

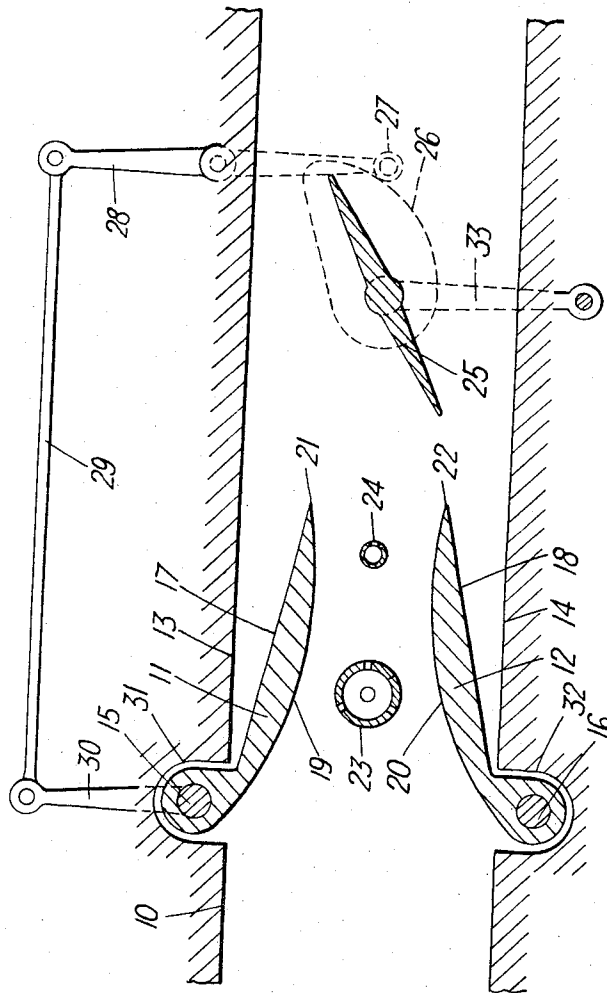
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C. SHORROCK

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CARBURETTORS

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Inventor

CHRISTOPHER SHORROCK

By *Young & Thompson*

Attorneys

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3,334,876

CARBURETTORS

Christopher Shorrock, Preston, England, assignor to Rubery, Owen & Company Limited, Darlaston, Wednesbury, England, a British company

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ABSTRACT OF THE DISCLOSURE

A mixing chamber of a carburetor having a rectangular section portion, on opposite walls of which are pivoted two plates having their facing faces curved, the plates being synchronously adjustable from an open position where they lie along their respective walls to a position with their tips closed together at, or near, and downstream of a main jet and a compensating jet debouching into the chamber, the facing faces being curved to assist in directing any fluid flow between the plates with a minimum of turbulence.

This invention concerns improvements relating to carburetors for internal combustion engines.

By the term "mixing chamber" is meant the part of the carburetor in which air and fuel mix to provide the air-fuel mixture before passing into the inlet manifold of the internal combustion engine, the fuel passing into the mixing chamber by means of a main jet and a compensating jet as is normal.

By the term "throttle valve" used herein is meant a device intended to permit controlled and variable restriction of the through orifice of a conduit, within which the valve is mounted, to permit control of the quantitative flow of fluid through the conduit.

By the term "butterfly valve" used herein is meant a known type of throttle valve which comprises a disc or plate which is complementary to and a close fit within the orifice of the conduit. This disc or plate is pivoted centrally about an axis at right angles to the through axis of the orifice to be pivotal through an angle of approximately 90° between limit positions in which it closes and opens the orifice.

According to the present invention there is provided a mixing chamber for a carburetor, the main and compensating jets being spaced axially from one another along a plane extending longitudinally within and bisecting the chamber.

Preferably the compensating jet is located downstream of the main jet.

Preferably also a throttle valve is provided in the mixing chamber, the throttle valve including two plates, the plates being pivotally attached to opposed walls of a portion of the mixing chamber rectangular in section, and means for pivoting said two plates in synchronism with one another to move them from a first or open position in which each plate lies along the respective wall of the rectangular section portion to which it is pivotally attached, to a second position in which the downstream tips of the plates are closed together just downstream of one of the main and compensating jets.

Preferably the facing faces of the plates are curved to assist in directing any flow of fluid between the two plates with the minimum turbulence.

Preferably also each plate is pivotally attached at its upstream end to the respective wall of the rectangular section portion.

Preferably, further, the plates are pivotally attached within recesses in the inside walls and the outside faces

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of the plates are flat to enable them to lie against the respective inside walls.

A second throttle valve may be provided in the mixing chamber, this second valve comprising a butterfly valve, which is operated from an outside source such as a throttle pedal or control lever, movement of the butterfly valve being followed by a cam and a cam roller connected to said means for pivoting the two plates of the first valve, the cam being suitably profiled so as always to open or shut the plates of the first valve an amount in proportion to the movement of the butterfly valve.

Preferably the second valve is located downstream of the first valve, and the cam profile is chosen so that fluid flow through the first and second valves is at a constant velocity.

In an embodiment of the present invention illustrated in the accompanying drawing which is a sectional elevation through the mixing chamber, a first throttle valve is mounted in a rectangular, for example square, section of the mixing chamber. The moving parts of the valve comprise two specially shaped plates 11, 12 of a suitable metal or other material, which are mounted on opposed walls 13, 14 inside the chamber, one plate 11 on the top inside wall 13 and the other plate 12 on the bottom inside wall 14. This pivotal mounting is achieved by mounting the upstream ends of the plates on pivot pins 15, 16 located in recesses 31, 32 in the top and bottom inside walls, 13 and 14 respectively, so that in one extreme position of pivotal movement the plates may lie along the respective walls, the appropriate face 17, 18 of each plate being flat to enable it to lie against the respective inside wall.

The inside or facing faces 19, 20 of the two plates are curved to assist in directing any flow of fuel-air mixture through the mixing chamber between the two plates with the minimum turbulence imparted to this mixture which will be emitted past the plates in a steady stream passing centrally through the chamber.

The two plates 11, 12 have to pivot towards or away from one another in synchronism so that the downstream tips 21, 22 of the two plates, which each described an arc when the plates are pivoted between their extreme positions, will always be at the same distance from a horizontal plane dissecting the mixing chamber. This synchronised movement of the two plates can be achieved through various drive arrangements, for example, the two pivot pins 15, 16 mounting the plates, can be geared to a common rack, (not shown) and the rack and the pivot pins can be so geared together that movement of the rack in one direction will impart the desired movement, through the pivot pins, to the plates. As an alternative example, the two pivot pins could be connected to the centres of equi-sized separate meshing gear segments. Movement imparted to one segment in one rotational direction will cause equal but opposite rotational movement of the other segment.

The drive arrangement for pivoting the two plates is, of course, actuated by and under the control of the throttle pedal in the case of a motor vehicle.

The carburetor in which the throttle is provided has two fuel jets, a main jet and a compensating jet, debouching through two emulsion tubes 23, 24 into the mixing chamber through a side wall thereof, the two emulsion tubes being spaced apart but centred upon the aforesaid horizontal plane bisecting the mixing chamber, the compensating jet tube 24, being downstream of the main jet tube 23 but just upstream of the tips 21, 22 of the two plates when the two plates are pivoted close together. The emulsion tubes are suitably drilled or slotted where they protrude into the mixing chamber to enable the fuel or fuel and air contained in them to be drawn into the

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mixing chamber by the main air flow over these tubes through the mixing chamber.

The interfunction of jets 24 and 23, with regard to discharge of fuel therefrom, is a basic and important consideration and is only achieved by the design of the venturi throat. For starting and slow running, maximum depression is achieved on the compensating jet 24, this depression continuing with progressively diminishing effect until depression is obtained, due to an increased throttle opening, on both jets 24 and 23. Further opening, of the throttle decreases the depression on jet 24, at which point jet 23 takes over, after which there is no or very little discharge from jet 24. It is by means of the location of the two jets in relation to the venturi throat that progressive mixture control is to a large extent dependent.

A second throttle valve is provided in the mixing chamber downstream of the first valve, this second valve comprising a butterfly valve 25, the operation of which is controlled from an outside source such as a throttle pedal or control lever 33, movement of the butterfly valve being followed by a cam 26 and a cam roller 27. The cam roller is connected by a mechanical linkages 28, 29, 30, to the arrangement for pivoting the plates of the first valve, whereby pivotal movement of the butterfly valve 25 is transmitted to the cam 26 which through the cam roller 27 and the linkage 28, 29 30, opens or closes the plates 11, 12 of the first valve an amount in proportion to the extent of pivotal movement of the butterfly valve. The cam is suitably profiled so that fluid flow through the plate and butterfly valves is at a constant velocity in order to minimise any turbulence imparted to the fuel-air mixture flowing through the mixing chamber when the butterfly valve moves.

One reason for the provision of the second or butterfly valve 25, in addition to the first valve is that without the second valve and with the plates 11, 12 of the first valve in the closed position or close together, a load would be imposed on these plates trying to open them, the imposition of this load being due to the high vacuum or negative pressure existent in the engine inlet manifold under small openings of the valve. With the addition of the butterfly valve, the negative pressure acting upon the plates of the first valve will be controlled by the relative opening of the butterfly valve which itself is in pneumatic balance as it is pivoted about its centre.

I claim:

1. A mixing chamber of a carburettor having a main jet and a compensating jet for the supply of combustion fuel, spaced from one another with their axes lying in a single plane extending longitudinally within and bisect-

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ing the chamber, the compensating jet being located downstream of the main jet, and having a throttle valve comprising two plates pivotally attached to opposed walls of a portion of the mixing chamber rectangular in section, means being provided for pivoting said two plates in synchronism with one another to move them from a first or open position in which each plate lies along the respective wall of the rectangular section portion to which it is pivotally attached, to a second position in which the downstream tips of the plates are closed together just downstream of the compensating jet, and wherein the facing faces of the plates are curved to assist in directing any flow of fluid between the two plates with a minimum of turbulence.

2. A mixing chamber as claimed in claim 1 in which each plate is pivotally attached at its upstream end to the respective wall of the rectangular section portion.

3. A mixing chamber as claimed in claim 1 in which the plates are pivotally attached within recesses in the inside walls and the outside faces of the plates are flat to enable them to lie against the respective inside walls.

4. A mixing chamber as claimed in claim 1 in which a second throttle valve is provided, this second valve comprising a butterfly valve, which is operated from an outside source such as a throttle pedal or control lever, movement of the butterfly valve being followed by a cam and a cam roller connected to said means for pivoting the two plates of the first valve, the cam being suitably profiled so as always to open or shut the plates of the first valve an amount in proportion to the movement of the butterfly valve.

5. A mixing chamber as claimed in claim 4 in which the second valve is located downstream of the first valve, and the cam profile is chosen so that fluid flow through the first and second valves is at a constant velocity.

References Cited

UNITED STATES PATENTS

40	1,429,534	9/1922	Renner	261—44	X
	1,792,053	2/1931	Weidenfeller	261—50	
	1,918,974	7/1933	Kirby	261—50	X
	2,010,563	8/1935	Ross	261—52	X
	2,250,932	7/1941	Kittler	261—51	X
45	2,573,093	10/1951	Burson	261—50	X
	2,670,189	2/1954	Phillips.		

HARRY B. THORNTON, *Primary Examiner.*

50 FRANK W. LUTTER, *Examiner.*

T. R. MILES, *Assistant Examiner.*