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CARBURETOR

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Fig. 1

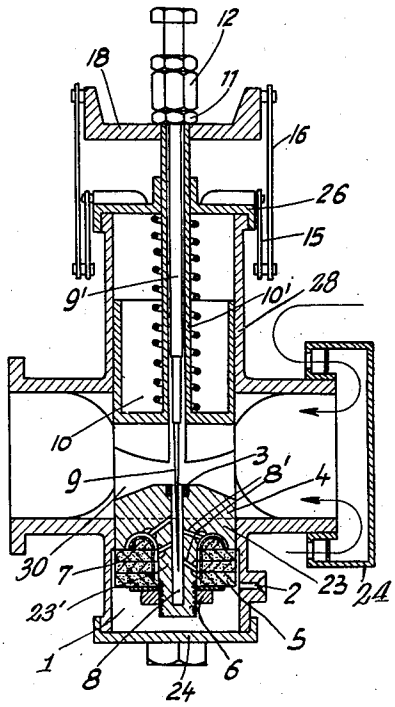
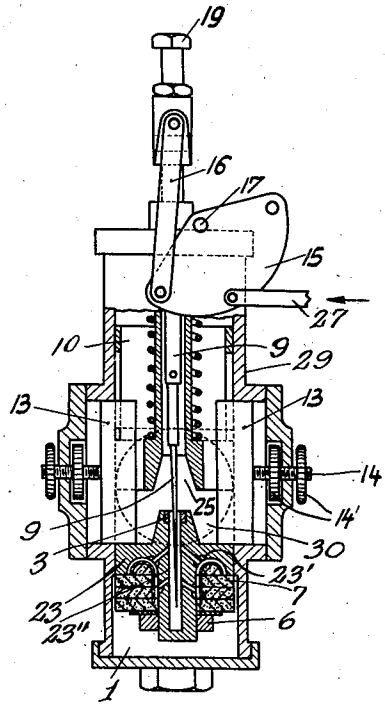


Fig. 2



Inventor:
O. Brökel

By: Glascock Downing & Seebold
Attys.

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CARBURETOR

Otto Brökel, Hamburg, Germany

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10 Claims. (Cl. 261—44)

The present invention relates to a carburetor for internal combustion engines.

Internal combustion engines are usually equipped with carburetors at which the supply of fuel to an atomizing or spraying nozzle is controlled by means of a float. These carburetors show the drawbacks, that the nozzles are easily clogged up by impurities and that the fuel in the float chamber frequently is ignited, whereby vast damages may be caused. The so-called surface carburetors and filter carburetors are also frequently used. At these carburetors the fuel is supplied through capillary bodies consisting of wicks or other bodies of wadding or similar substances in which the fuel is atomized, so that it enters the suction chamber of the engine in the form of spray or vapor.

The carburetors are usually controlled by throttling the passage through which the gas current flows and for this purpose a throttle flap or a similar device is provided. It has also been proposed in addition to this control to arrange a special fuel valve for the control of the fuel supply.

The present invention is based on a surface carburetor which is equipped with a holder having a seat for a compressible capillary body by means of which the fuel is finely distributed and is vaporized so that it enters the air-gas conduit in the form of vapor. This seat, which through a plurality of channels or ducts communicates with the air-gas conduit, is in accordance with the present invention so arranged, that it can easily be set for normal load and by regulation can be adjusted after the varying loads without difficulties. The seat is further so shaped, that it contacts with a relatively large part of the surface of the capillary body. The individual parts of the carburetor are hereby so formed and arranged, that the fuel vapors and the drawn-in air are thoroughly mixed.

It is already known to equip floatless carburetors for internal combustion motors with a capillary body holder adapted to receive a capillary body through which the fuel enters the holder, and it is also known in such carburetors to control the admission of air by means of a spring-controlled piston valve which cooperates with a conical valve needle projecting into the bore of the capillary body holder. At the hitherto known carburetors of this kind, however, the fuel does not pass uniformly through the capillary body and on account of the unsuitable construction of the devices which control the supply of air it is at varying loads not possible to maintain the proper ratio between the amount of air supplied to the mixing chamber and the amount of gasified fuel introduced into the same.

It is the main object of the invention to eliminate the above named drawback and to provide a carburetor in which the fuel is uniformly spread through the capillary body and a fuel-air-mixture of correct composition is always obtained.

A constructional form of the invention is shown schematically by way of example in the accompanying drawing.

Fig. 1 is a vertical sectional view showing a carburetor the throttle device of which consists of a piston valve.

Fig. 2 is a partial sectional view taken on a plane perpendicular to that of Fig. 1.

The carburetor shown in Fig. 1 is supplied with fuel through a tube 2 which is controlled by an electromagnetic valve (not shown). This valve may be arranged as a separate device or may be combined with the carburetor to a single unit. The lower fuel chamber 1 of the carburetor contains a capillary body 5, which for instance may consist of rings of felt, wadding, or the like. This capillary body may be more or less compressed by means of a nut 6 whereby the normal adjustment may be altered. It will be evident to persons skilled in the art, that the amount of vaporized fuel admitted to the carburetor may be reduced by compressing the capillary body and augmented by loosening the nut 6.

As shown in Figs. 1 and 2 the capillary body 5 is pressed against a seat formed by a holder 23 which is inserted into the body of the carburetor. This holder is formed with an annular groove 23' for the reception of the capillary body 5 and with a central downwardly projecting conical part 23'' the lower end of which is cylindrical and is threaded to receive the nut 6.

The capillary body holder is formed with channels 8' of conical cross-section which connect the capillary body with a main channel 8, which widens toward the side on which the capillary body is located. The channels 8' are distributed in a suitable manner in the body of the holder and some of them merge into the annular groove 23' whereas others merge into the surface of the conical projection 23''. Through this arrangement the capillary body is facing a very large suction surface. This surface is still more enlarged by an insert 7, which is located between the capillary body 5 and the holder 23 and which preferably consists of a wire gauze sieve. This sieve will also prevent particles of the capillary body from being drawn into the channels 8'

The upper part of the holder projects into the suction conduit 30 of the carburetor body and, as shown in Fig. 2, the main channel 8 terminates in a bridge member or rib 4, which is arranged in the direction of the gas current and the vertical and horizontal faces of which on both sides are separated by an inclined intermediate area (Fig. 1). The air drawn in has therefore its highest velocity at the fuel inlet opening. At this opening a calibrated steel matrix 3 is pressed into the rib 4 and within this matrix the conical valve needle 9 is moving which is adjustably connected with the lifting cylinder or piston valve 10 serving as a throttling member by means of a common double cross-piece 18.

At the constructional form of the invention shown in Figs. 1 and 2 the throttle member 10 slides in a cylindrical part 29 of the carburetor. At the lower end of the member 10, in the direction of the gas flow, a groove 25 is formed which during the downward stroke is entered by the rib 4 of the holder 23. For the purpose of increasing the nozzle effect this groove is like the said rib formed with inclined faces intermediate its vertical and horizontal faces. The inclined faces on both sides of the lower part of the throttle device serve the same purpose.

The lifting cylinder or piston valve 10 serving as a throttle device possesses a hollow piston rod 10' (Fig. 1) which is adjustably arranged in the common double cross-piece 18 and which for the light running may be raised or lowered by means of the nut 11. The fuel valve 9 is exchangeable and is fixed in a needle shank 9' which is adjustably arranged in the double cross-piece 18 in which it can be fixed by means of a second counter nut 12'. Owing to the adjustability of the needle the nozzle for light running can be dispensed with, since the amount of fuel needed for light running can be closed by means of the needle.

According as the motor is regulated the throttle device 10 will be brought more or less near to the rib 4 whereby the air inlet is correspondingly throttled. For further regulation of the air supply the carburetor is equipped with slidable plates 13 (Fig. 2) which project into the suction space from both sides and which may be shifted inward or outward by means of the screws 14 and the nuts 14' or similar adjusting elements. The plates are hereby received by grooves provided in the throttle device 10. Due to this arrangement the outlet opening for the fuel will always lie at the narrowest point of the total suction path and as near as possible to the centre of the air current, so that the fuel vapor and the air are thoroughly mixed. In contrast to the known carburetors the slide plates 13 cause a sudden narrowing of the suction channel just at the fuel inlet opening whereby to the right and to the left strong eddies are created, so that the fuel and the air are thoroughly mixed.

The throttle device is reciprocated by means of a lever system consisting of two segmental bodies 15 and two links 16. The bodies 15 are pivoted at 17, and are by means of links 27 connected to the accelerator of the motor. The distance of the points 17 from the centre of the bodies 15 varies in accordance with the desired length of the stroke. When the said segmental bodies are actuated the movements of the same are by means of the links 16 transmitted to the double cross-piece 18 to which the piston rod and the needle shank are adjustably connected in such a manner, that the parts are independent of each other. The effect of this arrangement is that with the throttle device in closing position, i. e. when the suction force acting upon the throttle device has its highest value, the leverage has its lowest value which increases when the throttle device is lifted. The leverage of the mechanism from the beginning to the end of the movement of the accelerator can for instance be varied from 1:0 to 1:1.

At the place in which the air suction channel is closed by the throttle device the cross-sectional area of the channel has in the carburetor shown in the drawing the form of a rectangle which on both sides merges into areas of circular contours. The rectangular cross-section is of great importance for this carburetor, because during the upward stroke of the device 10 the amount of air flowing in will increase proportionally with the stroke. The needle 9 is rigidly connected to the throttle device and may therefore be of exact conical shape. If the cross-sectional area of the suction channel at this place were of curved shape the needle would have to be of arcuate shape in certain places and it would practically be impossible to give the needle such a form by grinding. The needle 9 is exchangeably fixed to the needle shaft and can be adjusted for light running by means of the nut 19.

The fuel chamber of the carburetor is closed by a removable cover 24, and the cylinder 29 is at its upper end closed by a cover 26.

The carburetor can also be adjusted by other means than those described.

The fuel output of the capillary body 5 may for instance first be set in accordance with the normal load by suitable compression of the capillary body. Thereupon the throttle device 10 is so set, that the motor at light running, i. e. at substantially closed throttle device, takes up the desired number of revolutions, whereby the regulating screw for the needle is adjusted correspondingly.

After the basic adjustment the lateral slide plates 13 may be shifted in such a manner that a most favorable fuel mixture is obtained. By a simple displacement of the plates 13 the carburetor may also be adjusted after the varying weather conditions and temperatures.

The novel carburetor can be used at all known internal combustion motors for the gasifying of petrols of any kind. It is particularly well suited for air craft motors because it will work in any inclined position and even when turned bottom up.

I claim:—

1. In a carburetor for internal combustion motors, in combination, a fuel chamber, an air-fuel conduit, communicating with said fuel chamber, means for regulating the flow of fuel into the air-fuel conduit, other means for regulating the flow of the air-fuel mixture through the said conduit, a compressible capillary body arranged in the fuel chamber and being adapted to cause the fuel to enter the said air-fuel conduit as vapor, a holder for the capillary body arranged between the fuel chamber and the air-fuel conduit, communication channels between the fuel chamber and the air-fuel conduit formed in the said holder, and still other means for compressing the said capillary body.

2. In a carburetor for internal combustion motors, in combination, a fuel chamber, an air-fuel conduit communicating with said fuel chamber, means for regulating the flow of fuel into the air-fuel conduit, other means for regulating the flow of the air-fuel mixture through the said con-

duit, a compressible capillary body arranged in the fuel chamber and being adapted to cause the fuel to enter the said air-fuel conduit as vapor, a holder for the capillary body arranged between the fuel chamber and the air-fuel conduit, communication channels between the fuel chamber and the air-fuel conduit formed in the said holder, a seat for the capillary body formed in the said holder, said seat being of a form so as to be able to contact with a relatively large part of the surface of the capillary body, and still other means for compressing the capillary body.

3. In a carburetor for internal combustion motors, in combination, a fuel chamber, an air-fuel conduit communicating with said fuel chamber, means for regulating the flow of fuel into the air-fuel conduit, other means for regulating the flow of the air-fuel mixture through the said conduit, a compressible capillary body arranged in the fuel chamber and being adapted to cause the fuel to enter the said air-fuel conduit as vapor, a holder for the capillary body arranged between the fuel chamber and the air-fuel conduit, communication channels between the fuel chamber and the air-fuel conduit formed in the said holder, a substantially conical projection on said holder projecting into the fuel chamber, a seat for the capillary body in the form of an annular groove arranged at the basis of said conical projection, and still other means for compressing the annular body.

4. In a carburetor for internal combustion motors, in combination, a fuel chamber, an air-fuel conduit communicating with said fuel chamber, means for regulating the flow of fuel into the air-fuel conduit, other means for regulating the flow of the air-fuel mixture through the said conduit, a compressible capillary body arranged in the fuel chamber and being adapted to cause the fuel to enter the said air-fuel conduit as vapor, a holder for the capillary body arranged between the fuel chamber and the air-fuel conduit, a seat for the capillary body formed in the said holder, a substantially conical projection on the holder projecting into the fuel chamber, a central axial bore in the holder and the projection, said central axial bore opening into the air-fuel conduit and being closed at the end located in the fuel chamber, branch bores between the fuel chamber and the said central axial bore formed in the said holder, said branch bores widening at the end facing the fuel chamber, and still other means for compressing the capillary body.

5. In a carburetor for internal combustion motors, in combinaiton, a fuel chamber, an air-fuel conduit communicating with said fuel chamber, means for regulating the flow of fuel into the air-fuel conduit, other means for regulating the flow of the air-fuel mixture through the said conduit, a compressible capillary body arranged in the fuel chamber and being adapted to cause the fuel to enter the said air-fuel conduit as vapor, a holder for the capillary body arranged between the fuel chamber and the air-fuel conduit, communication channels between the fuel chamber and the air fuel conduit formed in the said holder, a seat for the capillary body in the form of an annular groove in the surface of the holder facing the fuel chamber, a filter member adapted to increase the suction face of the capillary body, arranged in the said groove between the capillary body and its seat, and still further means for compressing the capillary body.

6. In a carburetor for internal combustion motors, in combination, a fuel chamber, an air-fuel conduit communicating with said fuel chamber, a compressible capillary body arranged in the fuel chamber, a holder for said capillary body arranged between the fuel chamber and the air-fuel conduit and being adapted to cause the fuel to enter the air-fuel conduit as vapor, a substantially conical projection on said holder projecting into the fuel chamber, a central axial bore in the holder and the projection, said central axial bore opening into the air-fuel channel and being closed at the end located in the fuel chamber, branch bores between the fuel chamber and the said central axial bore, a piston valve for controlling the flow through the air-fuel conduit comprising a cylinder, a piston and a hollow piston rod, an adjustable valve needle arranged within the hollow piston rod and being adapted to control the supply of fuel in cooperation with said central axial bore, and means for compressing said capillary body.

7. A carburetor according to claim 6, in which, for an additional control of the flow through the air-fuel conduit, plate-shaped members are slidably arranged in the cylinder and in which the piston is formed with slots adapted to receive said plate-shaped members.

8. A carburetor according to claim 6, in which the said holder is formed with a rib with bevelled ends projecting into the air-fuel conduit and lying in the length direction of the same, and in which the said valve piston is formed with a correspondingly shaped slot, adapted to cooperating with the rib in regulating the cross-sectional area of the air-fuel conduit.

9. A carburetor according to claim 6, in which the piston rod is adjustably carried by a cross-member, which on both sides by the intermediary of two intermediate levers are connected with two segmental double-levers, somewhat below the fulcrums of the latter, and in which said segmental double-levers by means of other levers are connected to the accelerator of the motor.

10. A carburetor according to claim 6, in which independent means are provided for adjusting the position of the piston and the position of the valve needle.

OTTO BRÖKEL.