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W. JOHNSON

1,991,804

CARBURETOR

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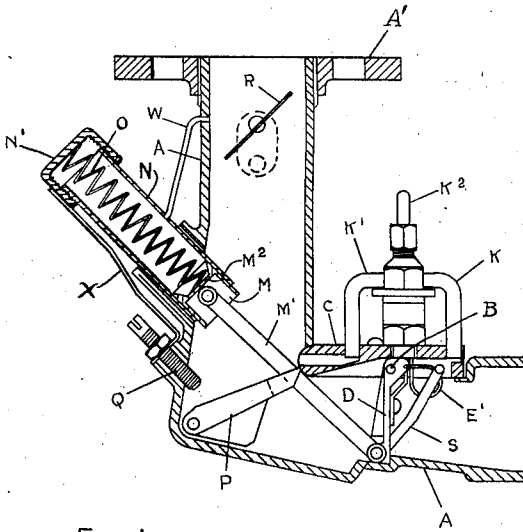


FIG 1.

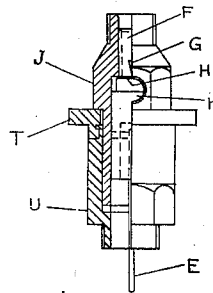


FIG. 3.

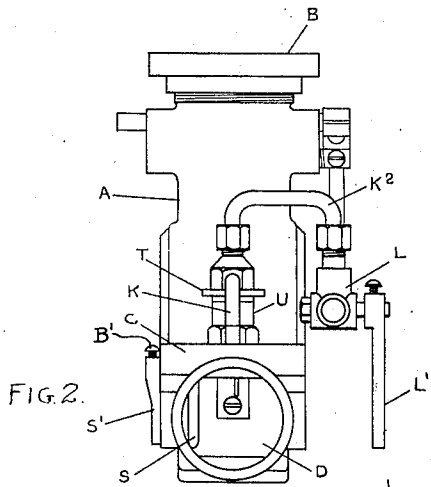


FIG. 2.

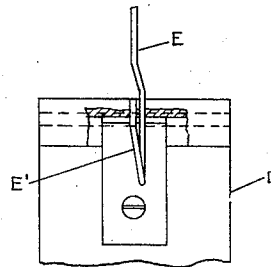


FIG 4.

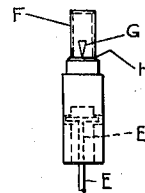


FIG 5

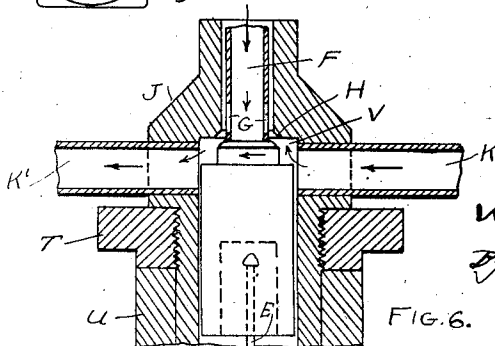


FIG. 6.

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UNITED STATES PATENT OFFICE

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CARBURETOR

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5 Claims. (Cl. 261—50)

This invention relates to an improved carburetor and refers more particularly to a carburetor for use with internal combustion engines.

The object of the invention is to provide a carburetor which will be efficient, and enable better carburetion with a relatively low fuel consumption, provision being made whereby fuels having different boiling points, such as petrol and kerosene, may be individually used at will, and whereby the carburetor will function for air braking when so desired.

In order that the invention may be better understood reference will be made to the accompanying drawing wherein—

Figure 1 is a part sectional side elevation of a carburetor according to this invention;

Figure 2 is an end elevation of the same;

Figure 3 is a part sectional elevation of the fuel valve assembly;

Figure 4 is a detail view of the flap valve; and

Figure 5 is a detail view of the fuel valve; and

Figure 6 is an enlarged fragmentary sectional detail view of the primary mixing chamber.

Referring to the drawing, the air tube A is right angled and provided with a flange A' for securing it to the induction manifold of an internal combustion engine. A block C upon which the fuel valve assembly is mounted is provided. Immediately below the valve assembly a flap valve D is hinged at its upper edge to the inside top of the air tube, said flap valve D being connected to the valve F by a link E. Link E is connected to valve F as shown in Fig. 5 and extends downwardly looping at E' and is connected to valve D so that as valve D swings about its pivot B the link E will be raised or lowered to raise or lower valve F.

The valve tube F is open at the top and closed at the bottom, excepting for a V-shaped hole G, and has a shoulder adapted to seat itself normally upon the seating H (see Figures 3 and 6) in the housing J. A tube K admits air to the valve chamber and the air thus admitted and the entrapped fuel proceed by pipe K' to the air tube A behind the flap valve D. The link E is given a turn at E' which affords a certain amount of restrained motion between the flap valve D and the valve F. As shown in the drawing the tube K opens into the block C and receives air from the air tube A. This is only necessary, as a precaution against foreign matter entering the valve chamber. A filter may be positioned in the inlet end of tube K.

The fuel, either petrol or kerosene, is led into the fuel valve chamber by pipe K2 from a suitable

cock or cocks L operated by lever L'. To dampen any sudden shocks upon the flap valve D and give a restrained action to it, a cylinder N is mounted at the rear of the air tube A and it houses a spring C which rests upon a piston M connected by rod M' to the bottom edge of flap valve D. A very small hole M2 is provided in the piston M to allow air to pass during the strokes as the flap valve D is swinging.

The heavy flap P, hinged at its lower edge in the bend of the air tube A, normally at its upper edge lies upon the upper bend of the tube A and closes the tube (as shown in Figure 1). The weight of this flap P may be varied for different modifications of the invention and results desired. A set screw Q is mounted at the back of the valve P and is adapted to be set to prevent the backward movement past the position set, thus providing the equivalent of an adjustable variable choke tube. The flap P has a slot through which the piston rod M' may pass freely. The usual butterfly valve R operated by the foot pedal is provided for controlling the amount of the mixture to be admitted to the induction pipe.

In use when the engine is being started up the cock L will be set to deliver petrol to the valve F; the flap valve D will be swung back by engagement with the arm S carried by shaft B which is rocked by lever S' secured thereto by screw B', thus flooding the air chamber A with petrol. Upon the release of the lever S' the flap valve D will adjust itself to the suction of the engine, the link E operating the valve tube F to regulate the uncovering of the V-shaped opening G to enable petrol to flow into the valve chamber and be drawn along by the air from the tube K to tube K' and thence to the air tube A posterior to the flap valve D. After the engine has warmed up sufficiently the cock L may be turned to close the petrol line and open the kerosene line.

It will be seen that the quantity of petrol or other fuel delivered is governed primarily by the flap valve D; as it opens and shuts it opens and shuts the said V-shaped opening G allowing various quantities of fuel to pass to the mixing chamber V. As the valve D swings it is restrained by the piston M, and as a further adjustment the spring O may be compressed by turning the screw cap N' down on the spring O in cylinder N. Spring X serves to retain cap N' in adjusted position.

With different engines and different fuels it may be desirable to adjust the proportions of the mixture entering the induction pipe. The rate of flow of petrol or other fuel to be delivered by

the valve F, as before stated, is governed by the opening and closing of the V-shaped hole G, which is operated automatically by the flap valve D. A means of altering the rate of flow is provided by the knurled nut T which turns loosely upon the hollow stud U (which screws into the block C). The knurled nut T is internally threaded and adapted to screw up or down upon the valve chamber J thereby, as may be desired, slightly raising or lowering its relative position to the valve tube F and altering the position of hole G relative to the shoulder H in chamber J. This movement enables adjustment for idling of the engine.

To alter the suction upon the hole G and thereby increase or decrease the flow of fuel from it irrespective of the flap valve D, the heavy flap P is adjusted so that it will only open the passage in tube A to the extent allowed by setscrew Q. By this means the proportion of air and fuel may be varied within a fairly large range.

It will be understood that immediately the engine stops running and the flap valve D comes to rest it automatically closes the opening G and brings the shoulder into contact with seating H thereby effectually shutting off the fuel supply.

To facilitate the opening of the fuel valve F, when idling (and when the suction is not sufficiently strong to raise flap valve D) an air duct W may be provided and may consist of a tube leading from above the butterfly valve to a position in the cylinder ahead of the piston M. When idling the butterfly valve R is nearly closed and the suction upon the duct W is greatest and tends to create a partial vacuum in the cylinder N behind piston M which allows flap valve D to swing back and open the fuel valve F to a greater degree. Upon increase of engine speed the piston M will pass back over the opening of the said duct W and make it inoperative.

When it is desired to employ the invention for braking purposes (as when descending an incline) the pipe lines from the fuel supply tanks are all simultaneously closed by turning the cock L into a neutral position thereby allowing any desired quantity of air permitted by the butterfly valve R to pass along the tube A to the induction manifold and thence to the cylinders.

I claim:—

1. A carburetor comprising a right-angled air tube, having vertical and horizontal legs, open at one end and adapted to be connected at the other end to an intake manifold of an internal combustion engine, a fuel valve assembly mounted on the upper portion of the horizontal leg of the air tube, said valve assembly comprising a tubular valve casing open at its top, provided with a portion of enlarged diameter constituting a mixing chamber and having a valve seat formed therein, a hollow tubular valve body positioned in said casing, said valve body being open at its upper end and provided with an enlarged closed bottom portion adapted to engage said seat, said tubular valve body having opposed V-shaped openings formed in the walls thereof immediately above the enlarged bottom portion, a flap valve in the air tube located beneath the said fuel valve assembly and hinged at its upper edge, a link between said flap valve and the fuel valve for opening and closing the fuel valve as the flap valve swings, a tube connecting one side of said fuel chamber with the air tube on the anterior side of said flap valve, and a tube connecting the other side of said fuel chamber with the air tube on the posterior side of the flap valve.

2. A carburetor comprising a right-angled air tube, having vertical and horizontal legs, open at one end and adapted to be connected at the other end to an intake manifold of an internal combustion engine, a fuel valve assembly mounted on the upper portion of the horizontal leg of the air tube, said valve assembly comprising a tubular valve casing open at its top, provided with a portion of enlarged diameter constituting a fuel chamber and having a valve seat formed therein, a hollow tubular valve body positioned in said casing and movable therein, said valve body being open at its upper end and provided with an enlarged closed bottom portion adapted to engage said seat, said tubular valve body having opposed V-shaped openings formed in the walls thereof immediately above the enlarged bottom portion, a flap valve in the air tube located beneath the said fuel valve assembly and hinged at its upper edge; a link between said flap valve and the fuel valve for opening and closing the fuel valve as the flap valve swings, a tube connecting one side of said fuel chamber with the air tube on the anterior side of said flap valve, a tube connecting the other side of said fuel chamber with the air tube on the posterior side of the flap valve, and means for adjusting the opening of the valve irrespective of the action of the flap valve comprising an interiorly threaded member rotatably mounted in the upper portion of the air tube body and threadedly engaging the tubular valve casing for vertically adjusting the tubular valve casing relative to the valve body.

3. An improved carburetor consisting of a right-angled air tube having vertical and horizontal legs open at one end and adapted for connection to an intake manifold at the other, a fuel valve assembly upon the horizontal leg of the air tube, a flap valve in the air tube located beneath the said fuel valve assembly and hinged at its upper edge, a link between said flap valve and the fuel valve for opening and closing the fuel valve as the flap valve swings, a butterfly valve in the vertical leg of the air tube operable by the driver, means for enabling variation in the area of the air passage consisting of a weighted flap hinged at its bottom edge in the bend of the tube and adapted to normally close the passage and open the passage by swinging inward as the air is sucked into the tube, an adjustable set screw for limiting the back swing to a maximum extent, and means for assisting the flow of fuel from the fuel valve consisting of an air tube leading into the mixing chamber on one side of the fuel valve and a delivery tube leading from the other side of said fuel valve in said mixing chamber to the posterior side of the flap valve in the air tube.

4. An improved carburetor consisting of a right-angled air tube having vertical and horizontal legs open at one end and adapted for connection to an intake manifold at the other, a fuel valve assembly upon the horizontal leg of the air tube, a flap valve in the air tube located beneath the said fuel valve assembly and hinged at its upper edge, a link between said flap valve and the fuel valve for opening and closing the fuel valve as the flap valve swings, a butterfly valve in the vertical leg of the air tube operable by the driver, means for restraining the said flap valve, consisting of a cylinder mounted outside the said air tube, a piston within said cylinder whose rod is hinged at its end near the lower edge of the flap valve, said piston having a very small hole formed therein, an adjustable spring in said

cylinder, means for altering the suction upon the fuel valve irrespective of the flap valve, consisting of a weighted flap at the back of the flap valve adapted normally to close the air tube and to swing back as the air is sucked past it, and an adjustable set screw adapted to limit the back swing of the weighted flap and enable a predetermined area of air passage.

5. An improved carburetor consisting of a right-angled air tube having vertical and horizontal legs open at one end and adapted for connection to an intake manifold at the other, a fuel valve assembly upon the horizontal leg of the air tube, a flap valve in the air tube located beneath the said fuel valve assembly and hinged at its upper edge, a link between said flap

valve and the fuel valve for opening and closing the fuel valve as the flap valve swings, a butterfly valve in the vertical leg of the air tube operable by the driver, means for enabling variation in the area of the air passage consisting of a weighted flap hinged at its bottom edge in the bend of the tube and adapted to normally close the passage and open the passage by swinging inward as the air is sucked into the tube, an adjustable set screw for limiting the back swing to a maximum extent, and means for opening the fuel valve to assist in starting up or idling the engine consisting of a depression transmitting duct between the airtube above the butterfly valve and the cylinder above the piston.

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