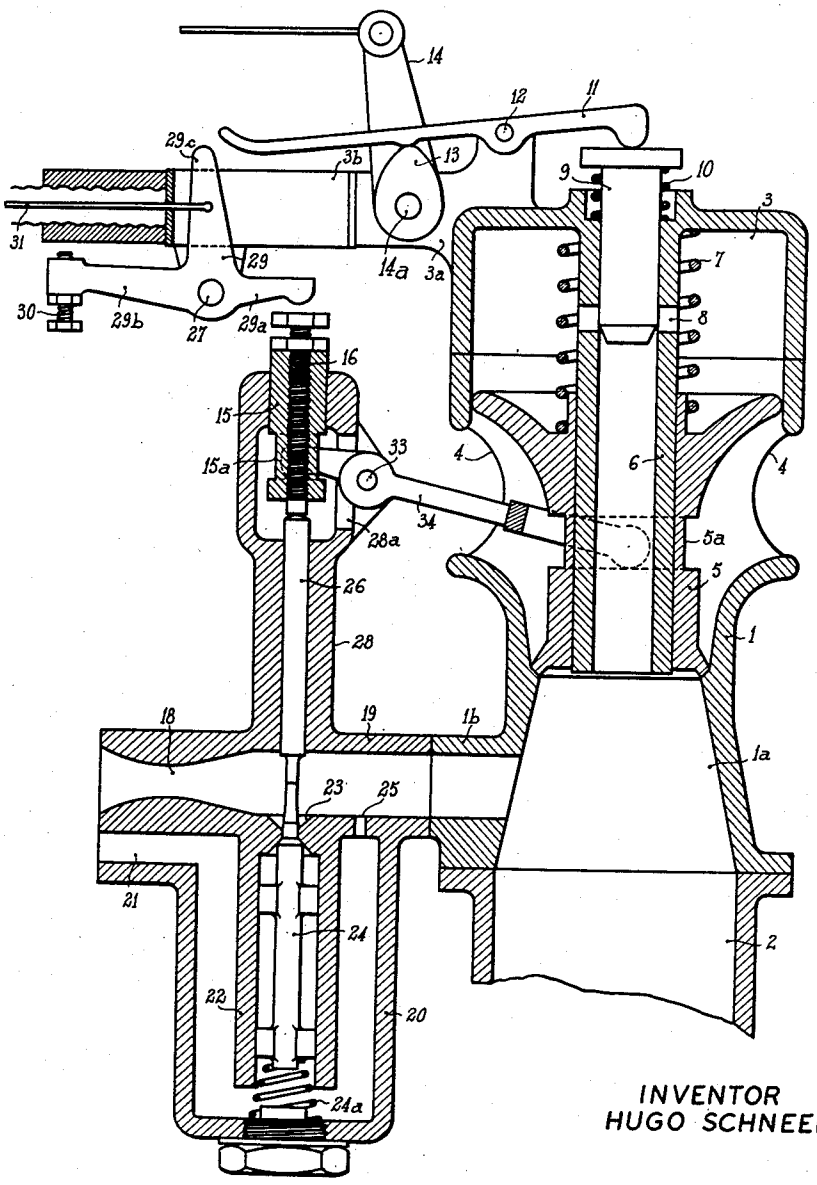
July 6, 1954 H. SCHNEEBELI 2,683,028

CARBURETOR

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2 Sheets-Sheet 1

FIG. 1



INVENTOR
HUGO SCHNEEBELI

BY

Henderson, Lind & Ponack
Attorneys

July 6, 1954 H. SCHNEEBELI 2,683,028

CARBURETOR

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FIG. 2

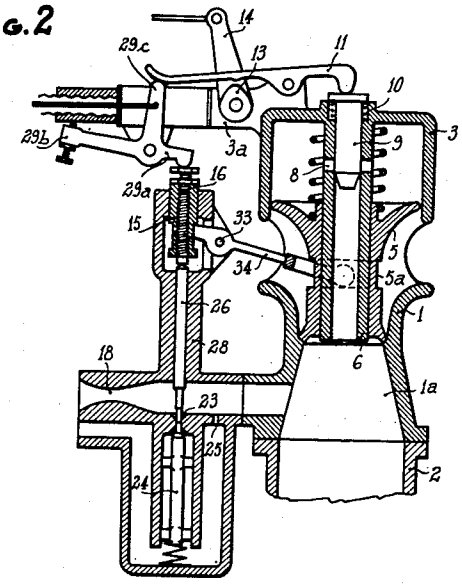
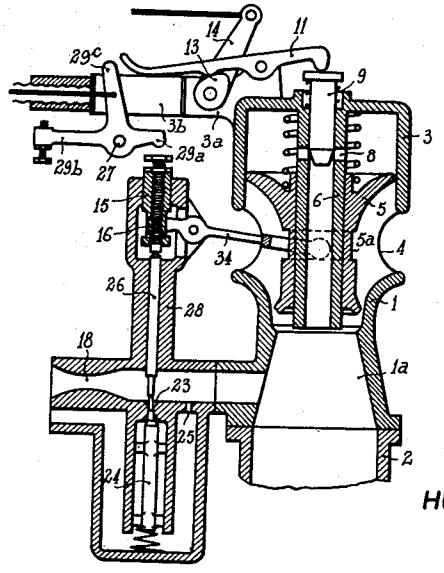


FIG. 3



INVENTOR
HUGO SCHNEEBELI

BY

Kenderath, Lind & Ponack
Attorneys

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CARBURETOR

Hugo Schneebeli, Courbevoie, France

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5 Claims. (Cl. 261—48)

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This invention relates to carburetors of the type comprising a suction chamber, a primary-air intake in this chamber, a valve-controlled fuel inlet in said primary-air intake, a secondary-air intake in the suction chamber which is controlled by a valve rigid with a piston movable in a cylinder communicating through a control valve (hereinafter termed "communicating valve") with the aforesaid suction chamber.

It is one essential object of the invention to so improve a carburetor of the above-defined type that it can be operated in the same manner as a conventional carburetor.

Another object of the invention is to neutralize the secondary-air inlet valve when starting the engine in order to supply the engine with the rich air-fuel mixture required under these conditions.

In view of the above objects as well as those to be made clear presently the secondary-air valve is operatively connected with the fuel inlet valve and the communicating valve can be actuated by the operator or driver.

Under starting conditions the fuel inlet valve and the communicating valve can be controlled jointly by the operator or driver independently of the secondary-air valve.

The appended drawings illustrate in diagrammatical sectional views one possible form of embodiment of the carburetor according to the invention. In the drawings:

Figure 1 shows the apparatus in its inoperative condition,

Figure 2 shows the apparatus of Fig. 1 at a smaller scale in its engine-starting conditions, and

Figure 3 shows the same apparatus when the engine is running normally.

The carburetor illustrated comprises a main body 1 the lower widening portion 1*a* of which is designed to act as a mixing chamber and to be fitted to the engine inlet manifold or pipe 2. The upper portion of this main body 1 forms a cylinder 3 closed at the top. The main body 1 is formed with a relatively large lateral apertures 4. In the body 1 and beneath these apertures 4 a valve seat is formed for cooperation with a valve 5 having an out-flared upper portion slidably engaged in the aforesaid cylinder 3. The valve 5 is guided for axial movement by a central tubular member 6 depending from the top or end wall of the cylinder 3. Besides the valve 5 is urged to its seated position by a coil spring 7 reacting against the same top or end wall of the cylinder. The cylinder 3 may be caused to communicate with

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the mixing chamber 1*a* through radial holes 8 formed in the tubular member 6 and controlled by a slide valve 9 engaging the upper portion of the axial bore of the tubular member 6 as shown. The slide valve 9 is resiliently urged upwards by another coil spring 10 and its uppermost position corresponds to the maximal opening of the radial holes 8. The bottom end of the slide valve 9 is tapered as shown.

The slide valve is placed under the dependency of one arm of a rocker 11 fulcrumed at 12 on a fixed support 3*a* projecting from the top wall of cylinder 3. The other arm of rocker 11 engages with its intermediate portion a suitably shaped cam 13 rigid with a lever 14 pivoted at 14*a* on the aforesaid support 3*a*. The lever 14 is connected through a convenient linkage with the accelerator pedal or equivalent control.

The lower portion 1*a* of body 1 is formed with a side fitting 1*b* adapted for connection with a primary-air inlet choke 18 formed in an auxiliary body 19. The lower portion of the auxiliary body 19 consists of a well 20 having a fuel inlet 21. In the central portion of this well 20 is a depending socket 22 forming a cylindrical chamber open at its bottom and communicating at its upper end through a valve-controlled small choke 23 with the aforesaid choke 18. The valve controlling the small choke 23 may be of the needle type formed integrally with an axial stem 24 suitably guided in the cylindrical chamber of socket 22 as shown. This valve is resiliently urged to its seated position by a spring 24*a*. Besides, the well 20 is in permanent fluid-connection through a jet passage 25 with the choke 18.

The upper end of stem 24 engages the bottom end of a push-rod 26 coaxial therewith and slidably guided in a bore suitably formed in the upper half 28 of the auxiliary body 19 of the carburetor.

This upper portion 28 of the auxiliary body is provided with an integral ear having pivotally mounted therein at 33 a two-arm lever 34 the longer arm of which passes through one of the side apertures 4 of the main body 1 and terminates with a fork portion engaging either side of an annular groove 5*a* formed in the waisted portion of valve 5.

The shorter arm of lever 34 passes through an aperture formed in the enlarged top portion of the upper half 28 of the auxiliary body 19 and is also shaped as a fork the branches of which encompass an annular groove 15*a* formed in a push-rod adjuster 15 slidably mounted in the upper half 28 of the auxiliary body. The respective widths of the shorter forked arm of lever 34 and groove

15a are so dimensioned as to leave a substantial axial clearance therebetween.

The push-rod adjuster 15 has an axial threaded bore engaged by a screw 16 the bottom end of which engages the top end of the push-rod 26.

The fixed support 3a has fastened thereto a supporting extension 3b having pivotally mounted thereon at 27 a double bell-crank lever 29 comprising three arms 29a, 29b and 29c. The arm 29a is adapted to engage the upper end of screw 16. The opposite arm 29b carries an adjustment screw 30 whereby the amplitude of the angular movement of lever 29 can be adjusted. The third arm 29c is operatively connected as by well-known linkage means to a control member (not shown) and in the example illustrated the double bell-crank lever is actuated through a flexible wire 31. The end portion of this arm 29c is adapted to engage the correspondingly shaped curved extension of rocker 11.

The above-described assembly operates as follows:

As already stated, the carburetor is shown in its inoperative conditions Fig. 1 and in engine-starting conditions Fig. 2. Referring to Fig. 2 it will be seen that for starting the engine the arm 29c of lever 29 has been pushed from left to right and that the arm 29a has depressed the adjuster and push-rod assembly 16—26. This causes the stem 24 and therefore the valve formed thereon to move downwards, thereby opening the small choke 23. On the other hand and simultaneously the arm 29c of lever 29 engages the cooperating extension of rocker 11 and causes the latter to move in clockwise direction so as to depress the slide valve 9 in the tubular member 6 until the radial holes or ports 8 therein are closed. As a result, the suction produced in the inlet manifold or pipe 2 by the engine cannot be transmitted to the chamber of cylinder 3 and therefore the valve 5 remains seated. The clearance or lost motion between the smaller arm of lever 34 and the shoulders of groove 15a of adjuster 16 is sufficient to open the needle valve 24 and leave the secondary-air valve 5 closed.

Under these conditions the engine is supplied with a rich mixture consisting of the primary air entering choke 18 and the fuel allowed through both small choke 23 and jet passage 25.

When the lever 29 is pulled the other way, that is from right to left, the spring acting upwards against the lower end of stem 24 causes the small choke 23 to be closed by its cooperating needle valve so that the engine will be supplied only with fuel passing through the jet passage 25, the resulting air-fuel ratio being sufficient for idling.

For normal running conditions (Fig. 3) the accelerator lever 14 is actuated from left to right, thereby rotating the cam 13 and allowing the rocker 11 to move anti-clockwise due to the action of spring 19 which at the same time lifts the slide valve 9 and causes the ports 8 to be uncovered. As a result, the suction created in the intake manifold or pipe 2 is transmitted to the cylinder 3 to the degree permitted by the opening of holes 8. The secondary-air valve 5 is thus opened by the suction and secondary air is allowed to enter the mixing chamber 1a already supplied with fuel emulsified with primary air. Besides, the upward movement of valve 5 causes the lever 34 to be rocked anti-clockwise in due proportion, thereby depressing the adjuster and push-rod assembly 16—26 and with it the needle valve 24 so as to open the small choke 23 and increase the amount of fuel in the mixture.

By suitably shaping the small choke 23 on the one hand and the main body 1 in the region thereof comprised between apertures 4 and valve seat 5 on the other hand, the amount of fuel may be adjusted automatically in relation to the secondary-air input for all engine speeds and loads.

Of course, the invention is not restricted to the specific embodiment illustrated diagrammatically in the drawings and described hereinabove, as many modifications may be brought thereto without departing from the spirit and scope of the invention.

What I claim is:

1. In a carburetor of the type comprising a suction chamber, a primary-air intake in this chamber, a valve-controlled fuel inlet in said primary-air intake, a secondary-air intake in the suction chamber which is controlled by a valve rigid with a piston movable in a cylinder communicating through a control valve with the aforesaid suction chamber, the provision of means operatively connecting the secondary-air valve with the fuel inlet valve, and means for actuating said control valve.

2. In a carburetor according to claim 1, a lost motion in the operative connection between the secondary-air valve and the fuel inlet valve, and means for actuating at will said fuel inlet valve and said control valve, independently of said secondary-air valve.

3. In a carburetor according to claim 1, a push-rod for the fuel valve, a lever with two unequal arms pivoted on a fixed axis and the fork shaped ends of which engage circular grooves respectively around the secondary-air valve and around a part of said push-rod for the fuel valve.

4. In a carburetor of the type comprising a suction chamber, a primary-air intake in this chamber, a valve-controlled fuel inlet in said primary-air intake, a secondary-air intake in the suction chamber which is controlled by a valve rigid with a piston movable in a cylinder communicating through a control valve with the aforesaid suction chamber, a push-rod for the fuel valve, a lever with two unequal arms pivoted on a fixed axis and the fork shaped ends of which engage circular grooves respectively around said secondary-air valve and around a part of said push-rod, the latter groove having a length greater than the fork end engaged therewith so as to provide a lost motion.

5. In a carburetor according to claim 4, a rocker fulcrumed on a fixed axis, and an arm of which is in permanent operative contact with the control valve, actuating means for said valve, the other arm of the rocker being in releasable contact with said actuating means, a bell-crank lever with three arms pivoted on a fixed axis, one arm of which is adapted to engage operatively said push-rod for the fuel valve, a second arm being adapted to engage operatively an extension of said rocker, a fixed abutment for the third arm, and actuating means for said bell crank lever.

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