Aug. 26, 1941. A. FERGUSON 2,253,901

CARBURETOR

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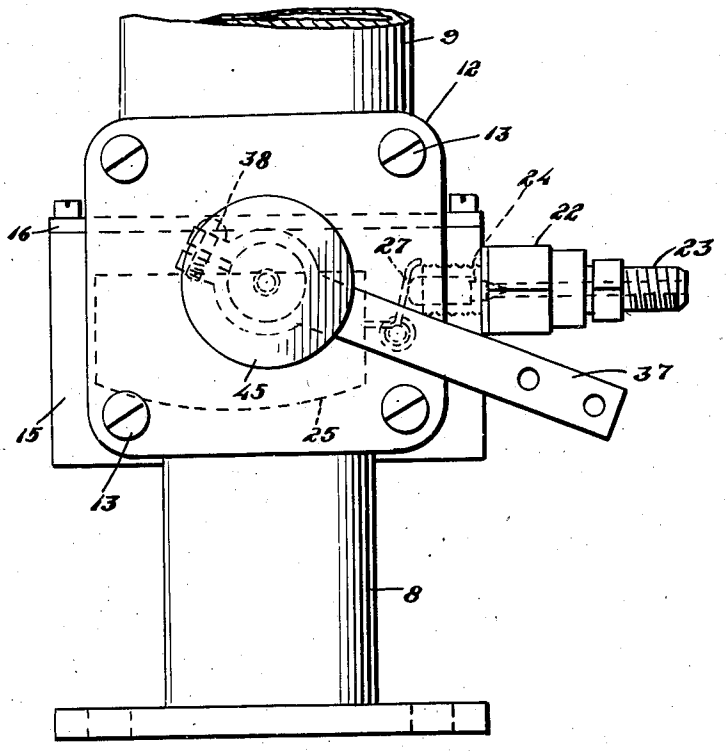


Fig. 1.

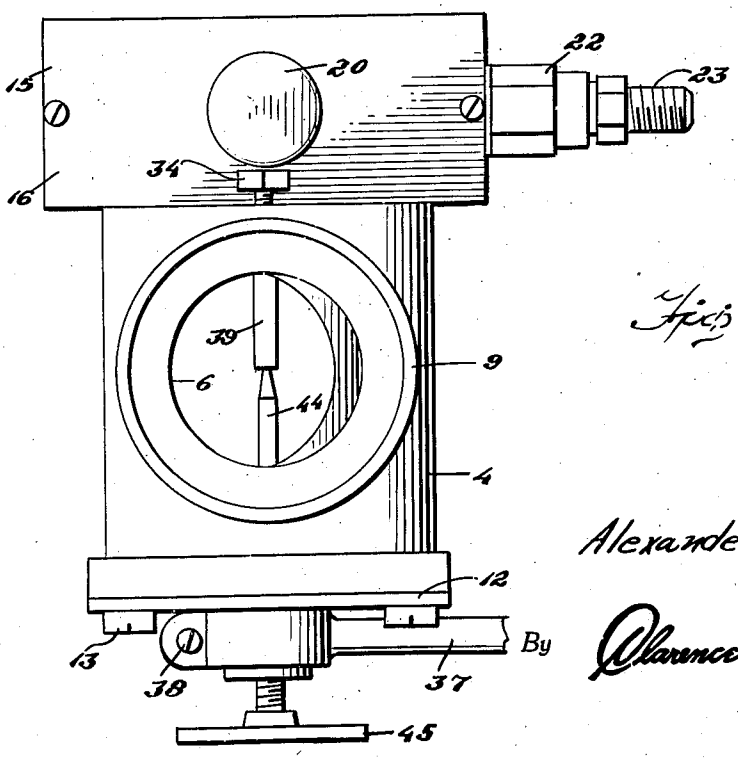


Fig. 2.

Inventor

Alexander Ferguson

By Clarence A. O'Brien

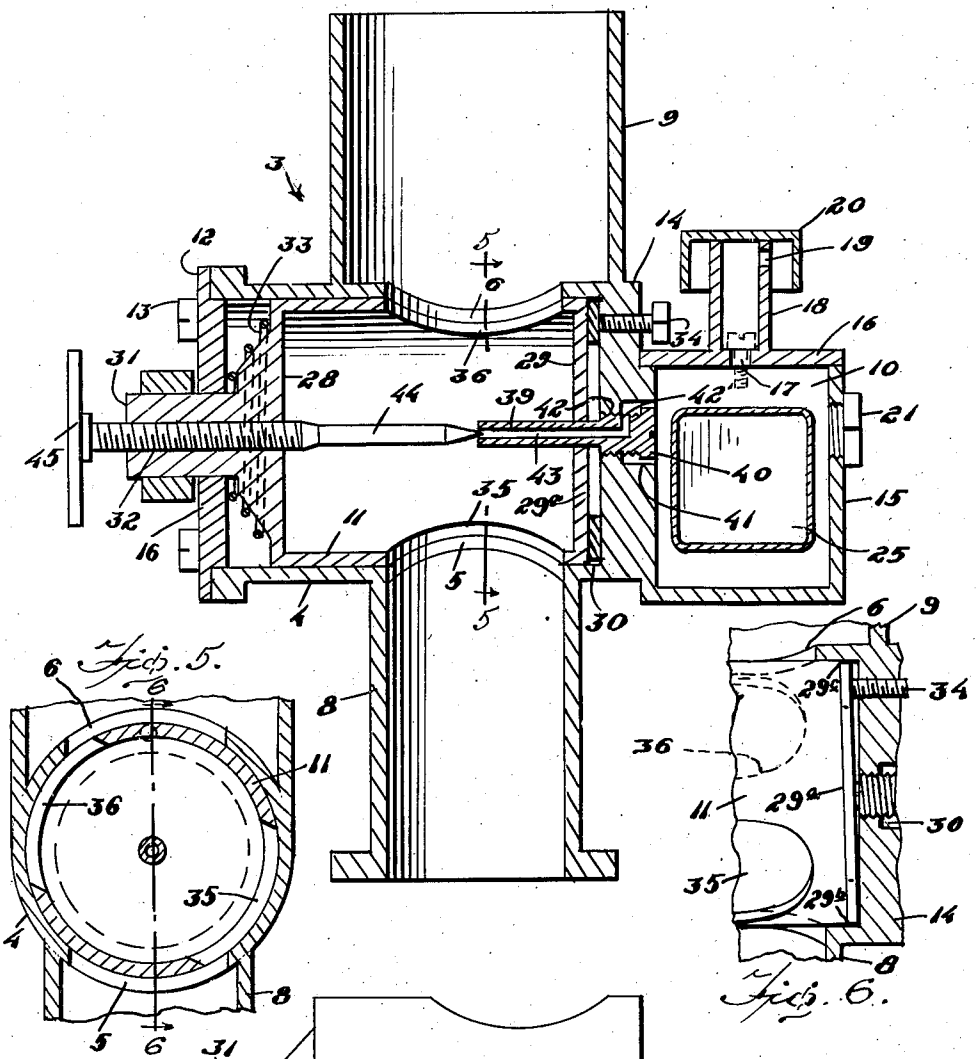
Attorney

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Fig. 3.



Inventor

Alexander Ferguson

By Clarence A. O'Brien

Attorney

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UNITED STATES PATENT OFFICE

2,253,901

CARBURETOR

Alexander Ferguson, Richardson Park, Del.

Application November 5, 1940, Serial No. 364,458

1 Claim. (Cl. 261—49)

My invention relates to improvements in carburetors for internal combustion engines.

The invention is designed with the principal object in view of providing a simply constructed carburetor equipped to supply a more thorough, intimate, mixture of air and gas effected by causing in the carburetor a greater degree of turbulence than present day carburetors are capable of producing by their usual construction.

Another object is to provide for ease in varying the mixture and for high and low speed operation with the use of a single jet.

To the accomplishment of the above, and subordinate objects presently appearing, a preferred embodiment of my invention has been illustrated in the accompanying drawings, set forth in detail in the succeeding description, and defined in the claim appended hereto.

In said drawings:

Figure 1 is a view in side elevation of the preferred embodiment of my invention,

Figure 2 is a view in top plan,

Figure 3 is a view in vertical section taken on the line 3—3 of Figure 1, and

Figure 4 is a view in side elevation of the valve core.

Figure 5 is a view in transverse section taken on the line 5—5 of Figure 3, and

Figure 6 is a view in vertical section taken on the line 6—6 of Figure 5.

Referring to the drawings by numerals, the carburetor of my invention comprises as its basic structure, a throttle valve 3 embodying a cylindrical casing 4 having a pair of diametrically opposite intake and discharge ports 5, 6 in the top and bottom thereof, respectively, a pair of lower and upper intake and discharge sleeves 8, 9, extending diametrically from the top and bottom of said casing concentrically of said ports 5, 6, respectively, an exterior float chamber 10 at the rear end of the valve casing 4, and a valve core 11 in the casing.

A head plate 12 bolted, as at 13, thereto closes the front end of the casing 4.

A rear end web 14, preferably integral with the casing 4, closes the rear end of said casing and has extended therefrom a rectangular trough 15 forming the float chamber 10.

A closure plate 16 suitably secured to the top of the trough 15 closes said float chamber 10. The closure plate 16 has a top air inlet port 17 therein communicating with an upstanding tubular breather pipe 18 provided with a lateral inlet port 19 in the upper end thereof and closed by an enlarged protective cap piece 20 suitably secured to said pipe. The purpose of the ports 17, 19 and pipe 18 is to break the vacuum in the float chamber 10. A clean-out plug 21 is provided in one side of the trough 15.

A coupling 22 is provided at one end of the trough 15 with a nipple 23 on its outer end for attachment of the gasoline line, not shown, thereto, said coupling terminating in the float chamber 10 in a needle valve 24, shown in dotted lines in Figure 1, operated by a float 25 pivoted, as at 26, in said chamber 10, and a float operated arm 27 all in the usual manner and for the usual purpose.

The valve core 11 is cylindrical with closed front and rear ends 28, 29, and has a working fit in the casing 4 for rotation and endwise movement therein. The front end 28 of the valve core 11 has extending axially and forwardly therefrom a trunnion 31 journaled in the plate 16 and extending forwardly thereof. The trunnion 31, and end 28 are bored, as at 32, axially of the core 11 for a purpose presently seen. The valve core 11 is provided with a pair of bottom and top intake and discharge ports 35, 36, therein diametrically opposed for coaction with the intake and discharge ports 5, 6, in the casing 4. A lever arm 37 clamped to the trunnion 32, as at 38, provides for connecting operating means to said core 11 to rotate the same, so as to move the intake and discharge ports 35, 36, into and out of alignment with the intake and discharge ports 5, 6, of the casing 4 to open and close said ports.

Extending axially and forwardly into the valve core 11 from the rear end thereof is a fuel jet nozzle 39 having an enlarged rear end 40 of screw head form for adjusting the nozzle by a screw driver and which is accommodated in a recess 41 in the web 14 opening into the float chamber 10, an intermediate shank 42 threaded into the web 14, and an axial port 43 opening at its front end into the core 11 in the axis of the sleeves 8, 9, and terminating in a right angled rear end extension 42' opening into the recess 41.

The nozzle 39 is axially opposed to a needle valve member 44 threaded into the bore 32 to extend at its rear end into the front end of the port 43 and for adjustment in opposite directions to open and close said port and thus vary the density of the spray issuing from the nozzle 39. A hand wheel 45 is provided on the front end of the valve member 44 for turning the same.

As will now be understood, the discharge sleeve 9 is for connection to the engine manifold, not

shown, and the intake sleeve 8 for admitting air under the suction created in said manifold.

Means are provided whereby under rotation in opposite directions of the valve core 11 the volume of fuel issuing from the nozzle 39 is varied for variable control of speed, which means will now be described.

The rear end 29 of the valve core 11 is oblique to the axis of rotation of the core whereby said end is provided with an outer cam face 29a opposed to end web 14 of casing 4 and having diametrically opposite high and low points 29b, 29c, respectively. A ring 30 loosely fitting in the casing 4 and interposed between said face 29a and web 14 provides an end thrust bearing member for said face 29a which is adapted for tilting adjustment laterally on the bottom of the casing 4 toward and from the face 29a. A coil spring 33 interposed between the front end 28 of the valve core 11 and the plate urges said cam face 29a against the ring 30 and the latter against the web 14. A set screw 34 threaded laterally through the top of the web 14 against one side of the ring 30 provides for variably tilting the latter toward the cam face 29a in opposition to the tension exerted by the spring 33.

To adjust the described carburetor for idling speed, the valve core 11 is rotated until the intake and discharge ports 35, 36 are almost closed to ports 5, 6 as shown for instance in Figures 5 and 6 in which position of said core the low point 29c of cam face 29a is uppermost and opposite set screw 34. Set screw 34 is then turned inwardly to tilt ring 30 against cam face 29a. Needle valve member 44 is then turned into the port 43 of nozzle 39 to establish the proper flow of fuel therefrom for idling purposes. In this position of the parts under rotation of said valve core 11 to open the intake and discharge ports 35, 36 to ports 5, 6, said core will be cammed endwise, forwardly, by coaction of ring 30 with cam face 29a to withdraw the needle valve member 44 from the port 43 and vary the volume of fuel issuing from said port in proper portion to the volume of air admitted to said core 11 under opening of the ports 35, 36. Under rotation of said core 11 to again close said ports 35, 36 to ports 5, 6 the spring 33 will force the valve core 11 rearwardly for obvious reasons to cause the needle valve member 44 to correspondingly close said port 43.

In the described operation of the carburetor, the valve core 11 forms a mixing chamber therein through which the air is drawn from the intake sleeve 8 under the suction from the manifold and into which the fuel from the float chamber 10 is drawn in spray, or vapor, form by such suction to be mixed with the air passing through said mixing chamber. Obviously, by manipulating the lever 37 to rotate the valve core 11 and adjust the intake and discharge ports 35, 36, of said core relative to the ports 5, 6, of the casing 4, the amount of air admitted to and passed from the mixing chamber may be varied as desired and the supply of fuel admitted to said chamber correspondingly varied in the manner already set forth.

As the air is drawn into the valve core 11 from the sleeve 8 and is sucked upwardly through said core, or the described mixing chamber, vacuum pockets are created in the opposite ends of the core upon opposite sides of the ports 35, 36, resulting in turbulence of the mixture in the core, or mixing chamber, thereby effecting an intimate mixture of the air and fuel.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the subjoined claim.

Having described the invention, what I claim is:

A carburetor including a body portion having the form of a valve comprising a cylindrical casing, a pair of diametrically opposite intake and discharge sleeves extending therefrom, a cylindrical hollow valve core fitted in said casing to form a mixing chamber therein, said core being diametrically ported to admit air thereto from said intake sleeve and to discharge mixture therefrom to said discharge sleeve and rotatable in said casing to adjust said ports relative to said sleeves and thereby vary the volume of intake and discharge, said core being endwise movable in said casing, means to introduce fuel into said core in finely divided form under control of endwise movement of said core, and means to cause endwise movement of said core as an incident to rotation thereof comprising a cam on said core, a bearing member in said casing coacting with said cam under rotation of the core and adjustable to vary the action of said cam, and manipulative means for adjusting said member at will.

ALEXANDER FERGUSON.