Dec. 1, 1925.

1,563,705

J. C. HANSEN-ELLEHAMMER

CARBURETOR

Filed Nov. 30, 1923

Fig. 3.

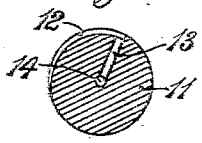


Fig. 4.

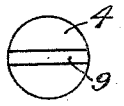


Fig. 1.

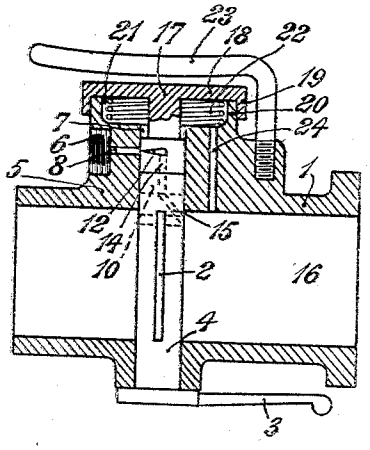
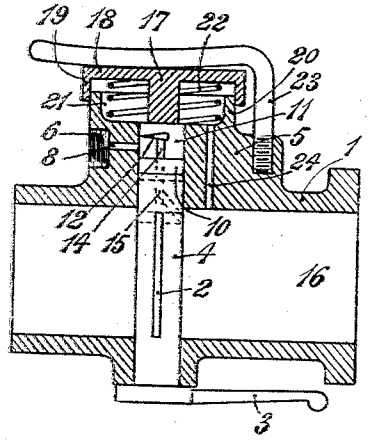


Fig. 2.



Inventor:

Jacob Christian Hansen-Ellehammer

By Lüe Pinckney

Attorney.

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UNITED STATES PATENT OFFICE.

JACOB CHRISTIAN HANSEN-ELLEHAMMER, OF COPENHAGEN, DENMARK.

CARBURETOR.

Application filed November 30, 1923. Serial No. 677,913.

To all whom it may concern:

Be it known that I, JACOB CHRISTIAN HANSEN-ELLEHAMMER, subject of the King of Denmark, residing at Copenhagen, Denmark, have invented certain new and useful Improvements in Carburetors, of which the following is a specification.

The present invention relates to carburetors.

The present carburetor is essentially characterized by a cylindrical block or plug, which rotates with the air inlet valve of the carburetor and which has a fuel passage, the inlet area of which increases gradually, as the depression in the carburetor increases, so that the proper ratio of mixture between fuel and air is permanently maintained.

In the accompanying drawing

Fig. 1 is an axial section through a constructional form of the improved carburetor with its parts in such positions that the fuel can enter.

Fig. 2 is a similar section with the parts in such positions that the fuel supply is interrupted.

Fig. 3 is a cross section through the said cylindrical block, and

Fig. 4 is an end view of a slotted spindle which is employed.

Referring more particularly to the drawing, 1 indicates the cylindrical body or casing of the carburetor, which is open at one end for admission of air and is adapted to be connected at its other end with the induction pipe of the engine. A butterfly or other suitable throttle valve 2 is rotatably mounted in the central portion of the casing, and is secured to a spindle 4 equipped with an external operating handle or lever 3; the portion 16 of the casing in advance of the throttle constituting a mixing chamber, as subsequently explained.

Above the throttle, the casing has formed on its upper side an enlargement or boss 5 provided with an axial vertical bore 7 and with an internally-threaded socket 6 to receive the end of the fuel pipe (not shown), the socket and bore being connected by a short horizontal duct 8. The upper end of spindle 4 projects into the bore 7, which thus forms one bearing for said spindle, the lower end thereof being journaled in a second bearing opening formed through the under side of the casing. An upstanding annular flange 20 is provided upon the top of the boss 5 concentric with bore 7 and defines a cylindrical space or chamber 21 into the center of which said bore 7 opens. The top of spindle 4 terminates an appreciable distance below the bottom of said chamber, leaving a space wherein a cylindrical block of plug 11 is slidably and rotatably fitted; this block being integrally or otherwise rigidly secured to a depending axial stem 17 provided upon a head or cap 18 which overlies flange 20 and is itself provided with an annular marginal flange 19 that extends downwardly across the outer face of flange 20. An expansible coil spring 22 is disposed in chamber 21, where it encircles stem 17 and exerts its pressure upwards against the under face of the head or cap 18, with the result that the latter and, hence, the slide block 11 connected to its stem 17 will be raised. To limit this movement, a stop 23, in the form of an L-shaped member, may be used; the short vertical arm of said member being secured in the top of boss 5, while its long arm extends horizontally above and across the cap, as shown.

It is proposed to utilize the slide block 11 in controlling the flow of the liquid fuel from the duct 8 to the carbureting chamber 16, and it is also proposed to regulate such flow in accordance with the movements of the throttle. To effect these objects, the block has a specially-shaped groove 12 formed in its periphery wall, and a loose coupling is provided between the block and the spindle 4. The groove 12 is connected at its inner end, by means of a short radial passage 13 (Fig. 3), with a vertical passage or bore 14 which is formed axially through the lower part of the block and is adapted to register with the end of a passage 15 in the upper part of the spindle; the lower part of this passage 15 opening at a downwardly-inclined angle through the side wall of the spindle so as to discharge the fuel into the carbureting chamber 16 in advance of the throttle.

The groove 12 above referred to, increases progressively both in width and in depth from its outer end, where it is as fine as a needle, to its inner end where it opens into the radial passage 13; so that, according as one part or another of the groove is brought opposite the inner end of duct 8, the supply of fuel flowing from the latter

into the duct will correspondingly increase or decrease. But it is to be observed, however, that in the normal position of parts, as depicted in Fig. 2, wherein the cap 18 and the block are raised by the action of spring 22, the aforesaid groove is above and, hence, out of registration with duct 8, and the supply of fuel is, consequently, shut off. To depress the cap and block and thereby obtain registration of the parts just mentioned, the suction of the engine is utilized and is transmitted through a duct 24 formed in the casing and its boss 5 into the chamber 21, where it acts to pull the cap downward, said cap returning to its raised position as soon as the suction decreases to a point where it can no longer overcome the pressure of spring 22.

As the suction action is controlled by the throttle 2, the connection between the spindle 4 thereof and the block is of such a nature as to be maintained throughout the sliding movements of the block, so that the two elements will always move as a unit irrespective of the position which said block happens to be occupying. A loose tenon joint is preferably utilized, one member being formed with a tenon 10, and the other with a slot or groove 9 wherein the tenon slidably fits; the depth of the parts 9—10 being such that the one is never entirely withdrawn from the other but remains sufficiently engaged therewith to insure rotation of the two members in unison. The construction here represented shows the slot 9 as formed in the top of the spindle 4, while the tenon 10 is formed on the under side of the sliding block 11, though such arrangement may be reversed if desired.

The hereinbefore described carburetor operates in the following manner: As long as the engine is running, the suction which, through the duct 24 reaches the chamber 21, will hold the cap 18, acting as a pneumatic valve and guided by the flanges 19 and 20, against the last-named flange. The cylindrical block 11 is then in its lowermost position, Fig. 1, in which the groove 12 registers with the axis of the passage 8. According to the more or less open position into which the throttle 2 has been set by the spindle 4, a narrower and less deep or a wider and deeper part of the groove 12 will register with the inner end of duct 8 so that, in consequence thereof, a more or less large admission opening for fuel is allowed, and the change from the one to another size of such admission opening proceeds evenly and gradually.

As the fuel supply leads to the mixing chamber 16, which is situated between the air valve and the engine, the vacuum for the suction of fuel will be the higher the more the throttle is closed, the highest vacuum and the maximum atomization of the fuel thus being obtained when the engine is running idly.

At the moment when the engine stops, the spring 22 will force the cap 18 upwards, until the latter is stopped by abutting against the stop 23, whereby the block 11 is lifted to the position shown in Fig. 2, so that the groove 12 will lie higher up than the duct 8, and the latter is thereby closed by the cylindrical surface of the block. Under the action of the spring the block is held in this position until the suction created by the engine commences again and forces the cap 18, and with it the block downwards into the position shown in Fig. 1.

From the foregoing it is evident that the cap 18 will be turned when the throttle valve 2 and the cylindrical block 11, are turned, and the frictional resistance between the said cap and its flange 19 and the flange 20 will have the effect that the parts will, when once set, maintain their position until they are set afresh.

The details shown and described in the foregoing specification and the drawing may be varied in many ways without departing from the principle of the invention as claimed.

I claim:

1. In a carburetor, a casing forming a mixing chamber and having a transverse bore; a fuel inlet opening through the periphery of said bore; a throttle valve having a spindle rotating in said bore, said spindle having a fuel passage therein; a cylindrical block rotating and reciprocating in said bore and having an opening to cooperate with said fuel inlet and a passage for fuel leading from said opening and communicating with the fuel passage in the throttle spindle; means for movably holding said block with said opening out of register with said fuel inlet; means responsive to the suction in the mixing chamber for reciprocating said block to cause said opening and inlet to register; and means connecting said block and throttle spindle to rotate the block with the throttle but permit said reciprocating movement.

2. In a carburetor, a casing forming a mixing chamber and having a transverse bore; a fuel inlet opening through the periphery of said bore; a throttle valve having a spindle rotating in said bore, said spindle having a fuel passage therein; a cylindrical block rotating and reciprocating in said bore and having a tapering groove to cooperate with said fuel inlet and a passage for fuel leading from said groove and communicating with the fuel passage in the throttle spindle; means for movably holding said block with said groove out of register with said fuel inlet; means responsive to the

suction in the mixing chamber for reciprocating said block to cause said groove and inlet to register; and means connecting said block and throttle spindle to rotate the block with the throttle but permit said reciprocating movement.

3. In a carburetor, the combination, with a casing forming a mixing chamber and provided with an annular boss having an axial bore and with a fuel inlet opening into said bore, of a throttle valve having a spindle rotating in said bore, a depressible controller in said bore having a passage for delivering the fuel to said chamber which registers with said inlet when the controller is depressed; said casing having a passage which opens into the interior of said boss; a cap slidably fitted on said boss and subjected to the suction action transmitted through said passage to be depressed thereby, said cap having the controller rigidly connected to it; a spring within said boss acting against said cap to normally hold the same and the controller in raised position with the passage in the controller out of register with the fuel inlet; and means connecting said controller and spindle to rotate the former in unison with the throttle valve when said valve is turned, while permitting movement of the controller independently of and relatively to said spindle.

4. In a carburetor, the combination, with a casing forming a mixing chamber and provided with an annular boss having an axial bore and with a fuel inlet opening into said bore, of a throttle valve having a spindle rotating in said bore, a cylindrical block rotating and reciprocating in said bore and having a passage for delivering the fuel to said chamber which registers with said inlet when the block is depressed; said casing having a passage which opens into the interior of said boss; a cap slidably fitted on said boss and subjected to the suction action transmitted through said passage to be depressed thereby, said cap having the block rigidly connected to it, a spring within said boss acting against said cap to normally hold the same and the block in raised position with the passage in the block out of register with said inlet, and means connecting said block and throttle spindle to rotate the block with the throttle but permit said reciprocating movement.

In testimony whereof I affix my signature.

JACOB CHRISTIAN HANSEN-ELLEHAMMER.