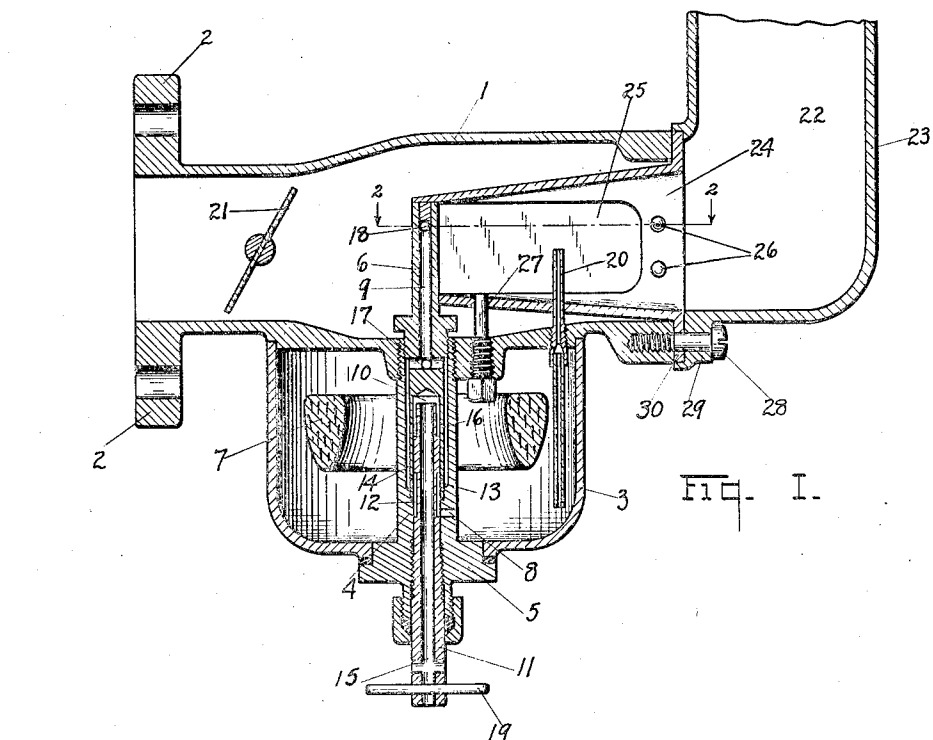


Fig. I.

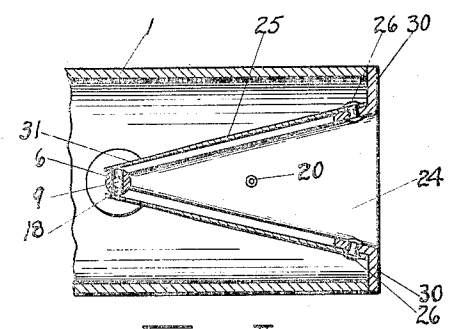


Fig. II.

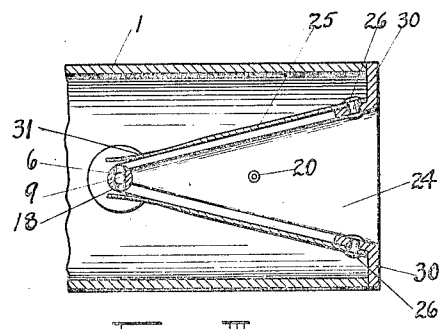


Fig. III.

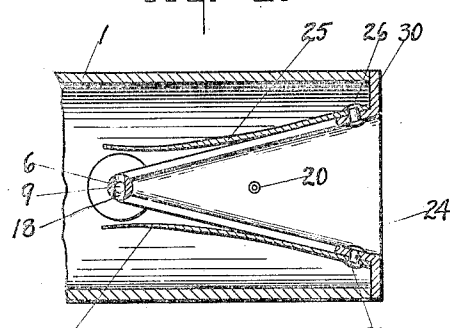


Fig. IV.

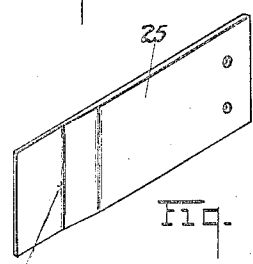


Fig. V.

INVENTOR.

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CARBURETOR.

Application filed February 24, 1919. Serial No. 278,743.

This invention relates to improvements in carburetors for mixing and vaporizing liquid fuel with air to produce explosive charges for internal combustion engines.

5 The invention in the embodiment illustrated herewith is shown applied to a well known form of carburetor, illustrated and described in application, Serial No. 118,369, filed September 5, 1916, by George F. Ritter, and Harry B. Tillotson.

10 One object of the invention is to construct a self-adjusting valve comprising leaf springs, so formed that the leaf springs normally close the main air passage but readily open to allow a supply of air to pass there-
through.

15 A further object of the invention is to provide a device of this character wherein the leaf springs are so constructed that they are most flexible at their free ends.

20 Further objects of this invention relate to economies of manufacture and details of construction, as will hereinafter appear from the detailed description to follow.

25 The objects of the invention are accomplished in one instance by the devices and means described in the following specification, but it is evident that the same may be varied widely without departing from the scope of the invention, as pointed out in the
30 appended claims.

A structure constituting one embodiment of the invention, which may be the preferred, is illustrated in the accompanying
35 drawing forming a part hereof, in which:

Figure I is a vertical-sectional view through the carburetor, illustrating the relative position of the operating parts with respect to each other.

40 Figure II is a horizontal-sectional view taken along the line 2—2 of Figure I, and illustrating the leaf springs in closed position.

45 Figure III is a horizontal-sectional view similar to that shown in Figure II, and illustrating the position of the leaf springs when a comparatively light suction is applied thereto.

50 Figure IV is a horizontal-sectional view, similar to that shown in Figure II, and illustrating the relative positions of the leaf springs when a comparatively high degree of suction is applied thereto.

Figure V is a perspective view of one of

the leaf springs, illustrating the tapered construction of the same.

In the drawing, similar reference characters refer to corresponding parts throughout the several views, and the sectional views are taken looking in the direction of the
60 small arrows at the ends of the section line.

In the embodiment of the invention illustrated herewith, a mixing chamber 1 of substantially cylindrical form is connected to the manifold of the engine by a flange 2.

65 A float chamber 3 which serves as a reservoir for the fuel supply is mounted on the mixing chamber 1 by means of a tubular stem 4, which has its upper end threaded into the wall of the mixing chamber, and
70 is provided at its lower extremity with an enlarged head 5, adapted to bear against the lower surface of the float chamber for the purpose of securing the same to the mixing chamber.

Threaded within the upper
75 end of the tubular stem 4 is a fuel nozzle 6, which projects into the mixing chamber at a point substantially midway of the side walls thereof. A float 7 is mounted within the float chamber in such a manner as to control the supply of liquid fuel thereto in the
80 usual manner. The tubular stem 4 is provided with an opening 8 in the side wall thereof, which is spaced a short distance from the bottom of the float chamber 3. The
85 fuel nozzle 6 is provided with an upper central passage 9, and a lower central passage 10 which is considerably larger than the central passage 9, and within which there is telescoped the upper end of a tubular stem
90 11, which is threaded within the tubular member 4 in such a manner as to be capable of vertical adjustment with respect to the tubular member 4 and the fuel nozzle 6 carried thereby.

The tubular stem 11 is provided with a ring groove 12 positioned upon the exterior surface thereof in such a manner as to be in communication with the opening 8 formed in the side wall of the tubular member 4. The lower tubular portion of
100 the fuel nozzle is provided with a plurality of radial openings 13, which communicate with the ring groove 12 and a circular recess 14 formed in the interior surface of the tubular member 4. By means of this
105 construction the liquid fuel is permitted to pass from the float chamber into the circular recess 14 formed in the tubular member

4 where it rises to the same height as the fuel contained in the float chamber. The tubular stem 11 is provided with a central passage 15 through which air is drawn by the suction exerted by the cylinders of the engine, the said air passing through the central passage 15 in the tubular stem into the lower central passage formed in the fuel nozzle, and passes therefrom through a plurality of radial openings 16 formed in the fuel nozzle into the circular recess formed in the tubular member 4 where it is mingled with the fuel which has been drawn therein in the manner described above, and the combined air and fuel is drawn upwardly through a plurality of radial openings 17 formed in the fuel nozzle and communicating with the circular opening 14 and the upper central passage 9 formed in the fuel nozzle. This mixture of combined air and fuel passes from the fuel nozzle into the mixing chamber through a pair of radial openings 18 formed in the upper end of the fuel nozzle, and communicating with the central passage 9 therein. The tubular stem 11 is provided with means 19 at its lower end whereby it may be adjusted within the tubular stem 4 for the purpose of controlling the supply of fuel admitted to the circular opening 14 through the opening 8 formed in the side wall of the tubular member 4.

A secondary fuel supply nozzle 20 is carried by the mixing chamber a short distance back of the primary nozzle, and is somewhat shorter than the primary nozzle, and has its lower end extending into the float chamber 3 while its upper end extends into the mixing chamber at a point in the rear of the primary nozzle. A butterfly valve 21 is provided for controlling the supply of the fuel mixture from the mixing chamber to the engine.

The main air supply which may be heated if so desired, enters the mixing chamber by the passage 22, wherein may be positioned a choke valve for controlling the supply of air if desired, so as to provide a rich mixture in starting the engine. The section 23 within which is formed the air supply passage 22, is secured to the rear end of the mixing chamber 1 and a horizontally extending section or cage 24 is provided which projects into the mixing chamber 1 and is secured thereto by removable means. The top and bottom walls of said cage are rigid and are slightly bowed, as shown in Fig. I, and the side walls of said passage are formed by the flexible reed members 25 consisting of leaf springs secured at their rear edges to the cage 24 by means of screws or rivets 26. The forward edges of said reeds are free so that the entire reeds may flex and yield under the engine suction, so as to increase the cross section of the air passage at the nozzle.

The primary nozzle 6 extends through the bottom wall of the mixing chamber 1 into the air passage of said mixing chamber at the free ends of the flexible reed valves 25, and between the same, as clearly appears from Figs. I to IV inclusive of the drawing, and the secondary nozzle 20 extends into the air passage at a short distance in the rear of the primary nozzle 6, the said nozzle 20 extending through the bottom of the cage 24, as illustrated in Fig. I of the drawing. The cage 24 and the flexible reeds carried thereby thus constitute a choke tube section for the mixing chamber. It will be observed from reference to Figs. II to IV inclusive, that the free ends of the flexible reeds 25 extend beyond and bear against the open ends of the radial openings 18 formed in the upper portion of the fuel nozzle. A centering and supporting pin 27 is threaded within the wall of the mixing chamber and extends into an opening formed in the cage 24 for the purpose of properly centering and supporting the cage within the mixing chamber. The cage 24 is removably positioned within the mixing chamber and is held therein by means of screws 28 passing through an exterior flange 29 formed upon the section 23 and through an exterior flange 30 formed upon the cage, and passing into the side wall of the mixing chamber for the purpose of firmly securing these parts thereagainst. Each of the reeds 25 decreases in thickness towards its free end as indicated at 31, whereby the reeds are capable of opening slightly under a less suction than would be required if they were formed of uniform thickness throughout their entire length.

From the description of the parts given above, the operation of the structure will be readily understood. Liquid fuel passes from the float chamber 3 through the opening 8 formed in the side wall of the tubular member 4 into the ring groove 12 formed upon the exterior surface of the tubular member 11, from whence the fuel is enabled to pass through the radial openings 13 formed in the lower tubular portion of the fuel nozzle into the circular recess 14 formed in the interior surface of the tubular member 4, and in which it is permitted to rise to the same height as the liquid in the float chamber. The engine suction draws air through the central passage 15 formed in the tubular stem 11, from which the air passes into the tubular opening formed in the lower end of the fuel nozzle and passes outwardly through the radial openings 16 into the circular recess 14 where it mingles with the fuel, and the mixture of air and fuel under the influence of the engine suction passes upwardly and through the radial openings 17 into the central passage 9 formed in the upper portion of the fuel nozzle, from whence it is supplied to the mixing chamber through the radial

openings 18 formed in the upper portion of the fuel nozzle. As the mixture of fuel and air passes from the radial openings 18 in the fuel nozzle, it is mingled with the air passing through the choke tube section and drawn from the main air supply passage 22, this mixture of air and fuel formed in the mixing chamber being supplied to the engine cylinders in the usual manner. The supply of this mixture of fuel and air to the engine cylinders is controlled by the butterfly valve 21 in a manner well known in the art. The main air supply enters through the air supply passage 22 and passes into the mixing chamber 1, being directed through the cage 24 and between the flexible reeds 25, said cage and the flexible reeds forming a choke tube for the mixing chamber 1. Since the side walls of said choke tube are formed by the flexible reeds 25, it will be seen that the cross section of the said choke tube and the curve thereof is automatically variable, dependent upon the variation of the suction in the engine cylinders. The suction which is exerted at the nozzle upon the fuel mixture is dependent upon the cross section of the choke tube at that point, being dependent upon the velocity of the current of air flowing past such point, which is controlled by said cross section, so that the volume of air flowing past the nozzle and the suction exerted upon the fuel at the nozzle will be both automatically controlled by variations in the engine suction. Thus, as the engine suction increases, the volume of air going past the nozzle will be increased and the cross section of the choke tube will be increased, so that there will be a corresponding decrease in the effective suction on the nozzle relative to the flow of gas, and more air will be supplied to the mixture and the fuel supplied to the air will not be increased to so great an extent as to provide a mixture which is too rich. As soon as the engine suction decreases, the internal flexibility and the elasticity of the reeds will bring them back towards their normal position. The secondary nozzle 20 is placed a short distance behind the primary nozzle 6, and as the engine suction increases as the engine is speeded up, the secondary nozzle 20 will come into play so as to aid and assist the primary nozzle in furnishing fuel to the air passing through the mixing chamber.

By reason of the fact that the radial openings 18 formed in the upper portion of the fuel nozzle are normally covered by the free ends of the flexible reed, the supply of fuel from the primary nozzle to the mixing chamber is more directly influenced by the choke tube passage formed by the ends of the reeds, and is more thoroughly vaporized by the air passing through the main air supply passage 22 than would be the case if the open-

ing in the fuel supply nozzle were otherwise positioned. Each of the flexible reeds is secured at one end to the frame portion of the cage 24 and decreases in thickness towards its free end, as indicated at 31, whereby the flexible reeds are more readily influenced in their initial movement from their normal position by a light degree of engine suction than would be the case if the flexible reeds were of uniform thickness throughout their length. By reason of this construction it is evident that air and fuel can be more readily drawn into the engine cylinders in starting the engine and in operating the same at low speed.

While I have shown and described in considerable detail a specific embodiment of my invention, it is to be understood that this showing and description is illustrative only, and for the purpose of rendering my invention more clear, and that I do not regard the invention as limited to the details of construction illustrated or described, nor any of them, except in so far as I have included such limitation within the terms of the following claims, in which it is my intention to claim all novelty inherent in my invention broadly as well as specifically.

What I claim as new and desire to secure by Letters Patent is:

1. In a carburetor, a fuel nozzle, a choke tube section provided with a plurality of leaf springs which are secured at one end to said section, and have their free ends converging toward the fuel nozzle, said springs decreasing in thickness towards their free ends.
2. In a carburetor, a flexible reed valve comprising a leaf spring having a fixed end and a free end, and decreasing in thickness towards its free end.
3. In a carburetor, a flexible reed valve comprising a valve seat; a leaf spring secured to said seat at one end, the other end being free, said spring decreasing in thickness from its fixed to its free end.
4. In a carburetor, a mixing chamber, a frame carried thereby, and a plurality of leaf springs, each of which is secured at one end to the frame and decreases in thickness towards the free end thereof.
5. In a carburetor, a mixing chamber, a flexible reed valve comprising a valve seat and a leaf spring which is fixed at one end to said chamber adjacent said seat decreasing in thickness towards the opposite end thereof.
6. In a carburetor, a fuel reservoir, a choke tube section having a plurality of leaf springs, a main fuel nozzle connected with said reservoir and arranged adjacent the restricted end of said choke tube section to be controlled by said leaf springs, an auxiliary fuel nozzle also connected with said reservoir and arranged within said choke

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tube section and spaced from said main fuel nozzle, said leaf springs being tapered in thickness between said auxiliary nozzle and said main nozzle.

5 7. In a valve construction, the combination of a chamber having an aperture in the wall thereof; a valve seat including said aperture; a flexible valve member fixed to the chamber adjacent said seat and adapted
10 normally to contact with the seat, said valve member having a thickness diminishing in value from its fixed to its free ends.

8. In a valve construction, the combination of a chamber having an aperture in the wall thereof; a valve seat including said aperture; a resilient and integral valve member fixed to the chamber adjacent said seat and adapted normally to contact with the seat, said valve member having a thickness

diminishing in value from its fixed to its 20 free ends.

9. In a valve construction, the combination of a chamber having an aperture formed therein; a valve enclosing said aperture; a spring member normally in contact 25 with said valve seat, said member being fixed at one end and free at its other end, the thickness of the valve spring diminishing from its fixed end to its free end whereby, under the force of the gaseous current 30 moving through said aperture, the spring member flexes outwardly, the flexure beginning with the free end of the spring member.

In testimony whereof, I affix my signature. 35

CHESTER H. BRASELTON.