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W. STURM

1,884,359

CARBURETOR

Filed June 18, 1929

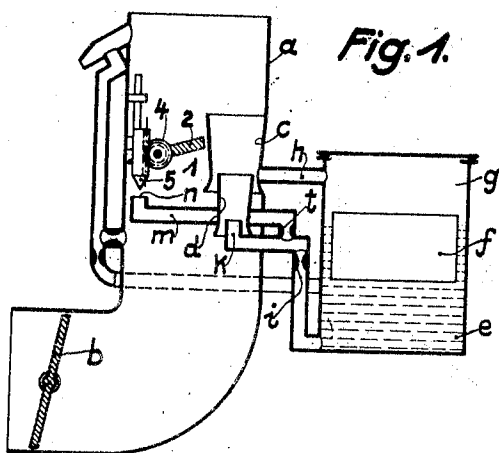


Fig. 1.

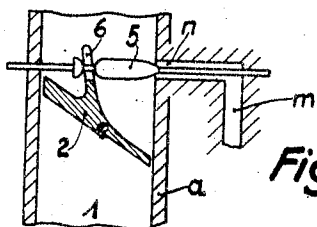


Fig. 2.

Fig. 3.

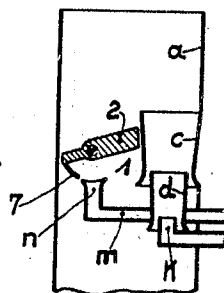


Fig. 4.

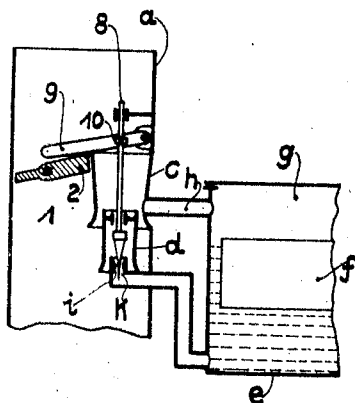
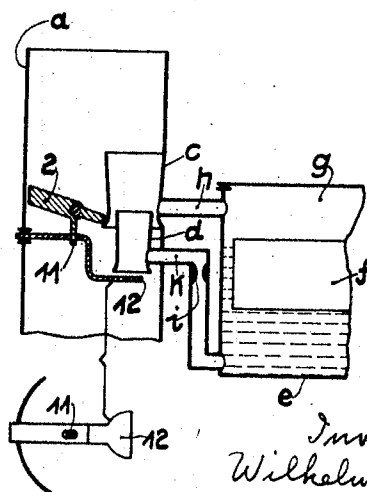


Fig. 5.



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UNITED STATES PATENT OFFICE

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CARBURETOR

Application filed June 18, 1929, Serial No. 371,832, and in Germany July 9, 1928.

The present invention relates to carburetors and more particularly to the injection type and having an air throttle and float chamber regulated as in the construction described in the specification of my copending application Serial No. 265,778 which matured into Patent 1,840,279, granted Jan. 5, 1932. In carburetors of this type an auxiliary throttle opens an auxiliary air duct parallel to the main air jet or choke tube immediately the quantity of air required by the engine is greater than that capable of flowing through the main air jet in the short time available.

This condition arises more particularly with fast running under load. The air entering through the auxiliary air duct does not however carry along any fuel with it. It meets the current of mixture coming from the main air jet and mixes with it in the suction pipe thereby diluting the mixture. If therefore no special measures are taken the mixture will be poorer the more auxiliary air is drawn in, since the quantity of the one component of the mixture, namely the fuel, remains constant.

In order to adapt this quantity to the increasing admission of auxiliary air and thereby to make the mixture uniform, the throttle regulating the auxiliary air current is allowed, according to the present invention, to act on elements which increase the flow of fuel out of the jet when the throttle opens and vice versa.

Five forms of construction of carburetors according to the present invention are shown diagrammatically in longitudinal section in the drawing. Each of the five figures shows one example.

So far as there is coincidence the separate elements have the same reference letters in all the forms of construction.

In the first form of construction shown in Figure 1 the carburetor housing is illustrated at *a*, the main throttle at *b*, the float chamber at *c*, conduits from said float chamber at *k*, *m* and *h* respectively, the conduit *m* branching off from the conduit *k* and having a throat *t* whilst the conduit *k* at a position between the branch *m* and the float chamber *c* is provided with a throat *i*.

The main air choke tube or air jet *c* is arranged at one side of the mixing pipe or chamber *a* and is of narrow cross section to leave a conduit 1 between itself and the remote wall of the carburetor mixing chamber *a*. An auxiliary choke tube or air jet *d* is mounted so that its upper end extends into the lower end of the main choke tube *c*.

The valve 2 regulating the auxiliary air current is constructed as an automatic valve with two unequal vanes. It positions itself according to the vacuum obtaining to the rear of it in the direction of flow.

This vacuum commences to increase as soon as the charge required by the engine can no longer be sucked through the main air jet *c* without any throttling action, assuming of course that the main throttle *b* is sufficiently open.

As soon as the valve 2 commences to open and as soon therefore as the air current sucked through the auxiliary duct *l* is greater a small gear wheel 4 mounted on the pivotal axis of the valve moves a valve cone 5 which is mounted in the housing *a* on the cylinder shaft and is provided with suitable meshing teeth.

The valve cone approaches the mouth *n* of the vapour duct *m* and throttles the supply of air to this duct so that with increasing flow of air through the auxiliary duct *l* the quantity of vapour passing into the supply tube *k* decreases and accordingly the quantity of fuel emerging from the supply tube increases.

The second example shown in Figure 2 differs from the first only in a slightly modified actuation of the valve cone 5 varying the cross section of passage of the vapour duct. A bifurcate extension 6 of the valve 2 displaces the valve cone 5 positioned in the housing *a* when the valve itself moves. In this case also the section of the vapour duct decreases with increased opening of the valve, and accordingly also the foam-air supply, so that correspondingly more fuel is sucked from the supply pipe *k*.

In the third form of construction shown in Figure 3 a member 7 similar to a slide valve is provided instead of the valve cone used in the first two examples which is arranged di-

rectly on the valve 2 and which covers the mouth *n* of the vapour duct *k* to a greater extent with increased opening of the automatic valve 2.

5 In the fourth example shown in Figure 4 no vapour duct is provided. The cross-section of the outlet of the supply duct (spray jet) is here altered in accordance with the position of the valve 2. For this purpose a regulating needle 8 passing centrally through
10 the air jet is provided which is articulated at 10 to a lever 9 articulated to the housing. The valve 2 when it opens strikes against the lever 9, lifts it and accordingly the needle 8
15 also, whereby the cross-section of the outlet of the supply pipe *k* and accordingly the quantity emerging are increased according to the progressive opening of the valve 2.

The fifth example as in Figure 5 shows the
20 manner in which the quantity of fuel emerging from the supply pipe can be altered by varying the suction force feeding it. In this case an extension 11 on the valve 2 forces a cover plate 12 off the auxiliary air jet *d* to an
25 increasing extent when the valve opens.

The suction effect in the neck of the auxiliary jet *d* could however be adapted to the requirements by allowing one or both of the jets *c* and *d*, constructed one in the other, to be displaced longitudinally in one another in
30 accordance with the movement of the valve.

What I claim is:

1. A carburetor comprising, in combination, a float chamber, a mixing pipe, a main
35 choke tube located in said mixing pipe and connected to said float chamber, said mixing pipe having an air passage external to the main choke tube, an auxiliary choke tube within said main choke tube, an atomizing jet
40 connected to the fuel space of said float chamber, an auxiliary air throttle controlling the air passage external to said main choke tube, and a pipe connected to the atomizing jet supply pipe, the opening to which is controlled directly from said air throttle.

2. A carburetor comprising, in combination, a float chamber, a mixing pipe, a main
45 choke tube located in said mixing pipe and connected to said float chamber, said mixing pipe having an air passage external to the main choke tube, an auxiliary choke tube within said main choke tube, an atomizing jet connected to the fuel space of said float
50 chamber, an auxiliary air throttle controlling the air passage external to said main choke tube, a pipe connected with said fuel supply to the atomizing jet, a valve controlling said pipe and means interconnecting said valve with said auxiliary air throttle.

3. A carburetor comprising in combination a float chamber, a mixing pipe, a main
60 choke tube located in said mixing pipe and connected to the air space of said float chamber, said mixing pipe forming a passage external to and in addition to the main choke
65 tube, an auxiliary choke tube within said main choke tube, an atomizing jet within said auxiliary choke tube and connected to the fuel space of said float chamber, a main air throttle controlling the air passage of the mixing pipe before the choke tubes and said passage external to the choke tubes, an auxiliary air throttle only controlling said air passage external to the choke tubes and means interconnected therewith to control the flow of fuel from the supply jet.

4. A carburetor comprising in combination, a float chamber, a mixing pipe, a main choke tube located in said mixing pipe and connected to the air space of said float chamber, said mixing pipe forming a passage external to and in addition to the main choke tube, an auxiliary choke tube within said main choke tube, an atomizing jet within said auxiliary choke tube and connected to the fuel space of said float chamber, a main air throttle controlling the air passage of the mixing pipe before said choke tubes and said passage external to the choke tubes, an auxiliary air throttle controlling said air passage external to the choke tubes, and means to regulate from said auxiliary air throttle the cross section area of the auxiliary choke tube in order to control the flow of fuel from the supply jet.

In testimony whereof I have hereunto affixed my signature.

WILHELM STURM.