June 14, 1927. 1,632,198

G. F. RITTER

CARBURETOR

Filed April 9, 1917

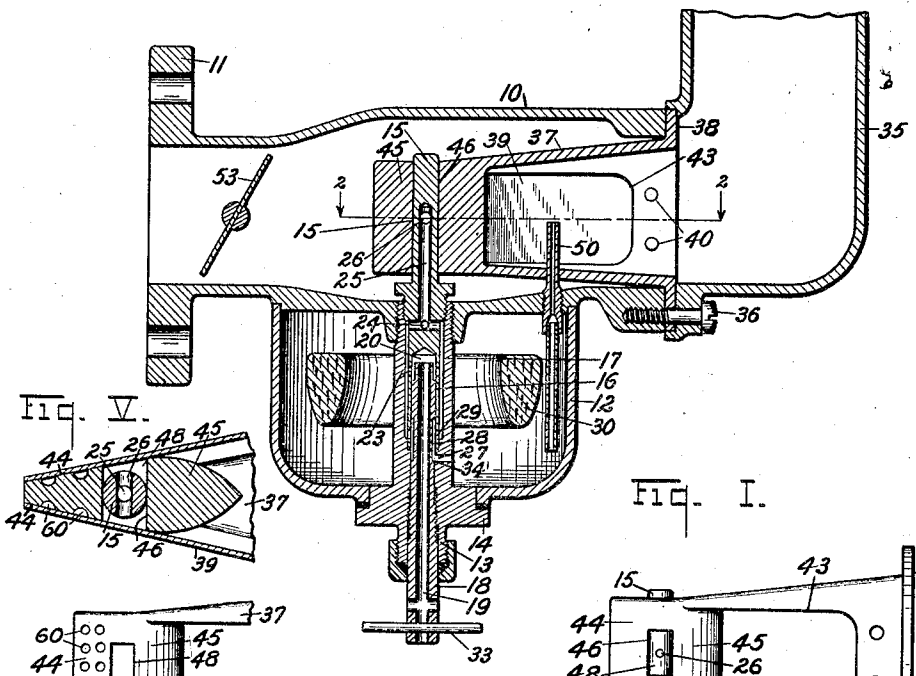


Fig. I.

Fig. V.

Fig. VI.

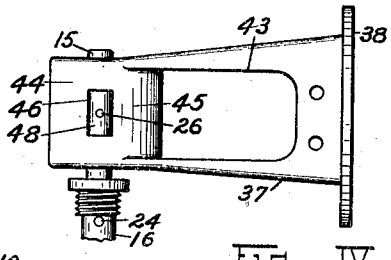


Fig. IV.

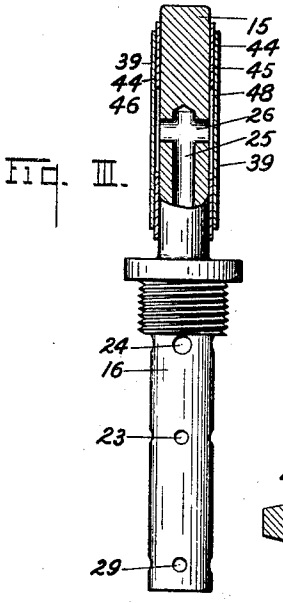


Fig. III.

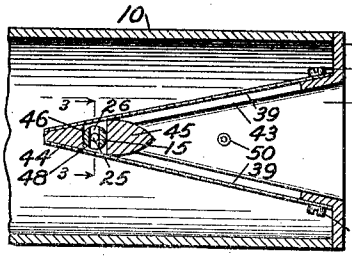


Fig. II.

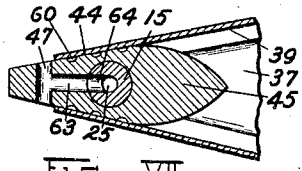


Fig. VII.

INVENTOR.
George F. Ritter
BY
Charles A. Braselton
ATTORNEY

Patented June 14, 1927. 1,632,198

UNITED STATES PATENT OFFICE.

GEORGE F. RITTER, OF TOLEDO, OHIO, ASSIGNOR TO THE TILLOTSON MANUFACTURING COMPANY, OF TOLEDO, OHIO.

CARBURETOR.

Application filed April 9, 1917. Serial No. 160,703.

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

The main object of this invention is to construct a self-adjusting valve, controlled automatically by the pressure of air, so that it will not make a noise. In the present form of embodiment, which is shown in the drawings for illustration purposes only, the valve comprises two opposing leaf springs restricting the air supply passage adjacent the fuel supply nozzle. The leaf springs are mounted at their ends remote from the fuel nozzle, and their free ends open automatically, more or less, depending upon the volume of air to be drawn into the mixing chamber. When the leaf springs move to normal position, they engage flat surfaces on fixed means between their free ends. In order to prevent these leaf springs from making a noise when they strike the fixed means, chambers or pockets are formed in the fixed means and adjacent the fuel nozzle so that the mixture of fuel and air in the pockets acts as cushions, whereby the leaf springs, instead of suddenly striking the fixed means, move slowly into engagement therewith, the mixture in the pockets serving to retard the final increment of movement of the springs to normal.

Further objects, and objects relating to economies of manufacture, and details of construction, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. My invention is clearly defined and pointed out in the appended claims.

A structure constituting a preferred embodiment of my invention is illustrated in the accompanying drawings, forming a part of this specification, in which:

Figure 1 is a vertical section through the preferred form of embodiment of the invention;

Figure 2 is a detail sectional view taken along the line 2—2 of Figure 1;

Figure 3 is a detail sectional view taken through the fuel nozzle and the leaf springs of the valve, as on the line 3—3 of Figure 2;

Figure 4 is a side view of the frame of the valve which comprises the frame and leaf springs;

Figure 5 is a detail horizontal section taken through the free ends of the leaf springs and the means therebetween, and shows pockets formed beyond the fuel nozzle;

Figure 6 is a detail side view of the portion of the valve frame between the leaf springs shown in Figure 5;

Figure 7 is a detail horizontal section taken through the free ends of the leaf springs and the modified form of the fuel nozzle and the portion of the frame between the free ends of the leaf springs.

In the drawings, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Considering the numbered parts of the drawings; a mixing chamber 10, of a substantially, cylindrical shape is provided with a flange 11, by which it is connected to the manifold (not shown) of the engine. A float chamber 12, which serves to hold the fuel supply, is mounted on the mixing chamber 10 by means of a tubular stem 13. The stem 13 has a flange 14 near its lower end, on which the chamber 12 rests, and the upper end of the stem is screwed into the mixing chamber 10 to hold the float chamber and stem in place. Screwed into the upper end of the stem 13 is a fuel nozzle 15. The diameter of the lower tubular end 16 of the fuel nozzle is somewhat less that the diameter of the bore 17 of the stem 13, in which the tubular portion 16 extends, so that a space or passage is provided between the tubular portion 16 and the stem 13. A tubular stem 18 is screwed into stem 13 and its upper end projects into the tubular portion 16 of the nozzle 15. The primary air supply is drawn through a passage 19 in the tube 18 (Fig. 1) into a chamber 20 formed in the upper end of the portion 16, through passages or ports 23 in the tubular portion 16, through the passage formed between the tubular portion 16 and the tube 13, through ports 24 communicating with the vertical passage 25 into the nozzle, and thence through the passage 25 and transverse ports 26 in the nozzle, into the mixing chamber. The liquid fuel is drawn from the chamber 12, through a passage 27 formed in the stem 13, into a passage 28 formed by an annular groove in the tube 18, through

ports or passages 29 in the tubular portion 16, and thence through the passage between the tubular portion 16 and the tube 13, where it is mixed with the air and drawn through the ports 24, passage 25, and the ports 26 in the nozzle 15. A float 30 controls the volume of fuel in the chamber 12 in any well known manner.

The stem 18 may be adjusted by a pin or handle 33 on its lower end to cause a shoulder 34 on the stem to restrict the passage 27 to any desired extent, and thereby regulate the volume of fuel drawn through the nozzle by the upwardly rushing air. This adjustment regulates the richness of the mixture of fuel and air to be discharged at the ports 26 of the nozzle 15.

The main air supply, which may be heated, enters the carburetor through a passage 35 (Fig. 1) connected to the mixing chamber 10 by screws 36. A frame 37, forming part of the valve for regulating the volume of air passing through the passage 35 into the mixing chamber, has a flange 38 positioned between the adjacent ends of the mixing chamber 10 and the passage 35, the frame being fastened to the mixing chamber by the screws 36, which project through the flange 38. Converging leaf springs 39 are fixedly mounted at their ends, remote from the fuel supply nozzle 15, to the frame 37 by means of screws 40. The springs 39 normally close openings 43 in the side of the frame 37. The free ends of the spring leaf members 39 normally engage the flat surface 44 on the sides of an upright portion 45 at the end of the frame 37. The nozzle 15 projects through a transverse opening 46, formed in the frame portion 45, this frame portion being bored above and below the opening to accommodate the nozzle 15. The nozzle has the two oppositely extending horizontal ports 26 leading from the passage 25, and each port 26 opens into a pocket 48 formed in the opening 46 by the nozzle. It is obvious that any desired number of ports 26 may open into each pocket 48.

An auxiliary fuel nozzle 50 is screwed into the casing 10, and projects within the frame 37 intermediate the frame portion 45 and the open end of the frame. In the chamber 10 is pivotally mounted a butterfly valve or throttle 53 of the ordinary type.

In operation, when the engine to which the carburetor is attached is cranked, and the valve 53 is opened, a partial vacuum will be effected in the mixing chamber 10, thus reducing the air pressure on the sides of the springs 39 within the chamber, so that the air in the passage 35 moves the free ends of the springs 39 away from the frame portion 45. As the springs open, the air, drawn through the passage 35 and past the valve springs 39 by suction, mixes thoroughly with the fuel and air drawn through the nozzle 15 by suction. Upon increase in demand for explosive mixture a more perfect vacuum is effected in the mixing chamber so that the springs 39 are spread still further apart at their free ends forming a kind of automatically adjustable suction action adjacent the primary fuel nozzle 15 analogous to that produced by a Venturi tube. In this way the volume of air rushing from the passage 35 into the mixing chamber 10 is automatically regulated so that it is proportional to the amount of fuel discharged at the nozzle 15 due to the suction effect in the mixing chamber. As the vacuum within the mixing chamber increases the springs 39 open out more and more and the auxiliary fuel nozzle 50 becomes active to supply additional fuel which is carried into the mixing chamber with that supplied from the main nozzle 15, thus automatically increasing the fuel supply in proportion to the increasing air volume. As the demand for the explosive mixture falls off, the suction diminishing and automatically acting to decrease or cut off the fuel supply delivered at the nozzle 50 the springs 39 moving back toward the boss 45.

When the springs 39 move back into engagement with the frame portion 45, they close the air pockets 48 formed in the opening 46 by the nozzle 15. As these pockets are closed the mixture of air and fuel in the pockets is compressed, thereby creating a cushioning effect to retard the final increment of return movement of the springs to normal position so that the springs will not make a noise when they engage the frame portion 45. When running at slow speed the amount of air drawn through the passage 37 will be small and the leaf spring being somewhat stiff, consequently will flutter, striking against the frame portion 45. The cushioning means is provided to deaden the sound caused by the striking of the valves against the frame portion.

The fuel which is not entirely vaporized may be deposited to form a film on the flat sides of the frame portion 45 normally engaged by the leaf springs 39, and films, likewise, may be formed on the free ends of the springs. When the springs move back to normal position, the films of liquid fuel also form a kind of a cushion to assist the air pockets 48 in preventing the springs from producing a noise. It can be seen by the above described construction that the leaf springs 39 of the valve are rendered noiseless, which is the main object of this invention.

Holes 60, (Figures 5 and 6), may be drilled in the sides of the frame portion 45 to form additional pockets which produce a still further cushioning effect for the leaf springs 39. It is obvious that the size and shape of the holes (60) may be changed as

desired, without departing from the spirit of my invention.

In the modification shown in Figure 7, air ports 47, formed in the frame portion 45, are connected to the passage 25 in the nozzle 15 by the passage 63 formed in the boss 45 and a port 64 formed in the nozzle. The fuel in these modified forms is discharged through the ports 47 into the mixing chamber at points beyond but adjacent the free ends of the leaf springs 39. Air pockets may be formed by holes or grooves 60 (Figure 7) made in the sides of the frame portion 45 and back of the ports 47.

I am aware that the embodiment of my invention here shown and described is susceptible of considerable variation without departing from the spirit and scope thereof and, therefore, I desire to claim the same broadly as indicated by the appended claims. I have found, however, that this particular embodiment is desirable from many standpoints and, therefore, I desire to claim the same specifically as well as broadly as will appear from the appended claims.

What is claimed, and it is desired to secure by Letters Patent is:—

1. In a carburetor, the combination with an air supply passage; of a valve in said passage comprising a leaf spring operated automatically by air pressure; and a member normally engaged by said leaf spring and having a pocket in which the mixture of fuel and air is compressed as the spring moves into engagement with said member and closes said pocket to form a cushioning effect for the leaf spring.

2. In a carburetor, the combination with an air supply passage; of a valve in said passage comprising a leaf spring operated automatically by air pressure; and a member having a pocket in which the mixture of fuel and air is compressed as the spring closes said pocket to produce a cushioning effect for said spring.

3. In a carburetor, the combination with an air supply passage; of a valve element in said passage; a member normally engaged by a flat surface on said element and having a pocket in which the mixture of fuel and air is compressed when the element moves into engagement with said member and closes said pocket to produce a cushioning effect for said element.

4. In a carburetor, the combination with an air supply passage; of a valve element in said passage; a member normally engaged by said element; and a fuel nozzle in said member, said nozzle and member forming a pocket for a mixture of air and fuel, the mixture being compressed as the element returns to normal position and closes said pocket to produce a cushioning effect for said element.

5. In a carburetor, the combination with an air supply passage; of a valve comprising a leaf spring operated automatically by air pressure; a member normally engaged by said spring to close said passage; and a fuel nozzle in said member, said nozzle and member forming a pocket for the mixture of fuel and air, the mixture in the pocket being compressed as the leaf spring returns to normal position and closes said pocket to produce a cushioning effect for said spring.

6. In a carburetor, the combination with an air supply passage; of a valve comprising two elements fixed at one of their ends and converging toward their free ends; a member between the free ends of said converging elements and normally engaged thereby to close said passage, said member having pockets on either side in which fuel mixture is compressed when the elements move into engagement with said member and close said pockets to produce a cushioning effect for said elements.

7. In a carburetor, the combination with an air supply passage; of a valve comprising two elements mounted at one end and free at their other end; a member between the free ends of said elements and normally engaged thereby; and a fuel nozzle in said member, said nozzle and member forming pockets for a mixture of air and fuel, the mixture being compressed as the elements return to normal position and close said pockets to produce a cushioning effect for said elements.

In witness whereof I affix my signature.

GEORGE F. RITTER.