

Feb. 20, 1934.

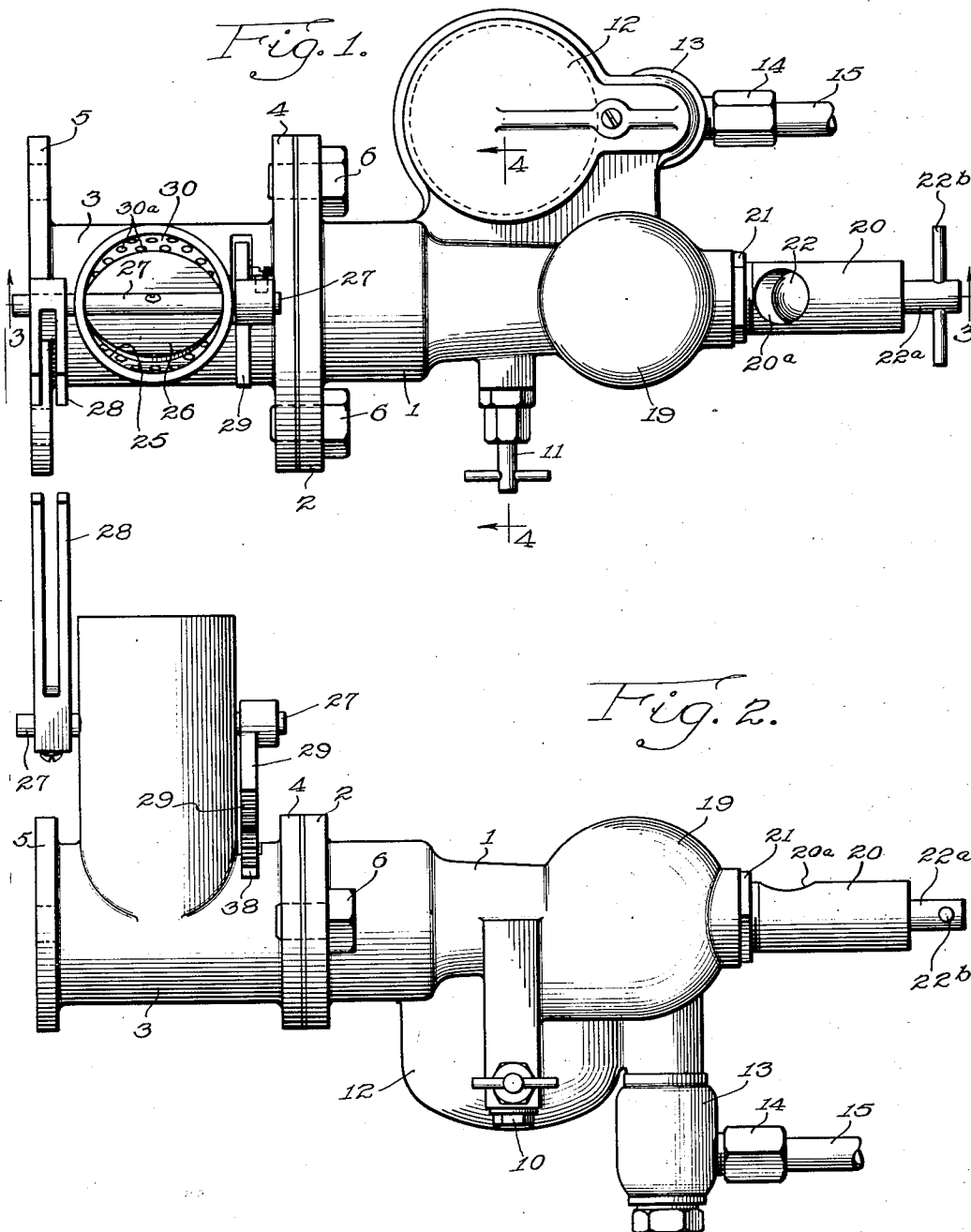
E. P. BUTUSOV

1,947,518

CARBURETOR

Filed Nov. 4, 1932

2 Sheets-Sheet 1



Witness

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2 Sheets-Sheet 2

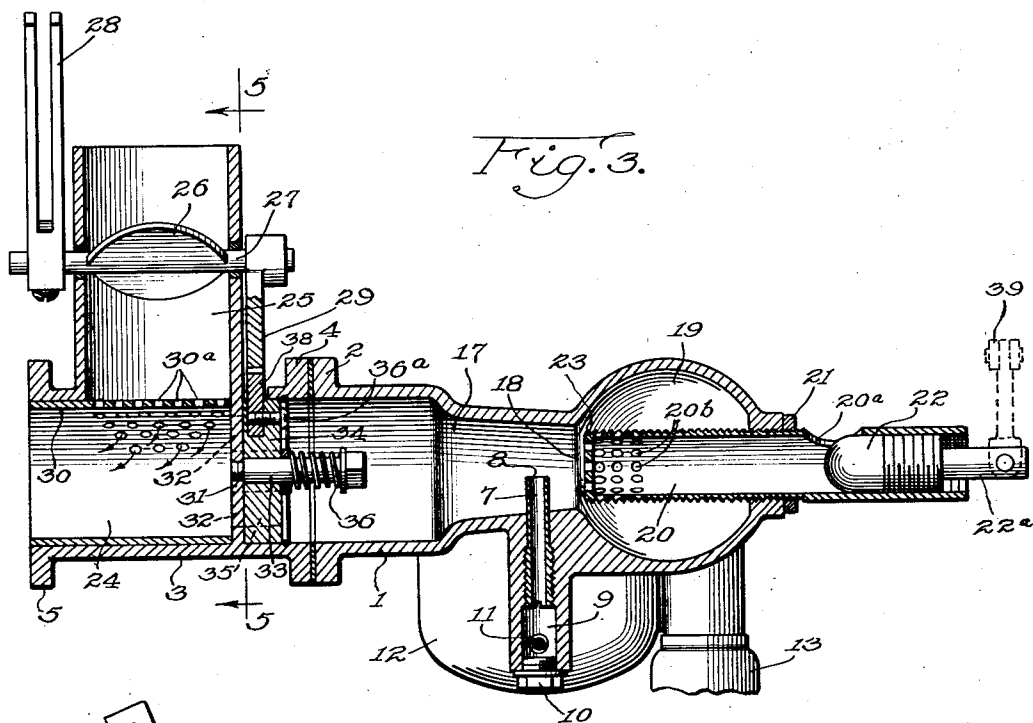


Fig. 3.

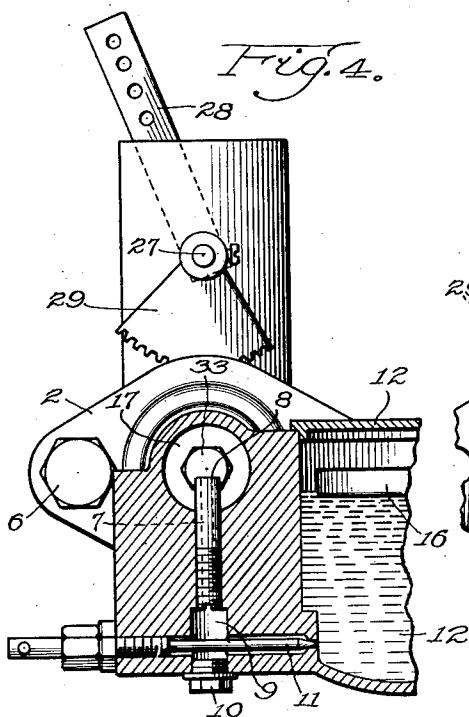


Fig. 4.

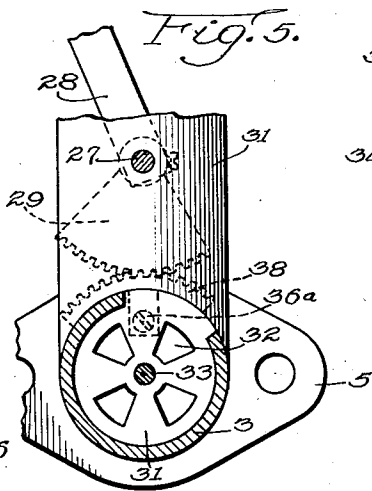


Fig. 5.

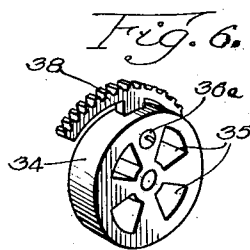


Fig. 6.

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UNITED STATES PATENT OFFICE

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CARBURETOR

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Application November 4, 1932. Serial No. 641,157

1 Claim. (Cl. 261-64)

This invention relates to an improved carburetor of the multi-stage type in which the mixtures in all stages are formed by static pressure rather than by velocity pressure.

One of the common difficulties in the operation of carburetors, especially in starting and when changing speed, is the jerky action of the motor, due to faulty carburetion. The mixture is uneven, alternating from rich to lean and too lean. Attempts of the driver to adjust the carburetion to overcome the jerkiness usually results in an over-rich mixture with low efficiency, shortening the amount of mileage per gallon of gasoline and a smoky exhaust pipe. By my improved method of separately atomizing and tempering, I am able to maintain a mixture which automatically adjusts itself to all speeds. Both the atomizing and tempering are brought about by the static pressure rather than velocity pressure. Multiple apertured restrictors are used in all stages to minimize the velocity pressure.

The main object of my invention is to provide for internal combustion engines and the like a mixture of liquid fuel with air which insures complete and uniform combustion of the fuel; and further to provide a uniformly gasified fuel which will be maintained independent of the rate of flow; to provide an improved apparatus which will automatically give the proper mixture of air and fuel; to provide means for controlling the distribution or diffusion of the air supply in an equalizing air chamber; to provide diffusion means for the air admitted to temper the mixture; and to provide diffusion means for the vaporized fluid admitted to the outlet conduit.

An illustrative embodiment of my invention is shown in the accompanying drawings, in which:—

Figure 1 is a plan view of the carburetor.
Fig. 2 is a side elevation of the carburetor.
Fig. 3 is a section on the line 3—3 of Fig. 1.
Fig. 4 is a section on the line 4—4 of Fig. 1.
Fig. 5 is a section on the line 5—5 of Fig. 3.
Fig. 6 is a perspective view of the rotary diffusion valve located between the mixing and vaporizing chambers.

The casing for my carburetor comprises a casting 1 with an outlet flange 2, a casting 3 with an inlet flange 4 and an outlet flange 5. The flanges 2 and 4 are fastened together by bolts 6. The fuel tube or duct 7 is seated in casting 1 with its outlet 8 near the center line of the casting 1. The fuel tube bore 9 is closed by a cap 10. Passing through the bore 9 is a needle valve 11, which pricks the fuel bowl 12. The inlet to the fuel bowl 12 is housed in a boss 13 to which is at-

tached a pipe coupling 14 for connecting the fuel line 15 to the fuel bowl 12. A float 16 in the fuel bowl 12 automatically controls the level of the fuel in the bowl.

The fuel tube outlet 8 is centered in a Venturi-shaped passage or vaporizing chamber 17 adjacent the throat 18 which opens into a spherical pressure equalizing air chamber 19. Air is admitted into the chamber 19 through a nipple 20 which is fastened to the casing by a locknut 21. In the projecting end of the nipple 20 is an annular opening 20a, and threaded in the nipple 20 is a bullet nose valve 22 for controlling the amount of air entering the nipple 20 through the opening 20a. A shaft 22a is secured to one end of the valve 22 and a manual control lever 22b is secured to the shaft for manipulation of the valve 22. The inner end of the nipple 20 is normally closed by a plate 23. Air distributing apertures or parts 20b are formed both in the plate 23 and in that part of nipple 20 nearest the throat 18 forming an air restrictor or diffuser.

The outlet casting or conduit 3 has a secondary air channel or mixing chamber 24 and a side channel or secondary auxiliary air inlet 25. A butterfly valve or damper 26 is mounted on a shaft 27 in the side channel 25. One of the projecting ends of the shaft 27 has a control lever 28 mounted thereon, and the other end of the shaft 27 has a gear sector 29 secured thereto. Interposed between the chamber 24 and the air inlet 25 is an open-ended tube 30 on which is formed a plurality of apertures 30a distributed over the upper surface thereof to normally close the side channel and to diffuse the air entering the mixing chamber 24. The inlet end of the casting 3 is partially closed by wall 31, in which ports 32 are located. At the center of the wall 31 is fastened one end of the shaft 33, on which is mounted a diffusing multiport rotary valve or damper 34 having ports 35 which are adapted to normally register with the wall ports 32.

A spring 36 on the shaft 33 normally holds the valve 34 against the wall 31. Secured to the upper periphery of the valve 34 by screw 36a is a gear sector 38 which coacts and meshes with the drive gear sector 29. The flange 5 is adapted to be attached to the intake manifold of an internal combustion engine. A remote control lever 39 may be attached to the shaft 22a of the bullet valve 22 for manual adjustment of the bullet valve from the driver's seat, or may be manually adjusted at the carburetor by using the control lever 22b as shown in Fig. 1.

The assembly and preparations for operation

comprise supplying the fuel bowl with liquid fuel to the predetermined level fixed by the float. The liquid fuel is admitted to the fuel tube by opening the needle valve. The inlet nipple with its multiple ports is placed in position in the spherical equalizing air diffusion chamber, and the bullet valve is adjusted to admit air to the nipple through the aperture in the nipple. The gear sectors on the butterfly valve shaft and on the diffusing rotary valve are set so that when the butterfly valve is closed, the diffusing rotary valve is proportionately closed, and when the butterfly valve is opened, the diffusing rotary valve is opened.

In operation the engine is started and the suction in the intake manifold draws air through both the butterfly air inlet valve and through the diffusion nipple. The spherical chamber is designed to furnish a substantially evenly divided air pressure over the entire throat area. Air jets and resultant eddy currents are thereby avoided. The air entering the Venturi-shaped section of the carburetor has an even rate of flow across its entire area. This even flow results in an even draw of fuel from the fuel tube, providing a uniform atomization or vapor mixture. Moreover, the air and fuel, by my improved method, produces a mixture in the vaporizing chamber which approaches complete saturation of the air admitted in the vaporizing chamber with the fuel vapor.

In a similar manner, side or deflection currents normally produced by the flow of air around the butterfly valve are broken up, and the tempering air stream, by way of the butterfly valve, is divided into a large number of small flow areas. The apertures in the tube in the mixing chamber distribute the flow of the tempering air in such a manner as to produce complete diffusion with the fuel vapor mixture which enters the chamber through the rotary valve which also diffuses the vapor mixture.

Experience has proved that by my improved method of thoroughly mixing the air, and the

maintenance of substantially equal pressures throughout the throat areas, give a smooth and reliable action of the engine. Under normal operating conditions the engine will start without priming or choking. Under abnormal conditions the choke effect can be obtained by temporary adjustment of the bullet valve. The outstanding result is that when the carburetor is once adjusted to give the proper mixture, the engine will run continuously without jerks throughout the entire range of speed and that, having the proper mixture, the highest efficiency and mileage are automatically obtained.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that certain details of the construction shown may be altered or omitted without departing from the spirit of this invention as shown in the following claim.

I claim:

In a carburetor, a pressure equalizing chamber, a restricted air inlet in said chamber, said inlet comprising a tubular shell extending into said chamber and projecting beyond the outer wall thereof, the portion of said shell extending in said chamber being provided on its end with a plurality of perforations forming ports, the portion of said shell extending beyond the outer wall of said chamber being provided with an aperture for admitting air to said tube and said portion of said tube being internally threaded for receiving an externally threaded valve for controlling the amount of air admitted to said tube, a vaporizing chamber having a fuel inlet, a mixing chamber being provided with a secondary air inlet, a rotary valve interposed between said mixing chamber and said vaporizing chamber, a butterfly valve in said secondary air inlet for controlling the amount of air admitted to said mixing chamber, and means for simultaneously controlling both of said valves.

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