

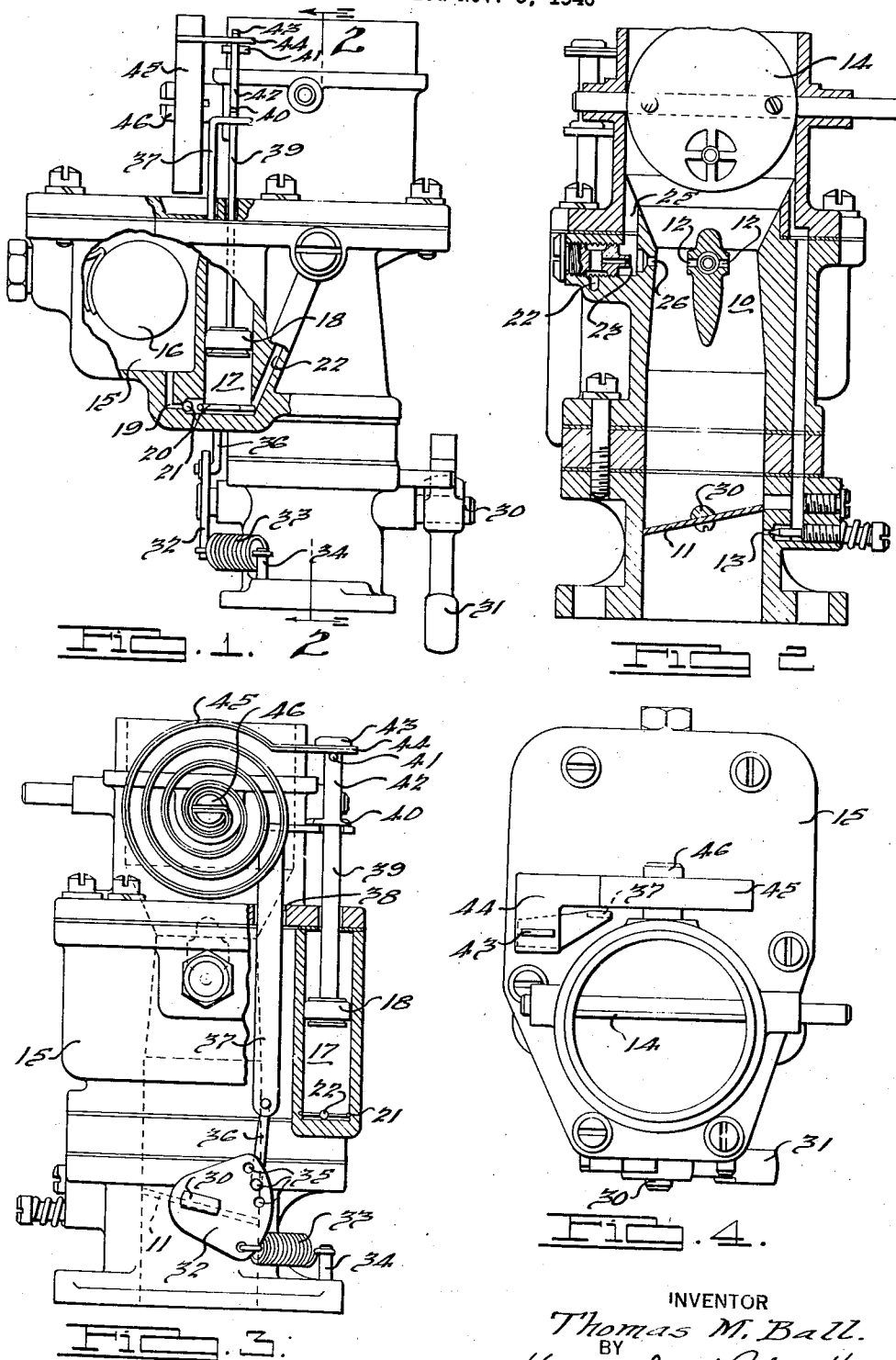
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CARBURETOR

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CARBURETOR

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2 Claims. (Cl. 261—34)

The present invention relates to carburetion devices for internal combustion engines and comprises means for injecting an auxiliary quantity of fuel into the carburetor when acceleration is desired. Specifically, the invention comprises means for injecting a quantity of fuel into the throat of the carburetor in addition to that normally supplied when the throttle valve is opened, and controlling the quantity of fuel so injected in accordance with the temperature of the engine with which the carburetor is associated in such manner as to reduce the amount of auxiliary fuel in proportion to the degrees of temperature adjacent the carburetor. It is the primary object of the present invention to enrich the mixture during acceleration of the engine to a greater extent when the engine is cold than when the engine is warm.

A further object of the present invention is to provide simple means for controlling the operation of an accelerator fuel pump associated with a carburetor in accordance with the temperature of the engine and of the air surrounding the carburetor. A further object of the present invention is to provide an auxiliary fuel supply means for augmenting the normal fuel supply to a carburetor when the throttle valve is opened, which auxiliary fuel supply means may be automatically controlled to supply varying amounts of fuel in accordance with the temperature of the engine, such amounts being greater when the engine is cold and decreasing as the engine becomes warm until the auxiliary fuel supply is discontinued or reaches a predetermined minimum.

An additional object of the invention is the provision of a temperature responsive member in a device of this kind which serves as the effective source of fuel displacing energy.

These and other objects of the invention may be more readily understood from a study of the following specification taken in connection with the accompanying drawing wherein like numerals refer to like parts throughout.

In the drawing,

Fig. 1 is a side view in elevation of a carburetor having the present invention applied thereto and with parts broken away for better understanding of the invention.

Fig. 2 is a vertical section taken substantially centrally of Fig. 1 along line 2—2 and looking in the direction of the arrows.

Fig. 3 is a view in elevation of the carburetor taken from the left side of Fig. 1 and with certain parts broken away.

Fig. 4 is a top plan view of the carburetor having the present invention applied thereto.

The invention is shown applied to a standard type of carburetor comprising an intake throat 10 and throttle valve 11 by means of which the normal supply of fuel to the engine is induced to flow through the main fuel ports 12 or the idle port 13 in accordance with known principles of carburetion. The carburetor is also supplied with a choke valve 14 which may be manually or automatically controlled in accordance with usual practice, and a constant level chamber 15 having a float valve including the ball float 16 therein from which fuel is led to the main fuel ports 12 and idle port 13 through passages which are not fully shown in this application.

The present invention is concerned with an auxiliary fuel supply means including a fuel injection device comprising the cylinder 17 in which piston 18 operates. The bottom of the cylinder 17 is connected to the constant level chamber 15 through an inlet 19 having a ball check device 20 therein. The ball check device 20 is situated in an enlarged portion of the inlet 19 and is retained therein by a spring clip retaining ring 21, the enlargement being of sufficient diameter to permit the ball to admit fuel when the piston 18 is raised in the cylinder 17. When the piston 18 is lowered, the ball check 20 closes the inlet 19 and fuel is forced from the cylinder 17 through an outlet 22 leading to an auxiliary fuel jet 23 situated in an air passage 25 and so located as to project fuel through an auxiliary port 26 located in the throat 10 adjacent the normal fuel supply ports 12. When the throttle valve 11 is opened, air may be drawn through the passage 25 by the suction of the engine and thence through the auxiliary port 26 in which it is mixed with the auxiliary charge of fuel projected through the injector nozzle 23.

The throttle valve 11 is mounted upon a shaft 30 having one end fixed to an operating lever 31 by means of which the throttle valve may be manually opened or closed to varying extents. The opposite end of shaft 30, projecting from the carburetor at the other side thereof, carries a substantially triangular plate 32, to the lower corner of which is attached one end of a tension spring 33 having its opposite end fastened to a fixed pin 34, the spring 33 being so arranged as to tend always to close the throttle valve 11 until manually opened. The other free corner of the triangular plate 32 is provided with a series of holes 35 at different angular positions with respect to the throttle valve 11, in a selected one

of which is fixed one end of a link 36 extending to the lower end of a pushrod 37 guided for vertical sliding movement in a slot 38 through a portion of the carburetor housing. The upper end of the pushrod 37 is bent laterally and outwardly to a position directly over the upper end of the cylinder 17 and is provided with an opening through which is slidably guided the plunger 39 attached to piston 18. The plunger 39 is provided with an enlargement 40 adapted to rest on the surface of the pushrod 37 so as to cause the pushrod to raise the piston 18 when the throttle valve 11 is closed, thereby causing a charge of fuel to flow into the cylinder 17 when the throttle valve is open.

The plunger 39 has a vertical extension 42 extending above the enlargement 40 and terminating in a second enlargement 43 which is adapted to engage the upper side of the free end 44 of the thermostatic coil device 45 mounted upon a pin 46 extending from the surface of the carburetor. The extension 42 is held against movement in the direction of its axis relative to the free end 44 of the thermostat by a pin 41 anchored in the plunger 39 below the free end of the thermostat and adjacent the head 43. The thermostatic device 45, which preferably comprises the coiled bimetallic resilient strip, has maximum strength when cold and is adapted to urge the piston 18 downwardly when permitted to do so by opening of the throttle valve 11 and simultaneous lowering of the push rod 37. This act causes the ball check 20 to close the inlet 19 and the injection of an auxiliary charge of fuel through the jet 23 and port 26. At a predetermined high temperature, preferably the maximum temperature to which the thermostat is subjected in normal operation of an engine, its fuel displacing action may be rendered either completely ineffective or reduced to a predetermined minimum value. During increase of the temperature to which the thermostat is exposed from the low value at which it has maximum fuel displacing action upon the plunger 39 to the upper temperature limit, the fuel displacing pressure as well as the length of the stroke of the fuel displacing member is gradually decreased. The decrease in pressure commences in response to changes in temperature before the length of stroke of the fuel displacing element is varied. Therefore, the change in the discharge of the augmenting fuel supply is not severe or excessively sudden at any stage of engine operation between cold and fully heated conditions.

I have illustrated and described the present invention in connection with a downdraft carburetor of a certain type, and it should be obvious to those skilled in the art that other types of carburetors may have the present invention incorporated therein by the use of simple modifications. I have shown the thermostatic control device as comprising a coiled bimetallic strip, but it should be readily apparent that other thermostatic control devices may be substituted therefor. The arrangement and character of the normal fuel supply means, the idle fuel supply means, and the injection device for the auxiliary acceleration fuel supply may be altered in accordance with the character of other types

of carburetors without departing from my invention. I claim as my invention all such modifications in arrangement and detail as come within the scope of the following claims and which may be readily apparent to those skilled in the art.

I claim:

1. A carburetor comprising a throttle valve, an acceleration pump comprising a piston and a cylinder in which said piston operates, a source of fuel, an inlet connecting said cylinder to said source of fuel, a check valve in said inlet for preventing return of fuel through said inlet to said source of fuel, means connecting said piston to said throttle valve to raise said piston when said throttle valve is closed and thus cause fuel to flow into said cylinder, said means having one-way engagement only so that said throttle valve may be opened without affecting the position of said piston, an outlet from said cylinder for conducting the fuel from said cylinder into the carburetor when the piston is returned, and means for variably returning said piston when said throttle valve is open comprising a bimetallic spring coil having one end anchored to the outside of said carburetor and its free end connected to said piston so as to be uncoiled when said piston is raised, said bimetallic spring coil being arranged to contract when cold so as to exert greater pressure tending to return said piston when cold than when warm and to expand when warm so as to variably decrease the pressure exerted by said piston and the distance it may be returned in accordance with increases in temperature whereby the quantity of fuel and the pressure at which it is injected vary inversely as the temperature to which said bimetallic spring coil is subjected.

2. A carburetor comprising a throttle valve, an acceleration pump comprising a piston and a cylinder in which said piston operates, a source of fuel, an inlet connecting said cylinder to said source of fuel, a check valve in said inlet for preventing return of fuel through said inlet to said source of fuel, means connecting said piston to said throttle valve to raise said piston when said throttle valve is closed and thus cause fuel to flow into said cylinder, said means having one-way engagement only so that said throttle valve may be opened without affecting the position of said piston, an outlet from said cylinder for conducting the fuel from said cylinder into the carburetor when the piston is returned, and means for variably returning said piston when said throttle valve is open comprising a bimetallic spring coil having one end anchored to the outside of said carburetor and its free end connected to said piston so as to be deflected to a more loaded state when the piston is raised, said bimetallic spring being arranged to exert greater pressure tending to return said piston when cold than when warm and tending to deflect when warm so as to variably decrease the pressure exerted by said piston and the distance it may be returned in accordance with increases in temperature whereby the quantity of fuel and the pressure at which it is injected vary inversely as the temperature to which said bimetallic spring coil is subjected.

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