Jan. 24, 1933. R. CONSTENSOUX 1,895,279

MULTIPLE CARBURETOR

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FIG. 1

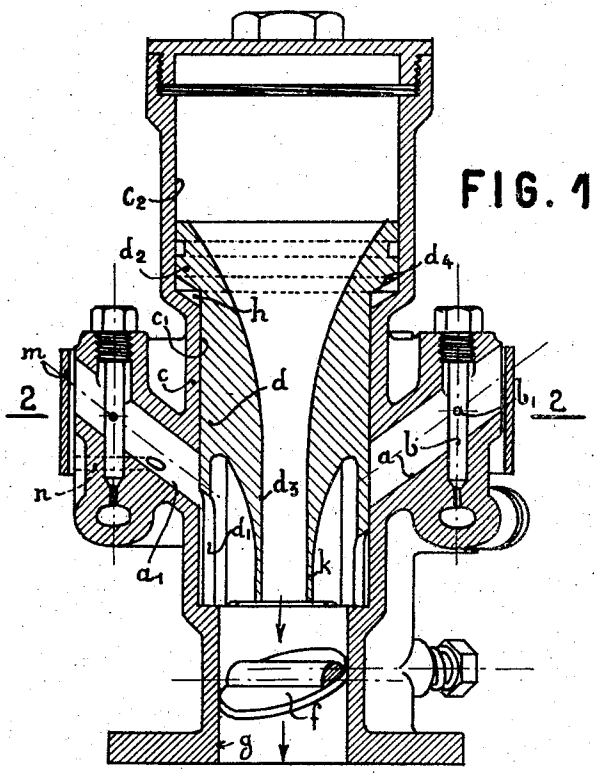
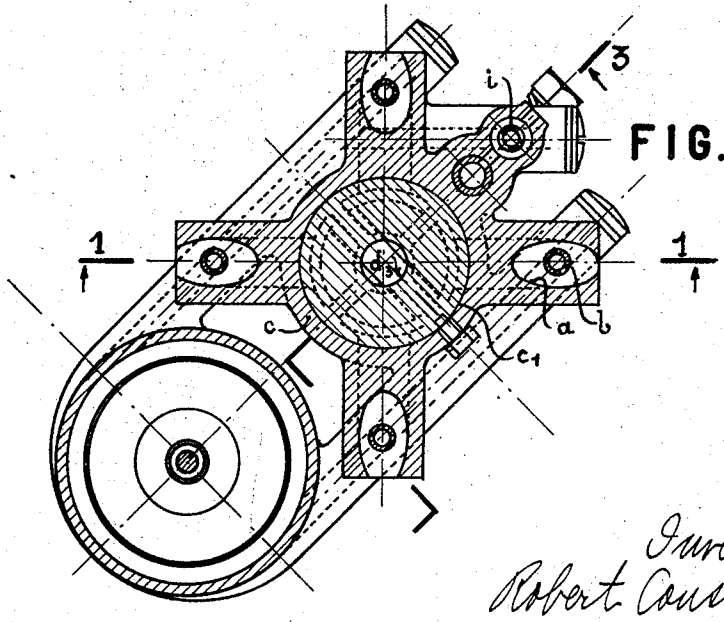


FIG. 2



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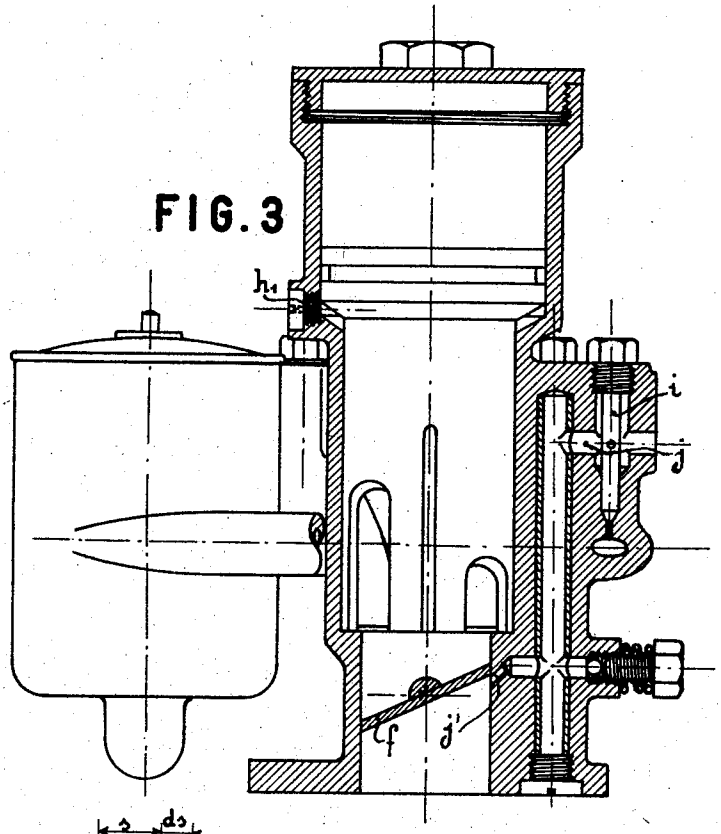
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MULTIPLE CARBURETOR

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FIG. 3



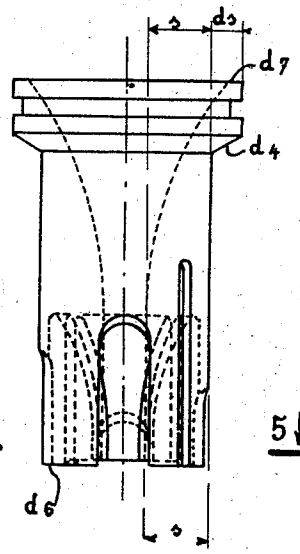
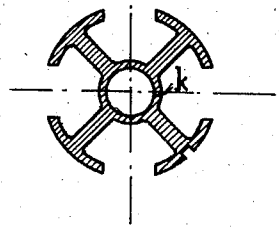


FIG. 4

FIG. 5



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MULTIPLE CARBURETOR

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FIG. 7

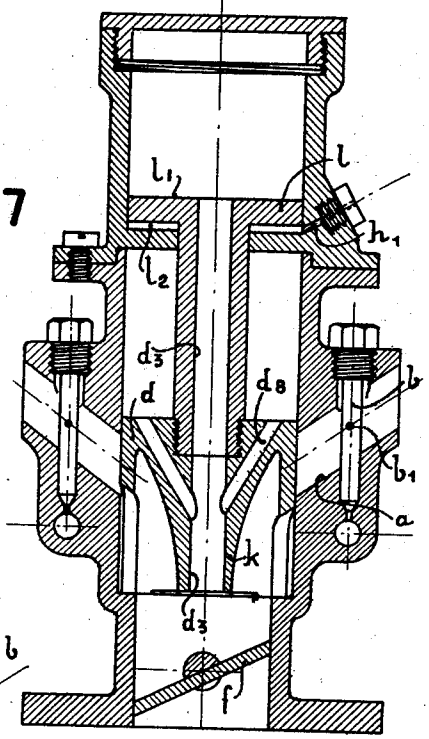
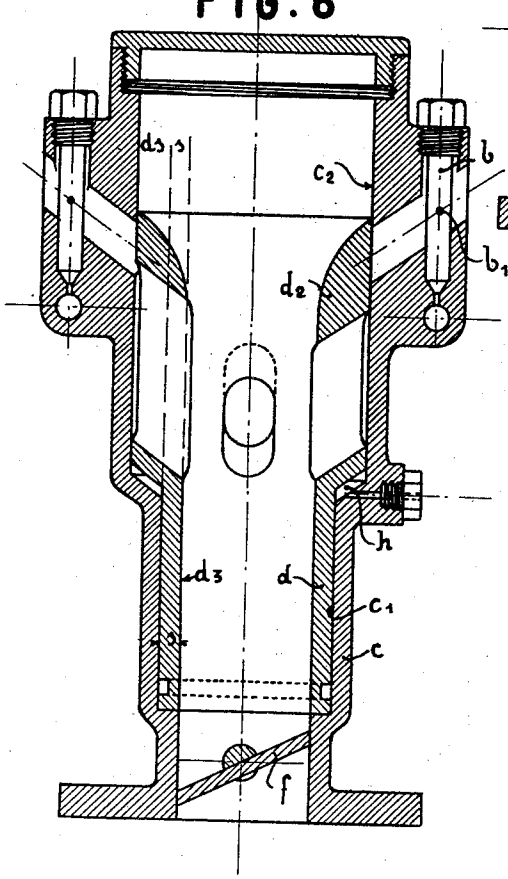


FIG. 6



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UNITED STATES PATENT OFFICE

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MULTIPLE CARBURETOR

Application filed March 20, 1931. Serial No. 524,168, and in France March 27, 1930.

Multiple carburetors are known in which a general central suction nozzle is fed by radiating suction channels each provided with a jet which enters into action by the automatic adjustment through the displacements of a slide valve accompanying the variations of speed of the motor according to the depression.

The present invention aims at the application of this principle for the provision of a carburetor with descending gas, the radiating suction channels being inclined towards the base by approaching towards the axis of the body of the carburetor, which eliminates, by simple gravitation, the condensations of petrol which, in the case of carburetors with ascending gas, occur in the bottom of the valve and work their way beneath it.

In order that the valve can assume when the suction increases, a lift in order to regulate the entry into operation of the different jets, the valve is formed as a differential valve the suction reigning at the level of the butterfly being transmitted above the valve by an axial hole pierced through it while the constant atmospheric pressure acts beneath the head of the differential valve in an annular space communicating with the free air, through a calibrated hole called "the compensating hole" braking the displacements of the slide by the entry or escape of air which is adjustable.

The valve is provided at the front in known manner with a deflecting cone which turns the gaseous streams delivered by the radiating channels in order to avoid objectionable eddies at the meeting of said streams, the arrangement of this deflector cone being such that the section offered to the gases travels crosswise when the valve lifts that is upon acceleration, which is logical.

The downward passage of the carbureted gases also has the advantage of giving a better filling of the cylinders and consequently an increase power.

Various other characteristics will be more clearly seen during the following description given with reference to the annexed drawings showing, by way of example, some possible constructions and particularly:

Fig. 1, a vertical section of a first form, taken on the line 1—1 of Fig. 2;

Fig. 2, a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3, a vertical cross section taken on the broken line 3—3 of Fig. 2;

Fig. 4, the detail of the valve;

Fig. 5, a section taken on the line 5—5 of Fig. 4;

Figs. 6 and 7, two other constructions.

In the example shown at Figures 1 to 5 the elementary carburetors each consist of an inclined radiating channel a for the passage of air into which opens the hole b_1 of a jet b. The number of these elementary carburetors can vary according to the size of the motor and the degree of precision which it is desired to obtain for the adjustment or regulation of the mixture.

These elementary carburetors radiating around the central bore c_1 of the body c in which slides the valve d forming in known manner, an automatic valve and provided with ports d_1 the length and disposition of which are regulated in such a manner that each channel a comes into play when the depression, produced by the suction of the motor, causes the valve to take up the position which is suitable.

The valve d is a differential slide valve with two diameters, its head d_2, of larger diameter, being engaged in the upper part c_2 of the body of the carburetor, likewise of larger diameter.

The valve is situated above the bore g of the butterfly valve f and the suction channels a are inclined towards the base and approach the axis of the body c.

The valve is pierced with an axial hole d_3 in a suitable position, in such manner that the maximum depression residing at the level of the butterfly valve f is transmitted to the space c_2 above mentioned and acts on the head d_2 of the valve.

Under the flange d_4 of the head of the valve acts, on the contrary, the atmospheric pressure which resides in the small annular space h made from the body of the carburetor owing to the two different bores c_1, c_2, said annular space h communicating with the at-

mosphere in known manner through a calibrated hole h_1 (Fig. 3) called "compensator hole", the function of which is to brake the movements of the valve by adjusting the entry (or escape) of the air.

It follows from what has been stated that the pressure acting on the valve are:

(*a*) The subatmospheric pressure residing on the lower base d_6 of the valve, of a surface s (Fig. 4);

(*b*) The subatmospheric pressure residing on the head d_7 of the same valve of a surface $s+ds$;

(*c*) The atmospheric pressure acting beneath the flange d_4 of the head of the valve in the annular space h of the surface ds.

The resultant force is finally equal to the force due to the pressure in space h minus the force due to the subatmospheric pressure acting on flange ds.

The slow down is obtained as shown in Figure 3 by means of the jet i which is independent and corresponds to the channel for the inlet of air having its outlet at j' at the level of the butterfly valve f. At the slow down the butterfly valve being partly open the subatmospheric pressure concentrates on this orifice j' and already primes the first elementary carburetor for normal running, a_1, which is slightly uncovered at the bottom position of the automatic valve (Fig. 1).

At the moment of the opening of the butterfly valve f, the depression expands at the interior and above the valve d whereby the pressure at h causes it to rise. There being the possibility of air arriving at h at the lower part and the fact that the valve works like a differential piston, the upward movement takes place permitting a progressive opening and continuous opening of the successive power carburetors a_1, a_2, a_3 . . .

The arrangement of the internal deflector cone k (Figs. 1 and 5) will be observed, which has the advantage that when the motor is running slow that is to say fed by a small volume of gas, the section of passage is reduced, in a fairly important manner (because it presents its largest base at the level of the suction orifices).

When one accelerates, given the ascending movement of the valve, the cone k becomes less and less visible leaving entirely free, for a better filling, all the internal section of the apparatus.

The carburetor has, as shown in Figures 1 to 3, jets dismantled from the top but it is obviously possible to have other arrangements for the arrival of the petrol, in particular horizontal jets or jets mounted on a single platform carrying the constant level chamber, which permits of dismantling the whole assembly of the constant level system.

Various modifications of construction can be made. Thus the radiating channels a of the elementary carburetors can be taken to the upper part the head d_2 of the valve having ports d_1 which successively uncover the said channels a, as shown in Fig. 6.

The compensating chamber is then placed at the base of the automatic valve.

The forces acting on the valve are the same as before.

Nevertheless the deflecting cone k is eliminated, the fluid streams all debouching in the central bore d_3 of the valve.

Another possible form of constructions is shown in Figure 7. To obviate too great a surface of the apparatus an automatic valve d is used on which the depression acts above as well as below by reason of holes d_8 which bring into communication with each other the two faces of the valve and this automatic valve d is coupled, thus balanced, with an upper piston l of the same surface as the valve, one face l_1 of which, of large surface, is subjected to the depression by reason of the inlet d_3 passing through the whole assembly debouching at the lower extremity of the deflector cone k while the other face l_2 of smaller surface, is subjected to atmospheric pressure by reason of the presence of the compensator hole h_1.

As a subsidiary point, there will finally be noted the arrangement provided to facilitate starting up from cold and consisting (Fig. 1) in a tongue piece m obturating the inlet of air a_1 for the first elementary carburetor for normal running which permits of increasing in strong proportions the richness of the mixture and ensure extremely easy starting. This tongue piece m is, in the example given, integral with a collar or a shutter capable of uncovering additional air holes n intended to weaken the mixture when the full output of the motor is not required.

It is moreover obvious that all modifications of detail may be incorporated into the invention according to the particular case and application particularly according to the needs of the installation, the power of the motor to be fed, the running characteristics and so on, without exceeding the scope of the general principle of the present invention.

In this way it is necessary to reserve the possibility of operating the valve or slide by pre-lifting the depression which is used as driving means for the valve, at a point and taking it to a suitable point, even if the valve has not a differential character as in the cases cited.

There is also necessity of covering the possibility of manually controlling the valve or slide by a flexible transmission such as a Bowden cable for instance or otherwise.

What I claim, is:

1. In a downdraft carburetor a carburetor body, a mixture outlet conduit, multiple mixture channels arranged with their axes converging downwardly, a suction actuated ele-

ment forming a valve for regulating the outlets of the said channels, said carburetor body having a chamber formed therein above said element, a central channel in said element effecting communication between said chamber and said conduit, a throttle valve in said conduit, partitions in said element forming chambers therein located around said central channel, said chambers effecting communication between the said channels and said conduit, said partitions acting to prevent formation of eddies in said element.

2. A downdraft carburetor as claimed in claim 1, in which the chambers in the suction actuated valve element are in the lower portion of said valve element and open toward said multiple mixture channels.

3. A downdraft carburetor as claimed in claim 1, in which the suction actuated element has a piston head at its upper end movable in the chamber of the carburetor body and in which the body has means to admit air to said chamber below said piston head so that said valve element is balanced.

In witness whereof I affix my signature.

ROBERT CONSTENSOUX.