

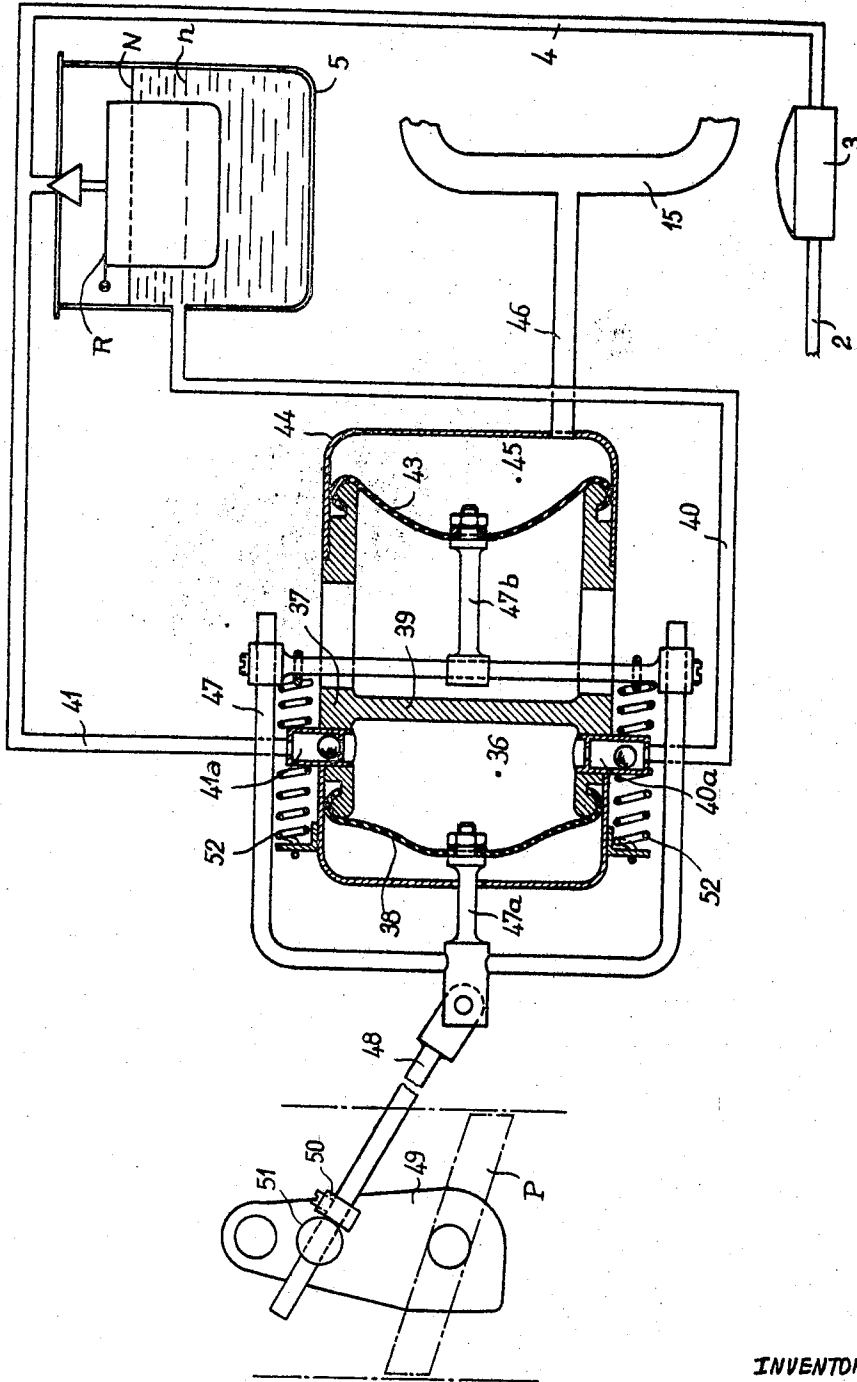
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FEED CONTROL DEVICES FOR CARBURETOR ENGINES

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FEED CONTROL DEVICES FOR CARBURETOR ENGINES

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4 Claims

ABSTRACT OF THE DISCLOSURE

Fuel feed control device for carburetor petrol engine, which comprises means for lowering the fuel level in the float chamber of the carburetor, said means becoming automatically operative when the engine is stopped, characterised in that said fuel level lowering means comprise a variable capacity auxiliary chamber separated from the carburetor and located at a lower level than said desired lower fuel level of the carburetor float chamber, and from which the petrol is drawn by suction when the engine is stopped, the petrol thus drawn into said auxiliary chamber being subsequently forced back into said float chamber when the engine is re-started.

This invention relates to improvements in the feed system of petrol engines of the carburetor type, and it is the essential object of this invention to avoid the hard starting frequently experienced after a stop and caused by the so-called "percolation" effect consisting of an overflowing of petrol through the main jet of the carburetor as a consequence of the pressure resulting from accidental vaporization in the float chamber. In fact, the petrol accumulating under these conditions in the suction pipe will produce an over-rich air-fuel mixture that will not ignite.

This inconvenience is observed chiefly by very hot weather, when the carburetor is exposed under the bonnet to the heat radiating from the engine.

In a prior patent application of June 27, 1966 No. 562,069, the applicants already proposed a device for avoiding this inconvenience, which is characterised in that it comprises means for reducing the fuel level in the carburetor which become operative when the engine is stopped.

It is the essential object of this invention to improve a device of this character by providing means for reducing the fuel level in the float chamber of the carburetor, these means consisting essentially of a variable-capacity auxiliary chamber separated from the carburetor and disposed at a level lower than the desired lower fuel level in the float chamber, and means for transferring the fuel from the float chamber to said auxiliary chamber when the engine is stopped and for forcing this fuel back to said float chamber when the engine is re-started.

This improved device is characterised inter alia by the following advantages in comparison with the device described and illustrated in the above-mentioned prior patent application cited above.

(a) The auxiliary chamber can be installed at a level other than that of the float chamber of the carburetor, thus facilitating the mounting of this auxiliary chamber at a location less exposed to the heat radiating from the engine;

(b) when the excess fuel accumulated in the auxiliary chamber is forced back into the float chamber a minor fraction of this fuel may be fed to the fuel pump to assist in re-priming same.

A device constructed according to this invention will now be described by way of example with reference to the single figure of the accompanying drawing which illustrates diagrammatically in fragmentary section the component elements of a specific form of embodiment thereof.

The drawing illustrates diagrammatically a fuel suction pump 3 connected to the fuel tank (not shown) via a pipe line 2 and adapted to deliver petrol under pressure through another pipe line 4 leading to the upper portion of the float chamber 5 of a carburetor; according to the conventional arrangement, a constant fuel level N is maintained in this float chamber, during the engine operation, by a float and needle valve device R.

Associated with the conventional float chamber 5 is a separate auxiliary chamber 36 consisting of a body 37 having fitted to one end thereof a membrane 38 of which the position with respect to the bottom 39 of chamber 36 causes the capacity of this chamber to vary. The chamber 36 is connected to the carburetor float chamber 5 through a pair of pipe lines 40 and 41 in which a suction valve 40a and a delivery valve 41a are interposed, respectively. The pipe line 40 opens into the float chamber at a point corresponding to the level n at which it is desired to lower the fuel level in case of stoppage of the engine. The other line 41 is connected to the aforesaid pipe line 4 just before the feed inlet or fuel union, as shown.

Another membrane 43 is fitted to the other end of the body 37. A cap or cover 44 fitted tightly to the same end of the body 37 through any suitable means constitutes with the underlying membrane 43 a fluid-tight chamber 45 connected through a pipe 46 to the suction or inlet manifold 15 of the engine.

This other membrane 43 has its central portion rigidly connected to the central portion of the first membrane 38 by means of a movable, adjustable frame 47 slidably mounted in a pair of diametrically opposite slots formed in said body 37 and urged by spring means 52 to the inoperative position illustrated in the drawing, a pair of axial rods 47a and 47b connecting the membranes 38 and 43 respectively to said frame 47.

In addition, the frame 47 is connected through a rod 48 to the lever 49 controlling the throttle or butterfly valve P of the carburetor, this connection being of unidirectional type and effective in this case only in the direction to open said throttle valve. This requirement is met by simply providing an axially adjustable stop member 50 on a cylindrical portion of rod 48 which otherwise slides freely in a corresponding diametral bore formed in a trunnion mounted for free rotation on the throttle lever 49.

The above-described device operates as follows:

In its inoperative condition the component elements of the device are in the respective positions shown in the figure, that is, with the frame 47 and membranes 38 and 43 in their left-hand end positions.

The chamber 36 is filled with the fuel sucked from the float chamber of the carburetor when the engine was stopped the last time, as will be explained presently, and the fuel level in said float chamber is therefore at n.

If under these conditions the starter motor is energized by turning on the ignition key, a certain vacuum is produced immediately in the induction manifold 15 and transmitted to chamber 45 via pipe line 46, thus causing the membrane 43 to be deflected towards the right, as seen in the figure, and pulling the movable frame 47 and therefore the other membrane 38 in the same direction; thus, this membrane 38 will begin to force the fuel contained in chamber 36 via pipe line 41 towards the carburetor, whereby the fuel level in float chamber 5 will rise while a minor fraction of this petrol will be forced into the

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feed pipe 4 towards the fuel pump 3 to facilitate the re-priming thereof.

When the engine is running normally the vacuum in manifold 15 increases considerably and thus becomes sufficient to move the membrane 43 as far as possible towards the bottom 44 of chamber 45, the other membrane 38 being moved accordingly to approach the bottom 39 of body 37, whereby a quantity of fuel sufficient to restore the fuel level N in the float chamber is forced into the carburetor while filling at the same time the other pipe lines. Under these conditions it is clear that normal operating conditions are quickly restored.

A complementary advantageous feature of the above-described unidirectional connection with the throttle lever of the carburetor lies in the following fact: If instead of directly energizing the starter motor the driver depresses beforehand the accelerator pedal, for example in order to set the shutter of an automatic starting device, the membrane 39 will be pushed back by the rod 48 responsive to the trunnion 51 engaging the stop 50, and it is clear that this movement is attended immediately by the delivery of fuel to the carburetor and its pipe line system. Obviously, normal operating conditions are thus restored even faster than in the preceding case.

When the engine is stopped by turning off the ignition key and the throttle lever 49 is allowed to resume its idling position, the vacuum in manifold 15 is reduced to zero and the movable frame 47 is moved to the left by its return springs 52, thus pulling the membrane 38 and causing same to suck the fuel contained in the float chamber 5 via pipe line 40, whereby the fuel level will drop from N to n. Thus, chamber 36 is again filled with fuel readily available for the next start, and at the same time the lower petrol level in the float chamber of the carburetor will prevent the undesired "percolation" effect explained in the aforesaid prior patent application to take place.

It will be seen that if under normal driving conditions the driver releases the accelerator pedal the stop 50 will be freed but as the membrane 43 is responsive to the vacuum in manifold 15 it will maintain the movable assembly 47-48 and therefore the other membrane 38 in their respective position, so that no suction will be applied to the fuel.

On the other hand, if during a stop the fuel pump became the seat of the so-called percolation effect caused by overheating, a certain amount of fuel may be forced into the carburetor float chamber, but this additional excess is discharged by gravity into the chamber 36, the volume of this chamber being calculated to be slightly greater than that sucked in from the float chamber and contained between the levels N and n.

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The above-described device constituting the subject-matter of this invention is applicable to all petrol engines fed by a constant-level float chamber carburetor.

We claim:

1. Fuel feed control device for carburetor petrol engine comprising: a carburetor having a float chamber therein which chamber is located at a first level; a variable capacity auxiliary chamber associated with said float chamber and located at a level lower than said first level; first movable wall means for controlling, by pressure, the level of petrol in said float chamber, said first wall means serving to draw petrol from said float chamber to said auxiliary chamber upon the stoppage of the engine and serving to inject petrol into said float chamber from said auxiliary chamber upon the start of the engine; and second movable wall means positively connected to the first movable wall for controlling the petrol level in the float chamber, said second movable wall being responsive to the vacuum produced in the induction manifold of the engine for actuating said first movable wall means.

2. Device according to claim 1, and further comprising a pipe line leading from said auxiliary chamber to said float chamber and connected to the float chamber at a level corresponding to the minimum petrol level in said float chamber.

3. Device according to claim 2, and further comprising: a fuel pump leading to the carburetor and forming a union therewith; a suction valve associated with said pipe line; and a further pipe line equipped with a delivery valve for connecting said auxiliary chamber to said union formed between the carburetor and the fuel pump.

4. Device according to claim 1 and further comprising: a carburetor throttle control lever on said carburetor; unidirectional means for connecting the movable wall which controls the petrol level in the float chamber to the carburetor throttle control lever in such a manner that the variable capacity auxiliary chamber delivers its fuel content into the float chamber when the throttle is opened and before the engine is started.

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