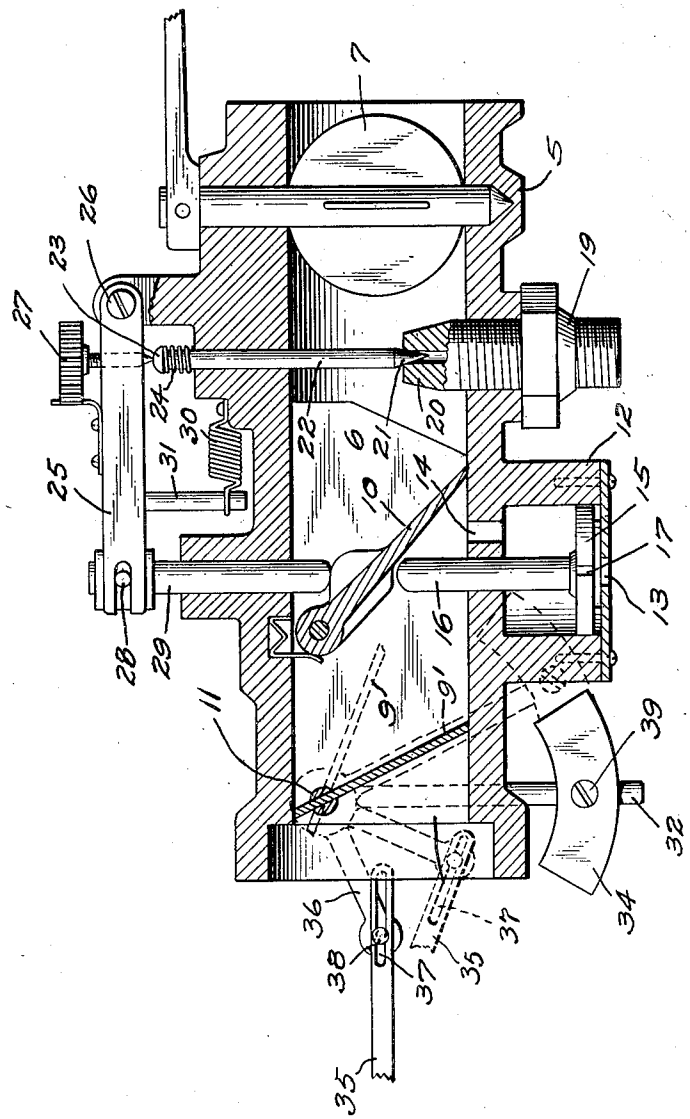
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CARBURETOR

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UNITED STATES PATENT OFFICE

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CARBURETOR

Application filed February 25, 1925. Serial No. 11,431.

This invention relates to carburetors, more particularly of the floatless type, an example of which is illustrated in patent application, Ser. No. 693,969, filed by me February 10, 1924.

The object of the invention is to improve the effectiveness and extend the usefulness of carburetors of motor vehicles employing gravity fuel feeding systems; more specifically, its object is to provide means for automatically regulating the amount of vacuum in a carburetor or afford the induction of fluid requisite to elevate the same from a supply tank located below the carburetor for operating the engine to propel the vehicle when travelling either upon a horizontal or inclined road. By the provision of devices thus characterized, a floatless carburetor is capable of being employed in association with a fuel supply tank positioned below the level of the fuel feed connection and without the use of an auxiliary, or vacuum tank, into which the fuel is drawn from the supply tank and then discharged by gravitation to a carburetor.

The invention consists in improved gravity actuated means for controlling the vacuum regulating devices of a carburetor, and in the novel construction, adaptation and combination of the parts thereof as hereinafter described and claimed.

My invention comprehends a mechanical method of carbureting in which a partial vacuum is controlled by the inclination of the carburetor in order to secure greater suction on the fuel on an up grade than on the level road and to materially decrease or eliminate suction down grade.

The accompanying drawing is a vertical longitudinal section of a carburetor embodying my improvements.

In said drawings, 5 represents the carburetor casing having a passage 6 extending through its entire length with a throttle valve 7 at its front or outlet end which is communicatively connected to the intake manifold, not shown, of an internal combustion engine.

The inlet 8 at the rear end of the passage 6 is open for the admission of air from the external atmosphere subject to the control of a choke valve which is indicated by 9. Provided in the carburetor passage between said throttle and choke valves is a flap valve 10 which is connected near its upper edge to a pivot pin or spindle 11.

The carburetor is formed to have below the valve 10 a cylinder 12, the bore of which communicates at its lower end through an inlet hole 13 with the external atmosphere; and at its upper end through an outlet hole 14 with the space between the valves 9 and 10.

Within said cylinder is a piston 15 having a stem 16 extending upwardly through a guide hole of the casing to have its upper end engageable against the underside of the valve 10 to swing the same upwardly into its open position when the piston is elevated by atmospheric pressure acting against its underside.

To permit a small leakage of air by the piston, the latter may be of slightly less diameter than the cylinder bore or, as shown, providing the piston with leak holes or notches such as 17.

19 represents a fitting adapted to be connected to a gasoline supply pipe engaging in the underside of the casing to extend, as a nozzle 20, into the passage 6 intermediate the throttle valve 7 and the flap valve 10.

Arranged to seat in the orifices of said nozzle is the conical lower end 21 of a vertically disposed rod 22, hereinafter designated as the needle valve, which passes through a guide hole of the casing and is formed or provided at its upper end with a head 23.

Acting against the head 23 on said needle valve is a spring 24 of sufficient power to overcome the weight of the needle and ele-

vate the same into its open position with respect to the nozzle orifice.

25 represents a lever fulcrumed at one end by means of a screw 26 which engages a post element of the casing.

Said lever extends over the needle valve to which it is operatively engaged by means of an adjustable screw 27 and has its free end connected by means of a pin 28 with the head of a bolt 29 which extends vertically through a guideway of the casing into engaging relation with the flap valve 10.

30 represents a spring connected to a stud element 31 of the lever 25 and tends to cause the lever to retain the valve 10 in its closed position.

The spring 30, moreover, is sufficiently strong to overcome the power of the spring 24.

The carburetor so far described as to its construction and mode of operation is substantially like that of the carburetor illustrated in my patent application hereinbefore referred to.

According to the present invention, I provide gravity actuated means for regulating the opening and closing movements of the choke valve 9 to shut off the supply of air, more or less, admitted into the carburetor.

As shown, said means comprises an arm 32 secured to and depending from the spindle 11 by which the choke valve is pivotally connected to the carburetor casing 5, and a heavy body 34 which is secured to the lower portion of the arm 32.

Said arm and weight constitute a pendulum-like device which is acted upon by gravity to retain the valve 9 in its closed position, indicated by full lines in the view, with respect to the air inlet 8 when the longitudinal axis of the carburetor is horizontal or nearly so; and also serves to cause the valve to swing into its dotted line 9^1 position to open said inlet when the front end of the carburetor is tilted down. The weight gives increased resistance to the opening of the choke valve when the front of the carburetor is elevated.

To enable the choke valve to be manually regulated as, for example, when starting the engine, a controlling rod such as 35 may be employed, said rod being connected either to the arm 32 or, preferably, to a second arm 36 of said spindle.

To permit movement of the choke valve independent of the controlling rod 35 the connection between the latter and the arm 36 is such as to provide lost motion, the connection shown being afforded by the provision of a slot 37 in the rod to receive a crank pin element 38 of the arm 36.

39 represents a set screw for securing the body 34 to the spindle arm 32 at selected distances from the choke valve axis to regulate the power of the body.

It will be evident from the preceding description taken in connection with the drawing, that my improved device including the automatic choke valve control hereinbefore described is designed for use either with a fuel storage tank located below the feed nozzle 20 of the carburetor or with a gravity fuel feed system wherein the gasoline reservoir or storage tank, not shown, is normally located at an elevation higher than that of the orifice of the fuel feed nozzle 20.

In case the vehicle is equipped with the gravity fuel feed system, when the vehicle to which the carburetor applied ascends an inclined road, the consequent upward tilting of the front end of the vehicle likewise tilts the carburetor and raises the fuel feed nozzle to an elevation higher than that of the reservoir, resulting in the stoppage of gravity induced fuel feed.

In this instance, however, gravitation acting through the medium of the body 34 and the arm 32 retains the valve 9 at a predetermined angular relation with respect to a vertical plane, whereby the longitudinal tilting of the carburetor will serve to effect a relative closing movement of the air entrance 8 thereof with respect to the choke valve.

With the admission of air directly into the carburetor passage thus stopped, or partially so, the engine created suction in the passage 6 will serve to induce the flow of fuel through the supply nozzle 20 into the carburetor even when the nozzle orifice is above the fuel level in the reservoir. From the foregoing, it is seen that the gravity controlled choke valve causes a gravity fuel feed-system to function as a vacuum feed system when the associated vehicle's front end is tilted up.

When the choke valve is closed a suction within the carburetor passage 6 affords a partial vacuum above the piston 15 in the cylinder 12 to coact with the atmospheric pressure against the under surface of the piston to cause the same to ascend and cause the flap valve 10 to be swung upwardly in its open position with respect to the carburetor passage 6.

The flap valve when swung upwardly pushes the rod 29 therewith to elevate the lever 25 whereupon the spring 24 acts to raise the needle valve 22 from its seat in the nozzle 20.

With the main air inlet 8 closed by the choke valve the only air admitted into the carburetor is the relatively small quantity which passes by the piston 15 so that the resultant mixture sucked from the carburetor is of a character rich in hydrocarbon. After the engine is operated by the explosion of charges of such a fuel mixture and the choke valve 9 is returned into its full open position, air being admitted through

the inlet 8 serves to keep the flap valve at elevations varying with and responsive to the suction operations of the associated engine.

It will thus be seen that the carburetor operates by a mechanical process in controlling the partial vacuum and thereby regulates the fuel in accordance with the inclination of the carburetor, for travel on the level, the valve resting in the position as shown in full lines with the weight supporting arm 32 in a perpendicular position. The normal suction of the engine will swing the valve to permit sufficient air to enter, or the rod 35 may be thrust forward to open the valve slightly. On the downgrade, the weight will swing the valve to the dotted line position as shown. On the upgrade the steeper the grade becomes, the greater the turning moment of the weight. Thus as the inclination increases, the choke valve is pressed tightly against the wall of the carburetor and a greater suction is required to open it, thereby creating a greater vacuum.

What I claim, is:—

1. In a carburetor, a fuel supply nozzle, a spring operated needle valve for said nozzle, a mechanism tending to close the same, an air controlled valve operating said mechanism, a choke valve and means rendered operable by a tilting movement of the carburetor to automatically effect the closing of said choke valve to afford within the carburetor a partial vacuum to influence said air controlled valve and the delivery of fuel through said nozzle.

2. In a carburetor, the combination with the carburetor casing having a passage therethrough, a fuel nozzle extending into said passage, a valve for said nozzle, a choke valve provided for the inlet of said passage, means actuated by tilting movements of the carburetor to effect opening and closing of said choke valve, and air controlled means rendered operable by the closing and opening of the choke valve for regulating said nozzle valve.

3. In a carburetor, for an internal combustion engine, an air passage made for connection to the suction side of the engine, a nozzle adapted to discharge fuel thereinto when sucked upon, and means for automatically changing normal suction on the nozzle when the carburetor is tilted from its normal plane including a resisting choke valve in combination with suction operated auxiliary means rendered automatically operative by change in position of said choke valve for simultaneously effecting a corresponding change in the active port area of the nozzle.

4. In a carburetor for internal combustion engines of motor vehicles wherein the carburetor is mounted so as to assume a predetermined normal position when the vehicle is on level ground, the combination with a chamber having an outlet communicating with the intake of the engine and an inlet opening communicating with the atmosphere; a controlled nozzle adapted to discharge fuel into said chamber when subjected to suction; and valve means controlled by tilting the carburetor from its normal position for changing the effective port area of the nozzle to a predetermined extent to feed the proper amount of fuel to the motor.

5. In a carburetor for internal combustion motors, the combination with a chamber having an outlet communicating with the intake of the motor, and an inlet opening communicating with the atmosphere; of a controlled nozzle adapted to discharge fuel into said chamber when subjected to suction; means for normally changing the suction on said nozzle when the carburetor is tilted from its normal plane; and valve means controlled by the change in suction for altering to a predetermined extent the port opening of the nozzle.

6. In a device of the character described, the combination with a mixing chamber having an outlet communicating with the intake of an internal combustion engine and an inlet communicating with the atmosphere; of a fuel feed means communicating with said mixing chamber; a fuel feed valve co-operating with said fuel feed means for controlling the amount of fuel fed to said chamber; a gravity actuated choke valve at said inlet adapted to have its position changed by changes in relative position of the device itself with reference to the horizontal; and means rendered automatically operative by change in position of said choke valve for actuating said fuel feed valve.

7. In a carburetor for internal combustion motors, the combination with a mixing chamber having an outlet communicating with the intake of the motor, a main inlet communicating with the atmosphere and an auxiliary inlet communicating with the atmosphere; of a choke valve for said main inlet; means rendered effective by changes in position of the carburetor for opening and closing said choke valve; fuel feed means communicating with said mixing chamber; a suction device actuated by the air admitted through said auxiliary inlet when the choke valve is arranged to close the main inlet; and means actuated by said device for controlling the fuel admitted through said feed means to the mixing chamber.

8. In a device of the character described, the combination with a mixing chamber having an outlet communicating with the intake of an internal combustion motor and an inlet communicating with the atmosphere; of a fuel feed passage communicating with said mixing chamber; means co-operating with said fuel feed passage for controlling the amount of fuel fed to said mixing chamber;

suction-operated means for actuating said controlling means; valve means controlled in accordance with the position of the device with reference to the horizontal for controlling the amount of air admitted at said inlet to effect a partial vacuum in said carburetor and thereby render operative said suction-operated means.

Signed at Palo Alto, California, this 30th day of December, 1924.

HARRY C. WAITE.