(54) Title: CARBURETTOR WITH MAGNETICALLY CONTROLLED FUEL-METERING DEVICE

(57) Abstract

In a carburettor the amount of fuel leaving the float chamber (2) en route to an internal combustion engine is adjusted by a sleeve (17) having one or more apertures (18) through which the fuel leaves the chamber and enters a jet supplying the engine intake manifold (8). A permanent magnet (11) coupled to the sleeve is movable to vary the area of the apertures through which the fuel can pass by an electromagnet (19) energised from a remote control circuit.
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CARBURATOR WITH MAGNETICALLY CONTROLLED FUEL-METERING DEVICE

TECHNICAL FIELD OF THE INVENTION

This invention relates to a carburettor such as those used for controlling the supply of a liquid fuel to an internal combustion engine and has an important application to a carburettor for controlling the supply of petrol to a petrol engine.

With the ever-increasing cost of petrol, diesel oil and other oil-based fuels, it is of paramount importance to every vehicle user to be able to reduce the fuel consumption of his vehicle as much as possible. Although savings can be made by paying attention to associated matters such as tyre pressures, lubrication and brake adjustment, all of which can affect fuel consumption to some extent, very little can be done by the average motorist to provide adjustment of the carburettor, on which fuel consumption primarily depends.

BACKGROUND ART

Carburettors as proposed hitherto comprise a jet or jets arranged to discharge a volatile fuel into an air stream under a pressure difference created by the velocity of the air as it flows through a nozzle-shaped constriction. The fuel is usually supplied to the jet or jets from a float chamber in which the float is arranged to control the amount of liquid fuel in the chamber by means of a needle valve which is opened and closed in response to the position of the float in the chamber. Such known carburettors are disadvantageous in that there is no external arrangement for adjusting the size of the jet or jets or for adjusting the position of the float to compensate for wear of the needle valve or other defect in the float chamber.
Consequently, to make an adjustment of the relevant parts requires removal and/or replacement of those parts and at least part of the carburettor has to be removed from the engine and dismantled. Moreover, in order to check any adjustment that is made, it is necessary to re-assemble the carburettor in the engine and then carry out a road test of the vehicle to ascertain the effect on fuel consumption. This can be a tedious time-consuming and expensive procedure.

An object of the invention is to provide a carburettor which assists in alleviating this disadvantage.

DISCLOSURE OF THE INVENTION

According to the present invention, a carburettor for supplying fuel to an internal combustion engine comprises a chamber in which a supply of liquid fuel is accommodated, at least one magnetic member arranged to adjust the amount of fuel leaving the chamber en route to the internal combustion engine, and a magnetic arrangement disposed externally of the chamber for providing a magnetic field which can influence the magnetic member and thereby control the amount of fuel leaving the chamber.

The above defined carburettor has the advantage that the amount of fuel leaving the chamber can be controlled from outside the chamber and also from a position remote from the chamber.

The magnetic member may be a permanent magnet coupled to a device for adjusting the egress of fuel from the chamber.

In one embodiment of the invention the egress of fuel from the chamber is adjusted by a flap to which the magnetic member is coupled and which is movable relative to an aperture through which the fuel leaves the chamber.
In another embodiment of the invention the egress of fuel from the chamber is adjusted by a sleeve to which the magnetic member is coupled, the sleeve having one or more apertures through which the fuel leaves the chamber and being movable to vary the area of the aperture(s) through which the fuel can pass.

In a further embodiment of the invention the egress of fuel from the chamber is adjusted by a needle valve to which the magnetic member is coupled and which is operable to allow the fuel to leave the chamber.

The amount of fuel leaving the chamber may also be adjusted indirectly by a float within the chamber arranged to operate a valve controlling the supply of fuel to the chamber in dependence of the position of the float in the chamber, and the magnetic member is a permanent magnet coupled to the float and influenced by the magnetic arrangement thereby to adjust the float independently of the level of fuel in the chamber.

Conveniently, the magnetic member may be attached to a lower portion of the float.

The magnetic arrangement may be an electromagnet arranged to produce a magnetic field movable relative to an outer surface of the chamber.

The electromagnet may have a plurality of energising windings selectively energisable to produce movement of the magnetic field or may have two energising windings arranged to be energised differentially to produce movement of the magnetic field.

The magnetic arrangement may also be a permanent magnet movable relative to an outer surface of the chamber.
In some embodiments of the invention the magnetic member is mounted in a tube communicating with the chamber and the magnetic arrangement surrounds a portion of the tube. An end of the tube remote from the chamber may extend upwards alongside the chamber and be provided with a transparent portion for visually monitoring the level of the fuel in the chamber.

The carburettor may be used in conjunction with an electrical control circuit arranged to operate the magnetic arrangement in a manner such that the magnetic member is moved to at least three different positions. The control circuit may be operable from a position remote from the chamber and may include a microprocessor.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS
Figure 1 is a sectional side elevation of a fixed jet carburettor in accordance with the invention connected to a control circuit;

Figure 2 is a sectional side elevation of a variable choke type carburettor in accordance with the invention connected to a control circuit;

Figure 3 is a sectional side elevation of another variable choke type carburettor in accordance with the invention connected to a control circuit;

Figure 4 is a sectional side elevation of a further variable choke type carburettor in accordance with the invention connected to a control circuit;

Figure 5 is a schematic circuit diagram of an electrical
control circuit similar to the ones shown in Figures 1 to 4 coupled to the accelerator pedal of a vehicle;

Figure 6 is a schematic circuit diagram of another electrical control circuit for the carburettors shown in Figures 1 to 4;

Figure 7 is a sectional side elevation of another fixed jet carburettor in accordance with the invention;

Figure 8 is a schematic circuit diagram of an electrical control circuit for the carburettor shown in Figure 7; and

Figure 9 is a sectional side elevation of a further fixed jet carburettor in accordance with the invention connected to a control circuit.

BEST MODES FOR CARRYING OUT THE INVENTION

Referring in the first instance to Figure 1, the carburettor 1, which is arranged for supplying a petrol/air mixture to an internal combustion engine, has a float chamber 2 to which petrol 3 is admitted through a needle valve 4. A hollow float 5, accommodated within the float chamber 2, is secured to a pivotally mounted arm 6 so that the float 5 can move up and down in the float chamber 2 to close and open the needle valve 4 and thus control the amount of petrol 3 admitted to the float chamber 2. A fixed jet 7, which communicates with an engine intake manifold 8, is arranged to supply petrol vapour to an air stream flowing in the direction indicated by an arrow 9 to the engine under the control of a throttle 10 in the manifold 8.

In accordance with the invention a tubular magnetic member 11 supported on a plastic tube 12 is mounted within one limb 13 of a U-shaped copper tube 14 which is sealed
through an aperture in the lower surface 16 of the chamber 2. The magnetic member 11, which may be a permanent magnet or of a magnetic material such as soft iron, is coupled by the plastic tube 12 to a closed ended sleeve 17 which forms a sliding fit over the lower end of the jet 7. The sleeve 17 is provided with a plurality of apertures 18 through which the petrol in the chamber 2 can pass into the jet 7. Reciprocal movement of the sleeve 17 is arranged to occlude or expose more or less of the areas of the apertures so that the amount of petrol passing from the chamber 2 to the jet 7 is increased or decreased according to the position of the sleeve 17.

An electromagnet 19 having two energising windings 20 and 21 mounted on a common yoke 22 is arranged to provide a magnetic field which can influence the magnetic member 11 and thereby change the position of the sleeve 17 to control the amount of petrol leaving the chamber 2. The two windings 20 and 21 are energised differentially from a source of electrical potential 23 by way of a potentiometer 24. A centre-zero voltmeter 25 connected across the potentiometer 24 monitors the voltages across the windings 20 and 21 and thereby provides an indication of the position of the member 11 in the tube 14 and consequently provides an indication of the position of the sleeve 17 which adjusts the egress of the petrol 3 from the chamber 2. A transparent tube 27 attached to the end of the tube 14 remote from the chamber 2 extends upwards alongside the chamber 2 and provides a visual indication of the level of the petrol 3 in the chamber 2.

In operation of the carburettor 1 shown in Figure 1 a switch 28 is closed and the moving arm 29 of the potentiometer 24 is varied to adjust the current flowing in the energising windings 20 and 21 and thereby control the position of the member 11 in the tube 14. In this way
the area of the apertures 18 through which the petrol 3 can pass from the chamber 2 into the jet 7 is adjusted, thus controlling the amount of petrol vapour supplied to the engine intake manifold 8. As shown in Figure 5 the moving arm 29 of the potentiometer 24 is coupled to the accelerator pedal 30 of the vehicle being driven by way of a linkage 31 and a rotatable member 32 so that the petrol passing through the apertures 18 and into the jet 7 will increase automatically when the accelerator pedal 30 is depressed. The sizes and positions of the apertures 18 are arranged so that when the accelerator pedal is not depressed and the engine of the vehicle is "ticking over" the amount of petrol passing to the jet is such as to provide maximum petrol economy.

Referring now to Figure 2, the variable choke type carburettor 1 has a jet tube 40 through which petrol from the float chamber 2 is supplied to the engine intake manifold 8. The amount of petrol 3 leaving the chamber 2 through the jet tube 40 is adjusted by a pivotably mounted flap 41 which is coupled to the magnetic member 11 by a domed bush 42 secured to the upper end of a plastic tube 12 on which the magnetic member 11 is supported. Reciprocal movement of the bush 42 is arranged to cause the flap 41 to pivot so that it allows more or less petrol 3 to enter the jet tube 40 depending on the position of the magnet 11 in the copper tube 14.

As before an electromagnet 19 having two energising windings 20 and 21 mounted on a common yoke 22 is arranged to provide a magnetic field which can influence the magnetic member 11 and thereby change the position of the bush 42 to control the amount of petrol 3 leaving the chamber 2. The two windings 20 and 21 are energised differentially from a source of potential 23 by way of a potentiometer 24 and a switch 28. A centre-zero voltmeter
25 connected across the potentiometer 24 provides a visual indication of the position of the member 11 and consequently provides an indication of the position of the flap 41 which adjusts the egress of the petrol 3 from the chamber 2.

Turning next to Figure 3, the variable choke type carburettor 1 also has a jet tube 50 through which petrol 3 from the float chamber 2 is supplied to the engine intake manifold 8. The amount of petrol 3 leaving the chamber 2 through the jet tube 50 is adjusted by moving the jet tube 50 up and down relative to a needle 51 extending through the jet tube 50. The jet tube 50 is coupled to the upper end of a plastic tube 12 on which the magnetic member 11 is supported within the copper tube 14.

Again an electromagnet 19 having two energising windings 20 and 21 mounted on a common yoke 22 is arranged to provide a magnetic field which can influence the magnetic member 11 and thereby change the position of the jet tube 50 to control the amount of petrol 3 leaving the chamber 2. The two windings 20 and 21 are energised differentially from a source of potential 23 by way of a potentiometer 24 and a switch 28. Again, a visual indication of the position of the member 11 and consequently of the position of the jet tube 50 which adjusts the egress of the petrol 3 from the chamber 2 is provided by a centre-zero voltmete 25 connected across the potentiometer 24.

Referring now to Figure 4, the variable choke type carburettor 1 has a jet tube 60 through which petrol 3 from the float chamber 2 is supplied to the engine intake manifold 8, the normal plunger mechanism for changing the position of the needle 61 by the reduction of pressure produced by the engine having been removed. The amount of petrol 3 leaving the chamber 3 through the jet tube 50 is adjusted by moving the needle 61 up and down relative to the jet tube 60. To this end the needle 61 is coupled
to the upper end of a plastic tube 12 on which the magnetic member 11 is supported within the copper tube 14.

Once again an electromagnet 19 having two energising windings 20 and 21 mounted on a common yoke 22 is arranged to provide a magnetic field which can influence the magnetic member 11 and thereby change the position of the needle 61 to control the amount of petrol leaving the chamber 2. The two windings are energised differentially from a source of potential 23 by way of a potentiometer 24 and a switch 28. A centre-zero voltmeter 25 connected across the potentiometer 24 provides a visual indication of the position of the needle 61 which adjusts the egress of petrol 3 from the chamber 2.

Instead of the control circuits shown in Figures 1 to 4 and Figure 5, the carburettor 1 may be provided with a control circuit of the kind shown in Figure 6, in which the electrical potentials applied to the two energising windings 20 and 21 by way of terminals 70, 71, 72 and 73 are changed to discrete steps by cam-operated switching contacts 74, 75, 76 and 77 coupled to the accelerator pedal 30 by a rotatable member on which the cams 78, 79, 80 and 81 are mounted. A linkage 31 is arranged to rotate the rotatable member 32 when the accelerator pedal 30 is depressed.

The switching contacts 74, 75, 76 and 77 comprise sets of change-over contacts arranged to modify the circuit connections between the terminals 70 to 73 and a plurality of potentiometers 82, 83, 84, 85 and 86. A pair of diodes 87 and 88 associated with each of the potentiometers 82 to 86 are arranged to prevent interaction between the potentiometers. Each of the potentiometers 82 to 86 also has associated therewith a lamp 89 arranged to provide a
visual indication that the potentiometer has been rendered operative by the switching contacts 74 to 77.

The control circuit also includes a potentiometer 91 which can be used for "normal" driving and a potentiometer 92 which can be used for "cold" starting. A pair of diodes 93 and 94 associated with each of the potentiometers 91 and 92 are arranged to prevent interaction between them while associated lamps 95 and 96 are arranged to provide a visual indication that the potentiometer is operative.

A thermostat fitted to the engine is arranged to select the cold start potentiometer 92 by way of contact 97 and a diode 98 when the engine is cold and to select the normal operation potentiometer 91 or the automatic operation potentiometers 82 to 86 by way of contact 100 when the engine is hot depending on the position of change-over contacts 99.

The potentiometer 82 is arranged to provide a "tick-over" setting when the engine is idling, the potentiometer 83 provides a setting when the vehicle is travelling between 10 and 50 mph, the potentiometer 84 provides a setting when the vehicle is travelling between 30 and 50 mph, the potentiometer 85 provides a setting when the vehicle is travelling between 50 and 70 mph and the potentiometer 86 provides a setting when the vehicle is travelling in excess of 70 mph. The potentiometers 82 to 86 are brought into operation in sequence by the cams 78 to 81 which actuate the switching contacts 74 to 77 in sequence as the accelerator pedal 30 is depressed. The lamps 89 will be illuminated in turn as the depression of the accelerator pedal changes from tick-over to maximum speed.

Turning now to Figure 7, a fixed jet carburettor 1, which is arranged for supplying a petrol/air mixture to an internal combustion engine, has a float chamber 2 to which
petrol 3 is admitted through a needle valve 4. A hollow float 5, accommodated within the float chamber 2, is secured to a pivotally mounted arm 6 so that the float 5 can move up and down in the float chamber 2 to close and open the needle valve 4 and thus control the amount of petrol 3 admitted to the float chamber 2. A fixed jet 7, which communicates with an engine intake manifold 8, is arranged to supply petrol vapour to an air stream flowing in the direction indicated by an arrow 9 to the engine under the control of a throttle 10 in the manifold 8.

In accordance with the invention a magnetic member 11 is coupled to the bottom of the float 5 and is arranged to be influenced by the magnetic field (not shown) of a co-operating permanent magnet 15 mounted close to the outer surface 101 of the float chamber 2. The permanent magnet 15 is arranged to be moved up and down the outer surface 101 of the float chamber 2, as indicated by the double-headed arrow 102, by a control mechanism 103. When the permanent magnet 15 is moved in this manner its magnetic field repels the magnetic member 11 and thus adjusts the position of the float 5 independently of the level of the petrol 3 in the float chamber 2.

The control mechanism 103 for moving the permanent magnet 15 may be arranged to provide a continuous movement or may be arranged to provide movement in a series of relatively small discrete steps. Thus the control mechanism 103 may comprise a vernier or screw-threaded device, or may take the form of a rotatable cam follower formed by, or attached to, the permanent magnet 15. The control mechanism 103 may be operated from the driving seat of the vehicle, while the vehicle is being driven, by means of a remote control arrangement such as a Bowden cable 104 and operating lever 105.
In use of the carburettor 1 shown in Figure 7 the permanent magnet 15 can be moved up or down the outer surface 101 of the float chamber 2 to give the most economical petrol consumption for any particular driving condition. In this regard it will be appreciated that the proportions of the petrol/air mixture passing along the manifold 8 are affected by the level of the fuel in the float chamber 2, i.e., the petrol/air mixture will be "rich" when the level is high and "weak" when the level is low. The position of the float 5 in the float chamber 2 can readily be adjusted to compensate for wear of the needle valve 4 without dismantling the carburettor 1.

Turning now to Figure 8, the control system comprises a rotatable cam 108 arranged to co-operate with the permanent magnet 15 which acts as a cam follower and is moved up and down the outer surface 101 of the float chamber 2 as indicated by the double-headed arrow 102. The cam 108 is rotated by a three-bank, twelve position, uniselector 109 arranged to act as a stepping motor which drives the cam 108 through a three-to-one step-up gear train 110 and a flexible drive 111. Thus the 120 degree angular rotation of the uniselector 109 is converted to a 360 degree rotation of the cam 108 by the gear train 110. Each step of the uniselector 109 produces a 10 degree angular rotation of a shaft 112 so that the cam 108 steps in increments of 30 degrees in one direction only. The amount of movement of the permanent magnet 15 produced by each 30 degree increment of angular movement of the cam 108 is dependent on the diameter and profile of the cam 108.

The uniselector 109 is stepped sequentially by a solenoid 113 which is energised from a battery 114 of the vehicle, by way of the ignition switch 115, interrupter contacts 116 and switches 117, 118, 119, 120, 121 and 122. These latter switches are interconnected in pairs, switch 117 being
connected to switch 120, switch 118 being connected to switch 121 and switch 119 being connected to switch 122. Switches 117, 118 and 119 are single pole, twelve position rotary switches which are ganged together and embodied in the uniselector 109. Switches 120, 121 and 122 are single pole, twelve position rotary switches each having a rotating open circuit position with all the remaining eleven switch positions short circuited. The three switches 120, 121 and 122 are located at a convenient position for operation by the driver of the vehicle and are each arranged to control a "homing" position of the uniselector 109, i.e. the uniselector 109 continues to step until the open circuit position of one of the switches 120, 121 or 122 is reached. When one of the homing positions is reached the circuit between the solenoid 113 and the battery 114 is broken by the open circuit position of the relevant switch 120, 121 or 122 and the uniselector 109 stops and remains stationary.

The three homing positions of the uniselector 109 are used to control the setting of the permanent magnet 15 to three different operating positions and hence set the position of the float 5 and thus vary the air/petrol mixture to suit three different running conditions of the engine. For example, the open circuit position on switch 120 stops the uniselector 109 at a position at which the needle valve 4 is open to maintain a relatively high level of petrol in the chamber 2. This position is known as "choke" control and can be used for cold starting. The open circuit position on switch 121 stops the uniselector 109 at a position at which the needle valve 4 is at an intermediate position such as to maintain the level of petrol in the chamber at an intermediate position. This position is known as normal control and is suitable for normal driving. The open circuit position on switch 122 stops the uniselector 109 at a position at which the needle valve 4 is nearly closed and maintains the petrol in the chamber 2 at a relatively low level. This position is known as the economy
control and gives an extremely economical petrol consumption in favourable road conditions.

To set up the carburettor 1 to these three conditions the positions of the permanent magnet 15 is adjusted to until the best petrol/air mixtures are found for the three conditions, preferably by road tests. Adjustments are made by changing the open circuit positions on the switches 120, 121 and 122. Once the optimum positions have been found further adjustment should not be necessary. However, the switch 120, 121 and 122 enables changes to be made to suit changing conditions, such as change in altitude, change in grade of petrol, change in a load carried by the vehicle or wear of the needle valve 4.

A thermostat 123 fitted to the engine is arranged to select the choke control circuit by way of contact 124 and diode 125 when the engine is cold and to select either the normal control circuit or the economy control circuit when the engine is hot depending on the position of change-over contacts 126. A hold-in relay 127, which is energised by way of contacts 128 when the accelerator pedal 129 of the vehicle is depressed to its fullest extent, operates contacts 130 if the driver is operating in the economy control condition and needs greater acceleration in an emergency. A reset button 131 is arranged to restore the economy control conditions when the emergency has passed by open circuiting the energising circuit of the relay 127.

The control circuit also includes indicator lamps 132, 133, 134, 135 and 136 and a further manually operated change-over switch 137 which supplements existing circuits as a safety measure. The switch 137 has a contact 138 which enables the normal or economy controls to be selected depending on the position of change-over contacts 126. The contact 139 enables the automatic choke control circuit to
be selected and the contact 140 enables the manual choke control to be selected by way of diode 141. The lamp 132 indicates that the normal control is operating, the lamp 133 indicates that the economy control is operating and the lamp 134 indicates that the normal control is operating with the accelerator pedal 129 override. Lamp 135 indicates that the normal choke control is operating and lamp 136 indicates that the automatic choke control is operating.

Although in the embodiment of the invention described with reference to Figures 7 and 8 two permanent magnets 11 and 15 are arranged to repel one another to adjust the position of the float 5, in other embodiments of the invention the permanent magnet 15 could be arranged to attract a suitably positioned permanent magnet or a magnetic member which is not a permanent magnet. Moreover, in other embodiments of the invention in which the amount of fuel leaving the chamber 2 is adjusted indirectly by the float 5 the permanent magnet 15 could be replaced by an electromagnet arranged to produce a magnetic field which is movable relative to the outer surface of the chamber 2.

For example, as shown in Figure 9, such an electromagnet 19 may have two energising windings 20 and 21 mounted on a common yoke 22 and arranged to provide a magnetic field which can influence a magnetic member 11 and thereby change the position of the float 5 to control the amount of petrol leaving the chamber 2. The magnetic member 11 is supported on a plastic tube 12 mounted within one limb 13 of a U-shaped copper tube 14 which is sealed through an aperture in the lower surface 16 of the chamber 2. The magnetic member 11 is coupled by the plastic tube 12 to the lower end of the float 5.
The two windings 20 and 21 are energised differentially from a source of electrical potential 23 by way of a potential 24. A centre-zero voltmeter 25 connected across the potentiometer 24 monitors the voltages across the windings 20 and 21 and thereby provides an indication of the position of the member 11 in the tube 14 and consequently provides an indication of the position of the float 5 which indirectly adjust the egress of the petrol 3 from the chamber 2. A transparent tube 27 attached to the end of the tube 14 remote from the chamber 2 extends upwards alongside the chamber 2 and provides a visual indication of the level of the petrol 3 in the chamber 2.

While the invention has been described with reference to carburettors of petrol driven engines, it will be appreciated that the invention could equally well be applied to carburettors for internal combustion engines driven by diesel oil or other oil-based fuel. Moreover, in any or all of the control circuits described above, temperature responsive elements may be utilized to compensate for temperature changes which occur when the engine to which fuel is being supplied "warms up" during use. Finally, in the embodiments of the invention described with reference to Figures 1 to 4 and Figures 9 of the drawings an a.c. current may be superimposed on the energising current supplied to the windings of the electromagnetic 10 to prevent the magnetic member 11 sticking in the tube 14. An additional energising winding may be wound on the electromagnetic 19 and arranged to produce from a back EMF created when sudden deceleration occurs, a series aiding potential on the "lean" winding of the electromagnet. This would assist in weakening the air/fuel mixture for a short period during deceleration and would assist in satisfying the stringent emission control regulations now being imposed in some countries.
CLAIMS

1. A carburettor for supplying fuel to an internal combustion engine comprises a chamber in which a supply of liquid fuel is accommodated, characterised by at least one magnetic member (11) arranged to adjust the amount of fuel leaving the chamber en route to the internal combustion engine, and a magnetic arrangement (19) or (102) disposed externally of the chamber (2) for providing a magnetic field which can influence the magnetic member (11) and thereby control the amount of fuel leaving the chamber (2).

2. A carburettor as claimed in Claim 1, characterised in that the magnetic member (11) is a permanent magnet coupled to a device for adjusting the egress of fuel from the chamber (2).

3. A carburettor as claimed in Claim 2, characterised in that the egress of fuel is adjusted by a flap (41) to which the magnetic member (11) is coupled and which is movable relative to an aperture (40) through which the fuel leaves the chamber (2).

4. A carburettor as claimed in Claim 2, characterised in that the egress of fuel is adjusted by a sleeve (17) to which the magnetic member (11) is coupled, the sleeve having one or more apertures (18) through which the fuel leaves the chamber and being movable to vary the area of the aperture(s) through which the fuel can pass.
5. A carburettor as claimed in Claim 2, characterised in that the egress of fuel is adjusted by a needle valve (61) to which the magnetic member (11) is coupled and which is operable to allow the fuel to leave the chamber.

6. A carburettor as claimed in Claim 1 or Claim 2, characterised in the amount of fuel leaving the chamber (2) is adjusted indirectly by a float (5) within the chamber arranged to operate a valve (4) controlling the supply of fuel to the chamber (2) in dependence of the position of the float in the chamber, and the magnetic member (11) is a permanent magnet coupled to the float and influenced by the magnetic arrangement (19 or 102) thereby to adjust the float independently of the level of fuel in the chamber (2).

7. A carburettor as claimed in Claim 6, characterised in that the magnetic member (11) is attached to a lower portion of the float (5).

8. A carburettor as claimed in any preceding claim, characterised in that the magnetic arrangement (19) is an electromagnet arranged to produce a magnetic field movable relative to an outer surface (16) of the chamber.

9. A carburettor as claimed in Claim 8, characterised in that the electromagnet has a plurality of energising windings selectively energisable to produce movement of the magnetic field.

10. A carburettor as claimed in Claim 8, characterised in that the electromagnet has two energising windings
arranged to be energised differentially to produce movement of the magnetic field.

11. A carburettor as claimed in any one of Claims 1 to 7, characterised in that the magnetic arrangement (15) is a permanent magnet movable relative to an outer surface (101) of the chamber (2).

12. A carburettor as claimed in any preceding claim, characterised in that the magnetic member is mounted in a tube communicating with the chamber and the magnetic arrangement (19) surrounds a portion of the tube (14).

13. A carburettor as claimed in Claim 12, characterised in that an end of the tube remote from the chamber extends upwards alongside the chamber and is provided with a transparent portion for visually monitoring the level of the fuel in the chamber.

14. A carburettor as claimed in any preceding claim, characterised by an electrical control circuit arranged to operate the magnetic arrangement (19) in a manner such that the magnetic member is moved to at least three different positions.

15. A carburettor as claimed in Claim 14, characterised in that the control circuit is operable from a position remote from the chamber (2).
16. A carburettor as claimed in Claim 14 or Claim 15, characterised in that the control circuit includes a microprocessor.

17. A carburettor constructed and arranged to operate substantially as hereinbefore described with reference to Figures 1 to 4, or Figure 9 of the accompanying drawings.

18. A carburettor as claimed in Claim 17, provided with a control circuit substantially as hereinbefore described with reference to Figure 5 or Figure 6 of the accompanying drawings.

19. A carburettor constructed and arranged to operate substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

20. A carburettor as claimed in Claim 19, provided with a control circuit substantially as hereinbefore described with reference to Figure 8 of the accompanying drawings.
**INTERNATIONAL SEARCH REPORT**

International Application No PCT/GB 80/00105

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) 3

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl. 3: F 02 M 7/18, F 02 M 5/06

II. FIELDS SEARCHED

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IV. CERTIFICATION

Date of the Actual Completion of the International Search 3

September 8, 1980

Date of Mailing of this International Search Report

September 15, 1980

International Searching Authority 1

European Patent Office

Signature of Authorized Officer 10

G.L.M. KRYDENBERG

Form PCT/ISA/210 (second sheet) (October 1977)
### III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

<table>
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<tr>
<th>Category</th>
<th>Citation of Document, with indication, where appropriate, of the relevant passages</th>
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