United States Patent

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[54] **DEVICE FOR BALANCED HOMOGENIZATION OF AIR AND LIQUID FUEL MIXTURES IN INTERNAL COMBUSTION ENGINES**
3 Claims, 1 Drawing Fig.

[52] **U.S. Cl.** ..... **123/97 B,** 261/41 D, 261/DIG. 19
[51] **Int. Cl.** **F02m 7/22**
[50] **Field of Search** ..... 123/97 B; 261/DIG. 19, 41.4

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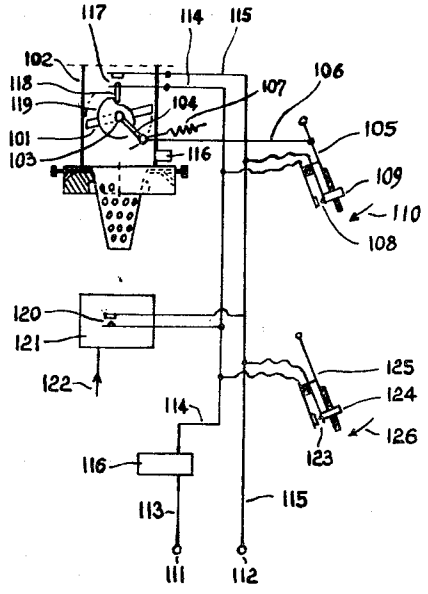
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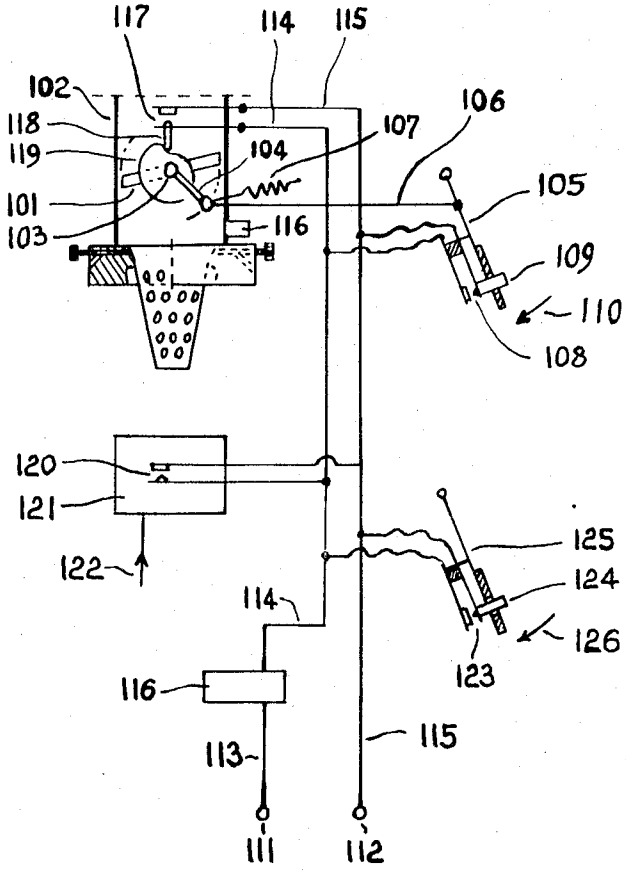
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ABSTRACT: The carburetor of an internal combustion engine of a motor vehicle has an idle-running jet and an air-fuel homogenizing chamber, an electrically operated fuel-admitting valve for the idle-running jet and a cam on the shaft of the air throttle of the carburetor, also an electric contact for actuating the fuel-admitting valve in connection with the clutch pedal of the wheels. The accelerator pedal of the vehicle has also an electric contact, whereby the two contacts are arranged electrically in parallel for opening the fuel-admitting valve and whereby the contact controlled by the cam closes as soon as the air throttle opens and remains closed for any opening position of the air throttle.





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DEVICE FOR BALANCED HOMOGENIZATION OF AIR AND LIQUID FUEL MIXTURES IN INTERNAL COMBUSTION ENGINES

The purpose of the present invention is to bring certain improvements to the device for homogenizing the mixture of air and liquid fuel for an internal combustion engine, said device being described in my U.S. Pat. No. 3,414,242 and in my patent application Ser. No. 727,591 filed on May 8, 1968, and now abandoned.

According to the structures described in the said patent and patent application, the inlet of fuel to the idle-running jet is open when the speed of rotation of the engine is lower than a determined value or in case of an acceleration of the engine. It is eventually the same concerning the inlet of fuel to the normal-running jet. Consequently in case of a deceleration the said jets are closed as long as the speed of rotation of the engine has not sufficiently slowed down. This closing, although favorable to a lessening of the toxicity of the exhaust gases and to a reduction of fuel consumption, has yet a drawback, i.e., the temporary and more or less complete emptying of the admission pipes of the fuel mixture. If, at that moment, the engine must be rapidly accelerated in order to pick up its rotation speed, there is in this case a risk, i.e., a stoppage of the engine due to the lack or shortage of fuel in its admission pipe. This drawback is specially to be regretted when the engine is the engine of a vehicle and when the picking-up which is wanted, occurs when there is a changing of gears.

In order to remedy this drawback, the control of the clutch placed between the engine, equipped with the carburetor associated with the homogenization device, and the gearbox actuated by this engine, is provided according to the invention with a means keeping open the inlet of fuel to the idle-running jet when the said control is actuated in the direction of the declutching when there is a changing of gear.

According to the invention, the inlet of fuel to the idle-running jet is open or closed by an electrovalve, the opening of which is ensured by a contact push placed on the pedal constituting the control of the clutch.

According to another improvement, an electric contact actuating at its closing the electrovalve of the idle-running jet to ensure the fuel feeding of this jet, is controlled by a cam supported by the axle of the air throttle of the carburetor equipped with the device, this contact being electrically parallel with the contact of the accelerator pedal acting on the air throttle, the contact controlled by the cam closing as soon as the air throttle opens and remaining closed for any opening position of the air throttle.

As an example and to facilitate the understanding of the invention, a description is given below of particular embodiments of the invention, one of which is represented diagrammatically and in a nonlimitative way on the sole FIGURE of the drawing herein attached.

According to the invention, the idle-running jet of the carburetor associated with the homogenization device, is provided with a member permitting to open and close the inlet of fuel to this jet.

This member is controlled, on the one hand, by a device sensitive to the rotation speed of the engine equipped with the homogenization device and, on the other hand, by another device maintaining the said member in an opening position when the butterfly valve of the carburetor is actuated in the direction of its opening in order to accelerate the engine.

According to the invention, the control of the clutch, placed between the engine and the gearbox actuated by the said engine, is provided with a means, maintaining in an opening position the member opening or closing the inlet of the fuel to the idle-running jet when the said control is actuated in the direction of the declutching when there is a change of gears. In the customary case of the clutch of a self-propelled vehicle, the said control is constituted by a pedal which is pressed upon for declutching; therefore the pressing on this pedal will be mechanically used or, preferably, electrically to ensure the inlet of fuel to the idle-running jet.

For this purpose, the member opening or closing the inlet of fuel to the idle-running jet may be constituted by an electrovalve. The pedal ensuring the declutching is then provided with a contact push which, being pressed by the foot at the time of declutching, sends current to the electrovalve to feed the idle-running jet with fuel.

The use of an electric contact on the accelerator pedal is advantageous, as it permits an immediate operation of the idle-running jet as soon as an acceleration is undertaken. However with practically constant speed, for instance if the engine actuates a vehicle moving on an approximately horizontal road, the pressing of the foot on the accelerator pedal may be uncertain and, in any case, is perturbed by the jolts of the road. It results in openings or closings of the contact of the accelerator pedal and consequently in closings or openings of the idle-running jet causing an unstable operation of the engine.

In order to remedy this drawback, the following device is used.

As is known, the air throttle **101** of the carburetor **102**, equipped with the device, is integral with a rotating axle **103** actuated by a lever **104**. The lever **104** is itself actuated by the accelerator pedal **105** by means of a rod **106** hinged on the lever and on the pedal. A spring **107** brings back the air throttle **101** towards its closing position. The accelerator pedal **105** is provided with a contact **108** closed by the pressing of the foot on a push **109** when the pedal **105** is pressed in the direction of the arrow **110** corresponding to the opening of the air throttle **101**, i.e., to the acceleration of the engine fed by the carburetor **102**. The closing of the contact **108** closes an electric circuit comprising an appropriate electric source connected with terminals **111**, **112**, conductors **113**, **114**, **115** and an electrovalve **116** placed on the inlet of the fuel to the idle-running jet of the carburetor **102**; the closing of the contact **108** opens the inlet of the fuel to this jet.

According to the invention, another contact **117** is connected to the conductors **114**, **115**, the contacts **108** and **117** being connected in parallel. The contact **117** is actuated by a push **118** actuated by a cam **119** integral with the axle **103** of the air throttle **101**. The cam **119** is designed so that the contact **117**, open when the air throttle **101** is closed, closes as soon as the air throttle **101** opens under the action of the accelerator pedal **105** and remains closed for any opening position of said air throttle. The contact **117** being thus closed, it is obvious that the contact **108** becomes inoperative and that the variations of the pressing of the foot on the push **109**, due to the jolts for instance, remain ineffective as regards the operation of the electrovalve **116** and of the idle-running jet fed by this electrovalve.

As has been previously stated, the electric circuit of the electrovalve **116** may also be closed by the contact **120** of the tachometric relay **121** receiving in **122** the indication of the rotation speed of the engine fed by the carburetor **102**; this circuit may also be closed by the contact **123** closed by the pressing of the foot on the push **124** when the clutch pedal **125** is pressed in the direction of the arrow **126**.

It is obvious that the invention is not limited to the aforesaid methods of application and realization and that it also comprises any of its variants.

What I claim is:

1. A device for homogenizing the mixture of air and a liquid fuel, said mixture fed into an internal combustion engine from a carburetor having an air throttle, said device comprising a homogenizing chamber communicating with the atmosphere by adjustable channels and a perforated cone-shaped diaphragm, the idle-running jet of the carburetor, associated with the device, being provided with a member opening or closing the inlet of fuel to this jet, the control of the clutch placed between the engine, equipped with the said carburetor, and the gearbox actuated by this engine being provided with a means keeping open the inlet of fuel to the idle-running jet when the said control is actuated in the direction of the declutching when there is a changing of gear.

2. A device as defined in claim 1, said member being an electrovalve the opening of which is ensured by a contact push placed on the pedal constituting the control of the clutch.

3. A device for homogenizing the mixture of air and a liquid fuel, said mixture fed into an internal combustion engine from a carburetor having an air throttle, said device comprising a homogenizing chamber communicating with the atmosphere by adjustable channels and a perforated cone-shaped diaphragm, the idle-running jet of the carburetor, associated with the device, being provided with an electrovalve opening or closing the inlet of fuel to this jet, an electric contact actuating at its closing the said electrovalve to ensure the fuel feeding of this jet, the said contact being controlled by a cam supported by the axle of the air throttle of the said carburetor, this contact being electrically parallel with a contact on the accelerator pedal acting on the air throttle, the contact controlled by the cam closing as soon as the air throttle opens and remaining closed for any opening position of this air throttle.

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