Aug. 8, 1933. C. J. ERADE 1,921,736

CARBURETOR

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Fig. 1.

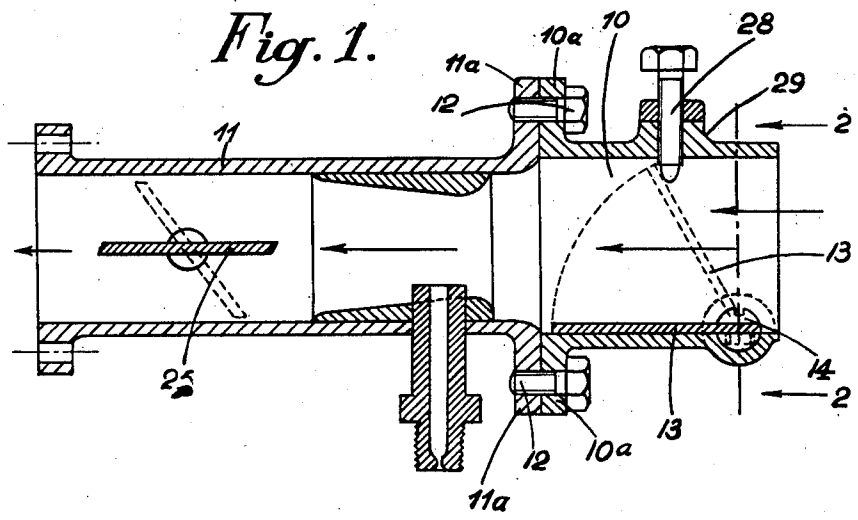

Fig. 2.

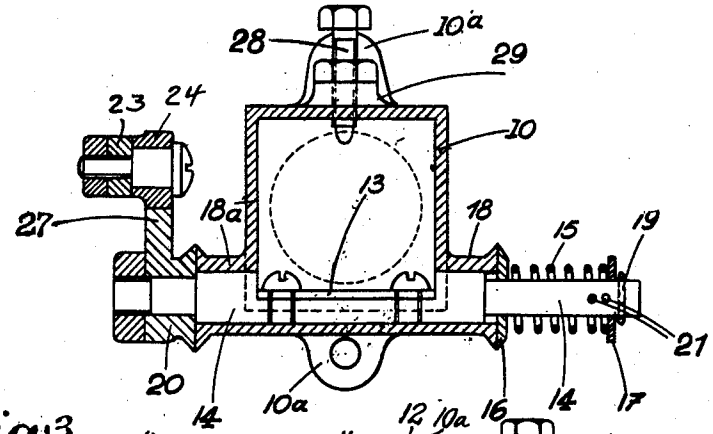

Fig. 3.

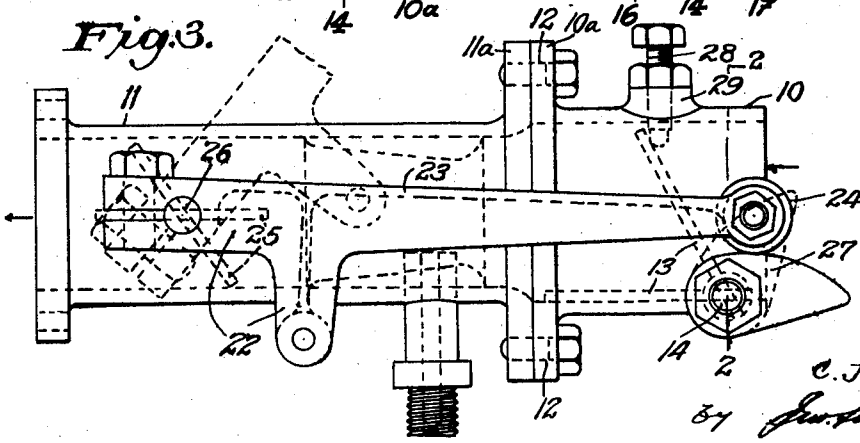

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Fig. 6.

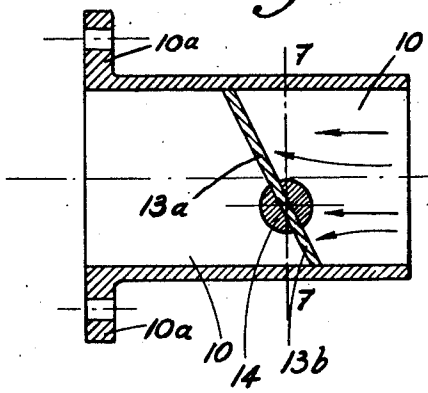

Fig. 7.

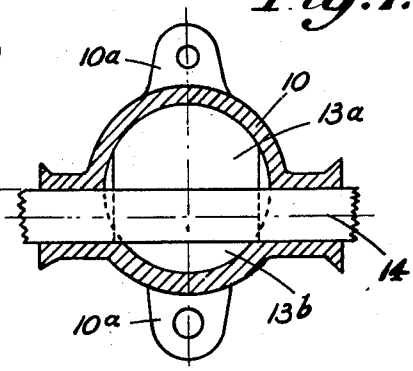

Fig. 8.

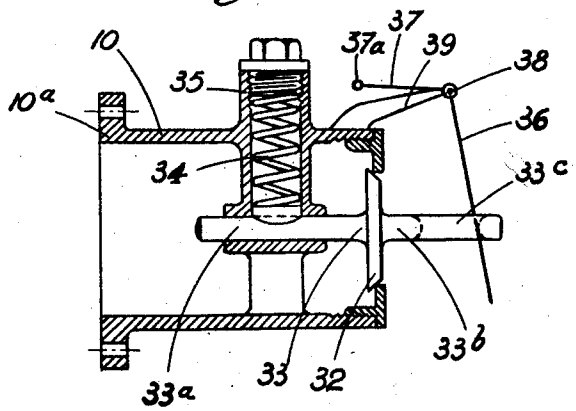

Fig. 4.

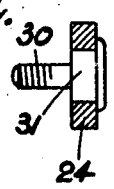

Fig. 5.

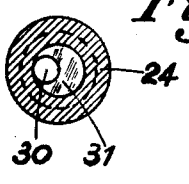

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Fig. 9.

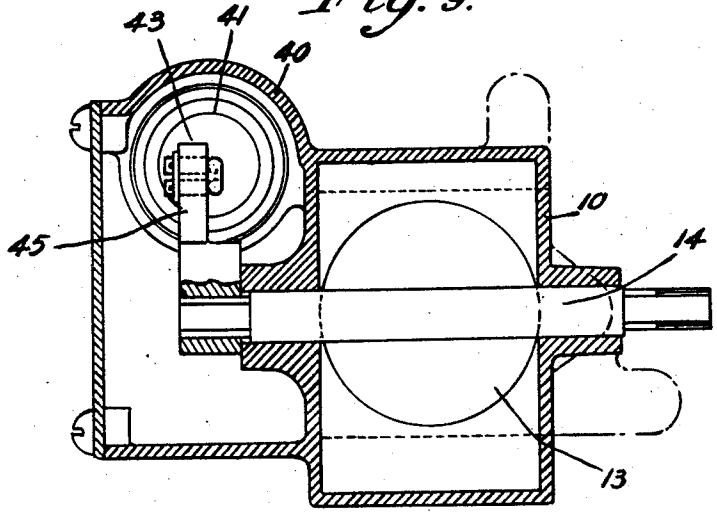
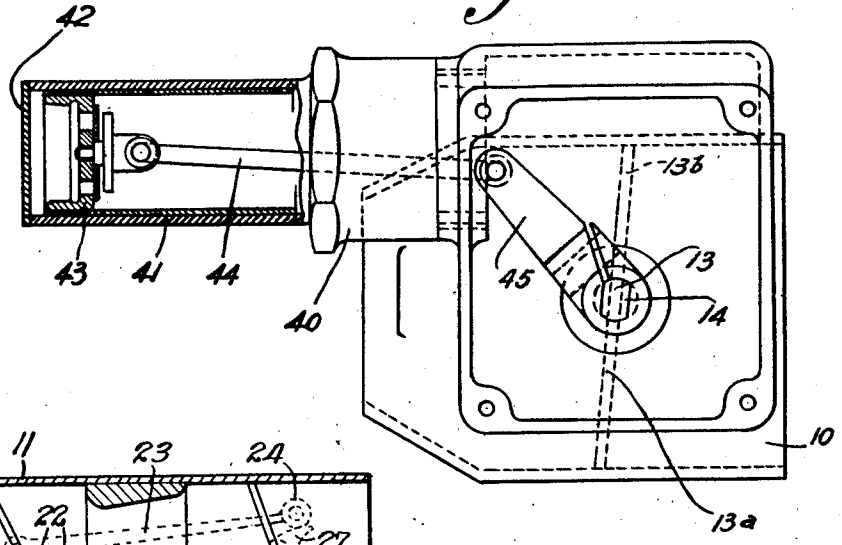


Fig. 10.



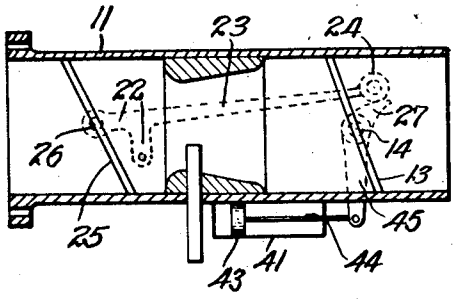


Fig. 11.

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UNITED STATES PATENT OFFICE

1,921,736

CARBURETOR

Charles Julien Erade, Brussels, Belgium

Application December 24, 1931. Serial No. 583,053

5 Claims. (Cl. 261—64)

My invention relates to a device for regulating the admission of air, which is applicable to carburetors of internal combustion engines, and in particular those employed on motor vehicles. The object of the said device is to prevent the sudden entry of too large a volume of air when the throttle of the carburetor is rapidly opened, and to obtain in this way a supply of air and petrol in the proportions required for the gaseous mixture to be supplied to the engine when it is desired to accelerate.

It is known that, when the throttle of a carburetor having no such device is rapidly opened, it causes misfiring when the engine is running, in view of the fact that the air which is light is immediately drawn in by the suction of the engine, while the petrol which is of much greater density than air is not drawn in so rapidly. Consequently, for a few turns of the engine the mixture does not contain enough petrol to ignite uniformly.

The object of the invention is to avoid this disadvantage by providing at the inlet of the carburetor a device comprising an air controlling valve which, when the throttle is opened, is subjected on one side to atmospheric pressure and on the other side to the vacuum produced by the suction of the engine, so that it can be brought into the position of opening required for permitting air to reach the carburetor, means being provided for returning this valve to its initial position when the throttle is closed. The slow or rapid opening movement of the valve must be controlled because, if it opens too rapidly it will have no utility. If on the other hand it opened too slowly, it would retard too much the entry of air and during this retardation the jet or jets would deliver too much petrol, thus producing misfires and uneven running of the engine, in view of the fact that the mixture would be too rich.

The means for obtaining such a control, and applied to the device forming the subject of the present invention, are described hereinafter with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a view in elevation of a carburetor fitted with a device for regulating the admission of air, constructed according to the invention.

Figure 2 is a cross section of this device taken along the line 2—2 in Figure 1.

Figure 3 is a side elevation of the carburetor illustrating the throttle lever and controlling means for returning the valve.

Figures 4 and 5 are detail views of a modification of one of the controlling means shown in Figure 3.

Figure 6 is a constructional modification of the valve arrangement shown in Figure 1.

Figure 7 is a cross section taken along the line 7—7 in Figure 6.

Figure 8 shows another modified form of construction.

Figure 9 is a cross section of a modification of the device for regulating the admission of air, shown in Figures 1 and 2.

Figure 10 is a side elevation of the modification shown in Figure 9.

Figure 11 is a detail diagrammatic section showing the application of the arrangement shown in Figure 10.

In the constructional examples shown in Figures 1 and 2, the device provided for regulating the admission of air comprises a duct or chamber 10 fixed to the end of the carburetor 11, for example by means of bolts or the like 12, engaging in brackets or lugs 10*a* and 11*a* respectively provided on the duct and on the carburetor.

The valve itself is preferably composed of a flap or plate 13 pivotally mounted in the chamber 10 on a spindle 14 arranged in Figures 1 and 2 at the side of the chamber 10.

The opening movement of the valve is controlled by the friction of two washers 16 and 20 rigid with the spindle 14 upon the bushes 18 and 18*a* of this spindle, which friction is obtained by means of a spring 15 interposed between the washer 16 and a washer 17 held fixed by a pin 19 or the like at the end of the said spindle.

The tension of the spring 15 can be regulated either by displacing the pin 19 in one of the holes 21 provided in the spindle 14 or by placing one or more washers between this pin and the spring 15; or the tension may be regulated by a nut and counter nut mounted upon the spindle, or by any other of the numerous known means and methods employed for regulating the tension of a spring.

When the engine is accelerated, the valve 13 is pushed towards the interior of the carburetor by the atmospheric pressure, to an extent which depends upon the adjustment of the spring 15.

According to the invention, in order to allow the valve 13 to return to its minimum position of opening when the engine is running slowly, the usual throttle lever 22 of the carburetor is provided with an extension or arm 23 carrying at its end a roller or stop 24 which, when the

throttle 25 of the carburetor is operated, acts upon a lever or cam 27.

As shown in Figure 1, the valve 13, upon returning to its closed position, abuts against a screw 28 mounted in a boss 29 rigid with the chamber or body 10 of the device.

In order to permit the closure of the valve 13 to be advanced or retarded when the throttle lever 22, 23 returns to the slow running position of the carburetor, the roller 24 actuating the cam 27 may be mounted upon a shaft 30 (Figures 4 and 5) having a cylindrical part 31 upon which the said roller turns, and which is eccentric with reference to its point of attachment. Such an arrangement will permit the roller 24 to occupy different angular positions upon its shaft, according to the extent to which the closure of the valve 13 is advanced or retarded.

Naturally, instead of mounting the valve 13 as shown in Figure 1, it may move about an axis mounted eccentrically with respect to the axis of the duct 10 for the purpose of presenting two surfaces 13*a* and 13*b* to the pressure of the atmosphere, the larger of these surfaces acting under the effect of this pressure for opening the valve against the resistance offered to the pressure of the atmosphere by the smaller surface 13*b* (Figures 6 and 7.)

According to the embodiment illustrated in Figure 8, a valve 32 may be provided at the end of the duct or chamber 10 in place of the valve 13, this valve 32 being carried by a rod 33, the axial part 33*a* of which is suitably guided in the interior of this chamber, and is acted upon by the pressure of a spring 34 lodged in a guiding recess 35 rigid with the said duct, the other part 33*b* of this rod having a slot 33*c* for receiving the end of a lever 36, 37 pivoted at 38 to the end of a support 39 mounted on the duct 10. The throttle lever 22 acts upon the end 37*a* of the lever 36, 37 in order to return the valve to its closed position. The flap-shaped valve shown in Figures 1 and 2 is preferable to the other devices described and illustrated, in view of the fact that, when it is completely open, it does not obstruct the air inlet duct of the carburetor in any way.

Moreover, in the construction it is preferable to employ as light a valve as possible, so that the valve will not be displaced by the variations due to the running of the engine.

According to a constructional modification of the braking mechanism for the valve shown in Figs. 1 and 2, there may be provided advantageously a hydraulic or pneumatic dash-pot adapted to control the movement of the said valve in the direction of opening. (Figs. 9 and 10.)

To this end the casing or chamber 10 may be formed with a lateral projection 40 having, extending therefrom, a cylinder 41 the outer end of which is closed by a cylinder cover plate 42, said cylinder having reciprocally mounted therein a piston 43 connected by means of a connecting rod to the end of a hand lever 45 secured to the spindle 14 of the valve 13, said spindle being eccentrically mounted in the duct 10, as shown in Fig. 6.

Considering the eccentricity of the spindle 14 relative to the valve 13, it will be easily understood that when the throttle valve of the carburetor will be opened, the atmospheric pressure will act more effectively upon the face 13*a* than upon the face 13*b* of said valve, so as to allow a slow opening movement thereof.

During the opening of the valve 13, the spindle 14 of the latter will take with it by means of the connecting rod 44 the piston 43 the movement of which inside the cylinder 41 is controlled by the fluid contained in the latter.

In order to keep the valve in its position of maximum opening use may be made if desired of a pawl or catch which under the action of a spring, becomes lodged either in a recess or on a plane surface on the lever or cam rigid with the spindle of the valve.

In order to release this pawl or catch a little before the throttle control lever encounters the above mentioned lever or cam, a stop fixed on this lever may be provided, so as to act on this said pawl in order to release it from the lever or from the cam, and thus release the valve.

An air choke or closing device of the usual kind for use when starting the engine may also, if desired, be positioned at the inlet end of the device, and also an air filter.

What I claim is:

1. A device for regulating the admission of air to an internal combustion engine carburetor provided with a main duct, a throttle valve in this duct and a throttle lever operatively connected to this throttle valve, comprising a chamber mounted on the inlet end of the air duct and in alignment with this duct, an air intake valve in this chamber opening under the action of difference of pressure acting on its two surfaces, means for braking this displacement of said valve and maintaining the latter in any position of opening, and means for positively returning said valve to its initial closed position by the action of the throttle lever only during the last period of the return stroke of this lever into its position for the slow running of the engine.

2. A device for regulating the admission of air to an internal combustion engine carburetor provided with an air inlet duct, a throttle valve in this duct and a throttle lever operatively connected to this throttle valve, comprising a chamber mounted on the end of the air inlet duct and in alignment with this duct, an air intake valve in this chamber opening under the action of difference of pressure acting on its two surfaces, a shaft on this valve eccentrically mounted with respect to the axis of this chamber, friction washers rigid with the shaft, two friction plates on the bushes of this shaft, a spring maintained at one end of said shaft for elastically pressing said washers on said friction plates, and means for the return of said valve into its initial closed position.

3. A device for regulating the admission of air to an internal combustion engine carburetor provided with an air inlet duct, a throttle valve in this duct and a throttle lever operatively connected to this throttle valve, comprising a chamber mounted on the end of the air inlet duct and in alignment with this duct, an air intake valve in this chamber opening under the action of difference of pressure acting on its two surfaces, a shaft on this valve eccentrically mounted with respect to the axis of the chamber, friction washers rigid with the shaft, two friction plates on the bushes of this shaft, a spring maintained at one end of said shaft for elastically pressing said washers on said friction plates, an extension of the throttle lever provided at its end with a roller, a cam fixed at the other end of the valve shaft receiving the action of the throttle lever during the last period of the return stroke of said lever into its position for the slow running of the engine.

4. A device for regulating the admission of air to an internal combustion engine carburetor pro-

vided with an air inlet duct, a throttle valve in this duct and a throttle lever operatively connected to this throttle valve, comprising a chamber mounted on the end of the air inlet duct and in alignment with this duct, an air intake valve in this chamber opening under the action of difference of pressure acting on its two surfaces, a shaft on this valve eccentrically mounted with respect to the axis of this chamber, a lever fixed at one end of this shaft, a dash-pot, a piston in said dash-pot and connected at said shaft lever, an air valve in said piston, an extension on the throttle lever provided at its end with a roller, a cam fixed at the other end of the valve shaft and receiving the action of the throttle lever during the last period of the return stroke of said throttle lever into its position for the slow running of the engine.

5. A device for regulating the admission of air to an internal combustion engine carburetor provided with an air inlet duct, a throttle valve in this duct and a throttle lever operatively connected to this throttle valve, comprising a chamber mounted on the end of the air inlet duct and in alignment with this duct, a spring controlled valve mounted in this chamber and exposed to atmospheric pressure on one side and to the suction of the engine on the other side and having a spindle arranged coaxially with the axis of the said chamber, a spring actuated pin mounted in the side wall of the said chamber and arranged so as to bear on the stem of said valve so as to resist any movement of this valve, a linkage connecting the throttle lever to said valve stem and so arranged that the said valve is closed by the closing movement of the throttle lever.

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