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CARBURETTORS FOR INTERNAL COMBUSTION ENGINES

BY A. P. C.

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Fig. 1.

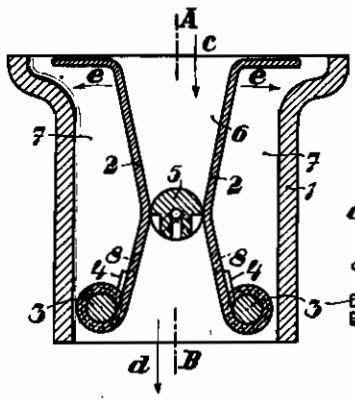


Fig. 2.

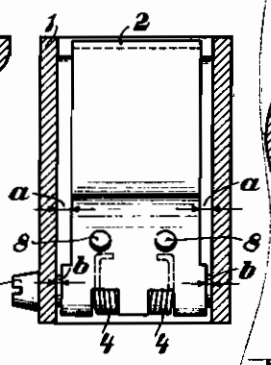


Fig. 4.

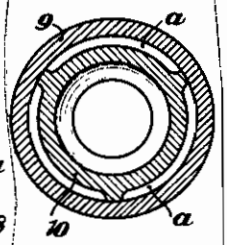


Fig. 5.

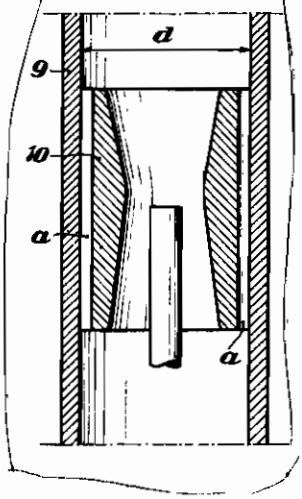
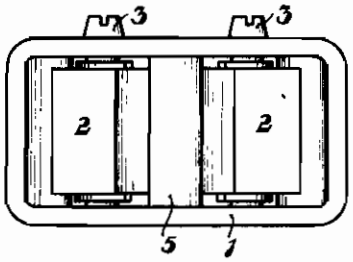


Fig. 3.



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ALIEN PROPERTY CUSTODIAN

CARBURETTORS FOR INTERNAL COMBUSTION ENGINES

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This invention relates to carburettors for internal combustion engines.

Carburettors are known the mixing chamber of which has a flow cross-section which varies automatically according to the conditions in the induction pipe. The mixing chamber of such carburrettors is usually of quadrangular cross-section. Pivoted blades of rigid or elastic material are provided at two oppositely disposed walls of this mixing chamber. These blades are pivoted at their one end on a pin and the other end of these pivoted blades is free. The pivoted blades are spring pressed.

The pivoted blades abut, when the engine is running, idly against the atomiser, arranged transversely in the mixing chamber. When the throttle valve of the carburettor is opened the engine sucks a greater quantity of air which flows with greater velocity. The energy of the air flowing through the mixing chamber acts on the pivoted blades in such a way that these are moved away from the atomiser. Simultaneously thc drop in pressure in the vicinity of the atomiser acts on the fuel which is disposed in the ducts and nozzles connected with the atomiser, so that the fuel begins to flow out of the atomiser into the induced air current.

A great defect of these known carburettors having a mixing chamber of variable flow cross-section is that the pivoted blades are built into the mixing chamber with the greatest accuracy, that is with a play which is as small as possible relatively to the walls of the mixing chamber. In many cases 0.005'' is prescribed for this play. This apparently correct precaution has for consequence that it is not at all possible to obtain both a favourable fuel consumption and also a trouble-free transition to the engine speed corresponding to sudden opening of the throttle valve of the carburettor. The cause of this is that by reason of the above mentioned accurate fitting of the pivoted blades in the mixing chamber when the energy of the air sucked in by the motor suddenly increases, (sudden opening of the throttle valve), the pivoted blades are moved with maximum velocity from the atomiser to the maximum possible distance from one another, whereby there immediately occurs a falling off in the velocity of the air sucked in by the motor, as well as in the drop in pressure associated therewith in the vicinity of the atomiser. Consequently a sudden interruption in the outflow of fuel from the atomiser and therefore also a momentary decrease in the speed of the engine takes place. Further, when the air passes exclusively in that space of the mixing chamber determined by the pivoted blades an economical fuel consumption is obtained only within very narrowly limited ranges of engine speed.

A carburettor, the mixing chamber of which has a non-variable flow section for the air sucked in by the motor, has the disadvantage that, for the purpose of obtaining a better fuel consumption, this flow cross-section must be enlarged, which impairs the volumetric effect of the engine because the cylinder charging of the engine is impaired when the flow velocity of the induced air drops, in the case that the invariable flow cross-section of the mixing chamber exceeds a predetermined limit.

The object of the present invention is to overcome these defects.

In a carburettor according to the present invention the air sucked in by the motor flows not only through the mixing space proper of the mixing chamber, but also in the same direction, partly through ducts which are disposed between the mixing space of the mixing chamber and the walls thereof.

The accompanying drawings illustrate how the invention may be carried into effect.

Figs. 1 and 2 are longitudinal sections in two mutually perpendicular planes and Fig. 3 a plan of a mixing chamber according to the invention provided with a variable flow cross-section.

Figs. 4 and 5 are respectively transverse and longitudinal sections of a mixing chamber provided with a non-variable flow cross-section.

In the mixing chamber **1** having a variable flow cross-section illustrated in Figs. 1 to 3, the pivoted blades **2** are pivotally mounted on rollers **3** and are pressed, when the engine is stationary and also when it is running idly, by springs **4** against the atomising nozzle **5**. The space determined by the blades **2** disposed below the atomising nozzle **5** is the mixing space proper. The spaces **7** of the mixing chamber are disposed apart from the mixing space. Hitherto it has been attempted to prevent the penetration of air into these spaces **7**. The air sucked in by the engine flows in the direction of the arrow c into the space **6** of the mixing chamber and, moving in the direction of the arrow *d*, reaches the induction pipe of the engine. The pivoted blades **2** are, according to the invention, so dimensioned that their width is smaller to the extent *a* than that of the mixing chamber **1** (Fig. 2). The air sucked in by the motor can penetrate through the ducts formed in this way into the spaces **7**, being drawn off from these through apertures **8**

in the blades **2** into the induction pipe of the engine. At the places where the blades **2** bear on the rollers **3** the usual play *b*, about 0.02 mm. relatively to the walls of the mixing chamber, is maintained. The width of the ducts *a* amounts to 1–4% of the width of the mixing chamber. The action of this arrangement is made effective because the induced air loses at all open positions of the throttle valve a part of its energy acting directly on the blades **2**. The induced air will therefore, at a desired opening of the throttle valve, move the blades **2** away from the atomising nozzle **5** more slowly, so that fuel from the atomiser flows without interruption and in addition a constant drop in pressure is obtained in the neighbourhood of the atomising nozzle at each opening of the throttle valve of the carburettor. It is clear that as the velocity of the air flowing through the mixing chamber increases, a correspondingly larger part of this air passes along the path of smaller resistance (channels *a*). When the quantity of air flowing through the space **6** decreases the drop in pressure in the neighbourhood of the atomising nozzle **5** is relatively reduced, so that the quantity of induced fuel will be smaller than is the case with previous constructions of mixing chamber.

The advantage of the operation above described is utilised in mixing chambers with non-variable cross-section because the mixer previously inserted very accurately in the mixing chamber forms between the latter and the walls of the mixing chamber the characteristic auxiliary flow ducts for the induced air.

Accordingly the mixer **10** of the mixing chamber **9**, which has an invariable cross-section, has a diameter which is correspondingly smaller than the diameter *d* of the mixing chamber, thereby providing the auxiliary flow ducts *a* (Figs. 4, 5).

The arrangement of the auxiliary flow ducts *a* can, in general, also be asymmetric to the axis of the mixing chamber.

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