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CARBURETOR

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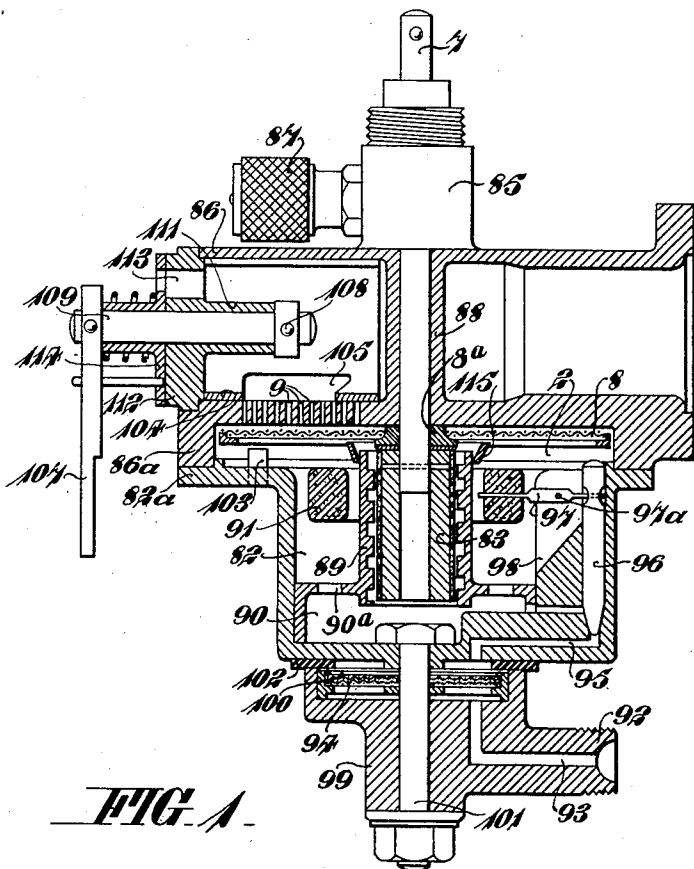


FIG. 1

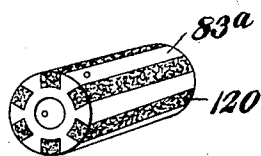


FIG. 3

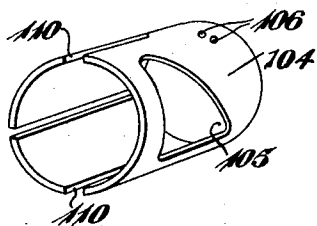


FIG. 2

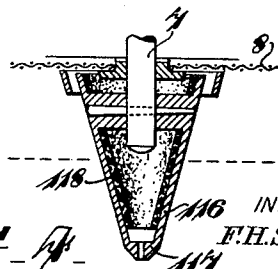


FIG. 4

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CARBURETOR

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This invention relates to carburetors such as are employed for producing an explosive mixture for use in an internal combustion engine.

An important object of the present invention is to provide a carburetor of simple construction and operation which will produce under all conditions of working a more thorough and effective vapourization or atomization of the fuel and secure a more complete mixing of the fuel and air than is possible with known or proposed carburetors.

A further object of the present invention is to provide a carburetor giving the maximum economy under all conditions of service but which is adaptable to produce a rich mixture when the engine is running at slow speeds in order that starting may be facilitated.

Further objects are attained by the novel arrangements and construction described below with reference to the accompanying drawing.

One feature consists of the provision of means whereby liquid fuel is supplied to a porous or perforated member independently of suction or vacuum effort.

In one method of attaining this end the fuel is fed to a rotary perforated disc by capillary or centrifugal action or by a combined centrifugal and capillary action, the arrangement being that at slow speeds the disc is fed in the main by capillary action and at high speeds mainly by centrifugal action.

In order more fully to understand the present invention reference is directed to the accompanying drawing illustrating a preferred form of the invention and wherein

Fig. 1 is a sectional view of a carburetor.

Fig. 2 is a perspective view of the fluid controlling valve.

Figs. 3 and 4 are detail views showing modified forms of petrol withdrawing elements.

In the drawing a gauze or like perforated disc 8 is located with its axis of rotation vertical, and the petrol or the like is fed to the disc from a float chamber 82 disposed beneath said disc, from which float chamber petrol is withdrawn by the combined centrifugal and frictional action of a member 83 operating therein and rotating in unison with the disc.

The driving spindle 7 for the disc 8 is rotatably borne within a suitable boss 85 forming an integral portion of or extending from the throttle chamber 86, a grease cup or equivalent means of lubrication 87 being provided on said boss 85. The spindle 7 is also rotatable within a sleeve 88 extending diametrically across the interior of the throttle chamber 86, and on the extremity of said spindle is fixed by pin or other means the petrol withdrawing member 83 which may comprise a metal sleeve covered exteriorly with felt or equivalent material which in one arrangement may be closely adhered to the sleeve by shellac or other substance insoluble in petrol, the longitudinal edges of the felt being pressed into a slot in the sleeve.

This member 83 fits closely within and is rotatable within an internally screw threaded sleeve 89 which latter has at its lower end an inverted dish-shaped portion 90 which rests upon the base of the float chamber 82. Perforations 90a are provided in the dish portion 90 through which petrol may flow into the float chamber above same and act upon the float 91.

92 is the petrol inlet connection, the petrol entering thereat flowing through passage 93 and removably mounted gauze or like filter elements 94 to a duct 95, the opening of which duct is controlled to the lower part of the float chamber by means of a vertically disposed needle valve 96 carried by a centrally pivoted lever element 97, said lever also carrying the float 91 which is preferably of annular formation encircling the internally screw-threaded sleeve 89. The pivot 97a for the float and valve lever 97 is removably carried within a slot 98 in a part of the float chamber wall extending laterally into the float chamber, said pivot comprising a tapered pin which is readily removable so as to permit quick insertion and removal of float and valve.

The petrol filter elements 94 may be installed within an annular cavity in a fitting 99 which embodies the petrol inlet connection 92 and duct 93, the gauze being advantageously retained in position by a split spring wire ring 100, and the fitting 99 being

fixed in position by a central bolt 101 or equivalent means, one or more suitable washers 102 being provided at the joint between the fitting 99 and the underside of the float chamber for preventing petrol leakage.

The annular chamber 2 for accommodating the disc 8 is in this arrangement formed between an upper horizontal flange 82a of the float chamber and a circular recessed portion 86a on the underside of the throttle chamber, one or more air inlet apertures 103 to the disc chamber 2 being formed through the flange 82a, and a series of lines of small perforations 9 being provided in the base of the throttle chamber immediately beneath the position adapted to be occupied by the throttle valve 104. This throttle valve advantageously comprises a split sleeve which is sprung into close engagement with the interior of the chamber 86, said sleeve valve having in the wall thereof a port 105 preferably of triangular formation, and also one or more small perforations 106 (see Figure 2) the purpose of which will be described hereinafter.

The rotation of the sleeve throttle 104 is effected from a throttle lever 107 through the medium of pins 108 projecting laterally from the throttle lever spindle 109 and co-acting with diametrically opposed slots 110 in the valve, said slots being open ended so as to permit of the ready removal of the valve operating means from the valve as and when required.

The valve spindle 109 is preferably accommodated within a sleeve 111 formed integrally with a cover plate 112 of the throttle chamber, said cover plate having therein one or more air inlet apertures 113 adapted to be opened and closed at will by the rotation of a suitable perforated disc 114 which rotates with the valve spindle.

In operation, when the engine to which the carburetor is fitted is started up, the throttle valve is rotated first to bring the small perforation or perforations 106 in said valve into register with the innermost perforation or perforations 9 in the valve chamber, that is to say, the perforation nearest the centre of rotation of the disc 8. While in this position petrol is withdrawn from the float chamber by capillary action up the felt or the like on the withdrawal member 83, such petrol being fed to the central portion of the disc 8 and spread evenly thereon by centrifugal action, an annular bevelled ring 115 on the underside of the disc ensuring the effective spreading of the petrol over the gauze. The suction effect produced by the engine causes air to enter at one or more openings 103 beneath the disc 8, such air bursting the petrol in said disc and mixing same to enter the throttle chamber through the uncovered perforations 9 and valve opening 106.

When the engine is running at higher speeds the rotating member 83 serves to drag round the part of the liquid in contact therewith so that it exerts a rotary motion and is thereby caused to move upwardly in the spiral grooves in the sleeve 89. In addition, on account of the rapid whirling motion of the column of liquid the same is forced by centrifugal action towards the base of the grooves, this assisting in holding the liquid therein. When the liquid reaches the top of the groove it is evenly spread over the rotating disc 8 and is drawn, mixed with air, into the throttle chamber, through the perforation or perforations 9 located farthest from the centre of the carburetor, this being effected by causing the small perforation or perforations 106 to pass out of register with perforations 109 and by gradually bringing the triangular port 105 into register with the perforations 9. The continued rotation of the throttle gradually uncovers in succession all of the perforations 9 from the outermost to the innermost. In this way it will be appreciated that the fuel is drawn first from the part nearest the centre when starting up then immediately afterwards drawn from the part farthest removed from the centre, the petrol film being thickest when operating at slow speeds and becoming thinner as the speed increases. Thus easy starting up is assured and high efficiency with petrol economy provided when the speed of the engine increases.

The internal thread on the member 89 is so designed as to ensure effective drawing up of the petrol along same by rotation of the internal member 83 frictionally operating within said member while restricting the withdrawal to predetermined limits when operating at high speeds.

From the above it will be seen that during the starting up the petrol is fed by capillary action while as the speed increases such feeding is effected by centrifugal force, thus positive control is effected irrespective of suction and at no time in the operation of the carburetor is there any excess of petrol feed. Additionally the petrol supplied is independent of any suction or vacuum forces.

The petrol supplied from the float chamber to the disc 8 may be controlled to a considerable extent by a disc 8a constituting the central boss of said disc 8 and revolving with same, said central disc 8a extending over the top of the internally threaded member 89 within which the rotating member 83 rotates. The central disc 8a may have associated therewith one or more washers of felt or equivalent material and the arrangement may be such that the member 89 may be adjusted towards or away from said central disc. It will thus be appreciated that if the upper edge of member 89 is in close proximity to disc 8a only a comparatively small quantity

of petrol can be fed to the perforated disc 8. Similarly, if one or more washers are associated with the central disc 8a and member 89 is caused to compress same, the passage of petrol is thereby restricted.

A baffle plate of any suitable material may be employed at the top of the float chamber for preventing undue supply of petrol to the disc 8 due to jolting or abnormal angular disposition of said float chamber. This baffle may comprise a perforated plate having felt or the like on either or both sides thereof.

Although the method of controlling the fuel inlets 9 just previously described has been found to be effective in operation, it is to be understood that such inlets may be controlled in any sequence. It is, however, important that when operating at comparatively slow speeds the outer openings 9, i. e. those farthest removed from the centre, are in operation so as to assure slow speed economy.

If desired, the rotating petrol withdrawal member may be constructed in the manner as shown at 83a in Figure 3 wherein the felt or other absorbent friction material is in the form of longitudinally extending strips 120 closely enclosed within parallelly disposed slots along the member 83a.

In a modified arrangement the petrol withdrawal member may be of hollow conical formation, as shown at 116 in Figure 4, said member having at its pointed end a plug or cap 117 with small central perforation through which the petrol is drawn. Normally the petrol is maintained within the member 116 at a suitable height, say approximately half-way up, and in starting up the engine such petrol is fed by capillary action to the disc by felt or other absorbent lining 118. As the speed of rotation increases the level of petrol in the member is gradually lowered by reason of the fact that the increased centrifugal force within the cone causes the petrol to be withdrawn faster than the small inlet in nozzle 117 will permit ingress of petrol. Thus by suitably determining the size of the inlet aperture the amount of liquid gaining access to the cone can at all times be caused to balance the amount withdrawn and excess of petrol feed is effectively prevented. By experiment it has been found that an effective angle of taper of the cone member is approximately 30°. When employing a conical withdrawal member such as last previously described any suitable means are provided for preventing upward drawing or feeding of petrol on the exterior of the member.

If desired a cap with small central aperture may be provided at the lower extremity of withdrawal member 83 such as shown in Figures 1 and 3 for governing the amount of petrol fed to the internal screw 89.

It is understood that the series of perfora-

tions 9 in Figure 1 may be replaced by a narrow elongated slot.

The perforations may, instead of being arranged in a straight line, be composed of a plurality of lines or rows of perforations, the perforations of each row being disposed relatively to each other and to the port in the rotating throttle member so that after opening the first perforation each succeeding perforation commences to open before the next preceding perforation is fully opened. A more uniform supply of burst filaments during the uncovering of said perforations is thus ensured.

Instead of producing the petrol film upon or in a disc or the like as before described, same may be formed in a restricted space between said disc and an adjacent surface.

I claim:—

1. In a carburetor, a rotary disc incorporating perforated material, an air inlet through which air is drawn to penetrate the film on said disc, fuel mixture withdrawal apertures connecting with a mixing chamber, a displaceable throttle valve interiorly of said mixing chamber for controlling the amount of fuel withdrawn from said disc and means for feeding liquid fuel to said disc by capillary and by centrifugal action.

2. In a carburetor, a rotary disc incorporating perforated material, capillary and centrifugally acting means for supplying liquid fuel to said disc, an air inlet through which air passes to penetrate the film on the disc, a series of withdrawal apertures through which fuel mixture may be drawn from said disc and a displaceable throttle valve for progressively opening said series of apertures.

3. In a carburetor, a rotary disc incorporating perforated material, means for supplying liquid fuel thereto independently of suction or vacuum effort, means whereby the amount of petrol passed to said disc is controlled by the adjustment of the fuel supplying means relatively to said disc and means for withdrawing fuel mixture from said disc.

4. In a carburetor, a rotary disc incorporating perforated material, means for feeding liquid fuel to said disc near the axis of rotation to produce a film of fuel on the disc, a petrol withdrawing member operating by centrifugal and by capillary action, means whereby the adjustment of said petrol withdrawing means relatively to the rotary disc controls the amount of petrol supplied to said disc, inlet means through which air may pass to penetrate the film on the disc and a series of apertures through which the mixture generated may be drawn from such disc.

5. In a carburetor, a rotary disc incorporating perforated material, means for feeding liquid fuel thereto near the axis of rotation to produce a film of fuel on the disc,

petrol withdrawing means functioning by centrifugal and by capillary action to feed fuel to such disc, means whereby the adjustment of said petrol withdrawing member relatively to said disc controls the amount of fuel supplied thereto, an air inlet aperture through which air may pass to burst or penetrate the film on the disc, a series of fuel mixture withdrawal apertures opening into a mixing chamber, a displaceable throttle valve interiorly of said mixing chamber adapted progressively to uncover said series of apertures and additional air apertures to said mixing chamber controlled in unison with said throttle valve.

6. In a carburetor, a rotary disc incorporating perforated material, a liquid fuel chamber, an internally grooved member, a member rotatable in unison with the disc and arranged interiorly of said internally grooved member whereby liquid is raised up said grooved member, means whereby such liquid is distributed over said rotary disc and means for withdrawing fuel mixture from said disc.

7. In a carburetor, a rotary disc incorporating perforated material arranged on a vertical axis, a liquid fuel chamber, an internally grooved member dipping into said fuel chamber, an element carried on the under side of said disc and coacting with said grooved member whereby liquid may be raised from said fuel chamber and distributed over the rotary disc, means for adjusting said withdrawal element relatively to the rotary disc for regulating the amount of fuel supplied to said disc, air inlet apertures, fuel mixture withdrawal apertures and means for progressively opening said withdrawal apertures.

8. In a carburetor, a disc rotatable on a vertical axis and incorporating perforated material, a liquid fuel chamber, an internally grooved sleeve dipping into said fuel chamber, a felt covered withdrawal element carried on the under face of said disc and rotatable interiorly of said grooved sleeve whereby fuel may be fed by capillary action to the disc at low speeds and by centrifugal action at high speeds, means whereby the adjustment of said felt covered element relatively to said rotary disc regulates the amount of fuel supplied to such disc and means for withdrawing fuel mixture from said disc.

9. In a carburetor, a disc rotatable on a vertical axis and incorporating perforated material, a liquid fuel chamber, an internally grooved sleeve dipping into said fuel chamber, a felt covered withdrawal element carried on the under face of said disc and rotatable interiorly of said grooved sleeve whereby fuel may be fed by capillary action to the disc at low speeds and by centrifugal action at high speeds, a petrol filter element below said fuel chamber, means for supplying petrol

thereto, float control means for controlling admission of petrol to said fuel chamber and maintaining a constant level therein, a series of fuel withdrawal apertures for the mixture generated by the disc and means for progressively opening said series of apertures.

10. In a carburetor, a disc rotatable on a vertical axis and incorporating perforated material, a liquid fuel chamber, an internally grooved sleeve dipping into said fuel chamber, a withdrawal element incorporating inset absorbent strips and rotatable interiorly of said sleeve whereby fuel may be fed by capillary action to the disc at low speeds and by centrifugal action at high speeds, means whereby the adjustment of said withdrawal element relatively to said rotary disc regulates the amount of fuel supplied to the disc and means for withdrawing fuel mixture from the disc.

11. In a carburetor, a disc rotatable on a vertical axis, a coned withdrawal member on the underside of said disc, an aperture at the depending pointed end of said withdrawal member, absorbent material interiorly of said coned member, a fuel supply chamber in to which said withdrawal member dips, means whereby the liquid fuel raised by said absorbent material at low speeds may be distributed over the rotary disc, means whereby at higher speeds the liquid may be raised by centrifugal action, means for admitting air to penetrate the film on the disc and means for removing fuel mixture therefrom.

12. In a carburetor, a disc incorporating perforated material, means for rotating said disc on a vertical axis, a fuel supply chamber below said disc, a liquid withdrawal member mounted below said disc and rotating therewith, capillary means for feeding fuel from said fuel supply chamber to near the centre of the rotary disc from whence the fuel is spread over said disc as a film, centrifugally operating means serving also to raise fuel from said chamber to said rotary disc and means for drawing air through the film on said disc to produce a vaporized mixture.

13. In a carburetor, a disc incorporating perforated material, means for rotating said disc on a vertical axis, a fuel supply chamber below said disc, capillary means functioning at lower speeds to feed fuel from said fuel chamber to near the centre of rotation of said disc, means operating at higher engine speeds to raise liquid by centrifugal action from said fuel supply chamber to near the centre of said rotating disc and means for drawing a stream of air through the film of liquid produced on said disc.

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