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CARBURETOR CONTROL

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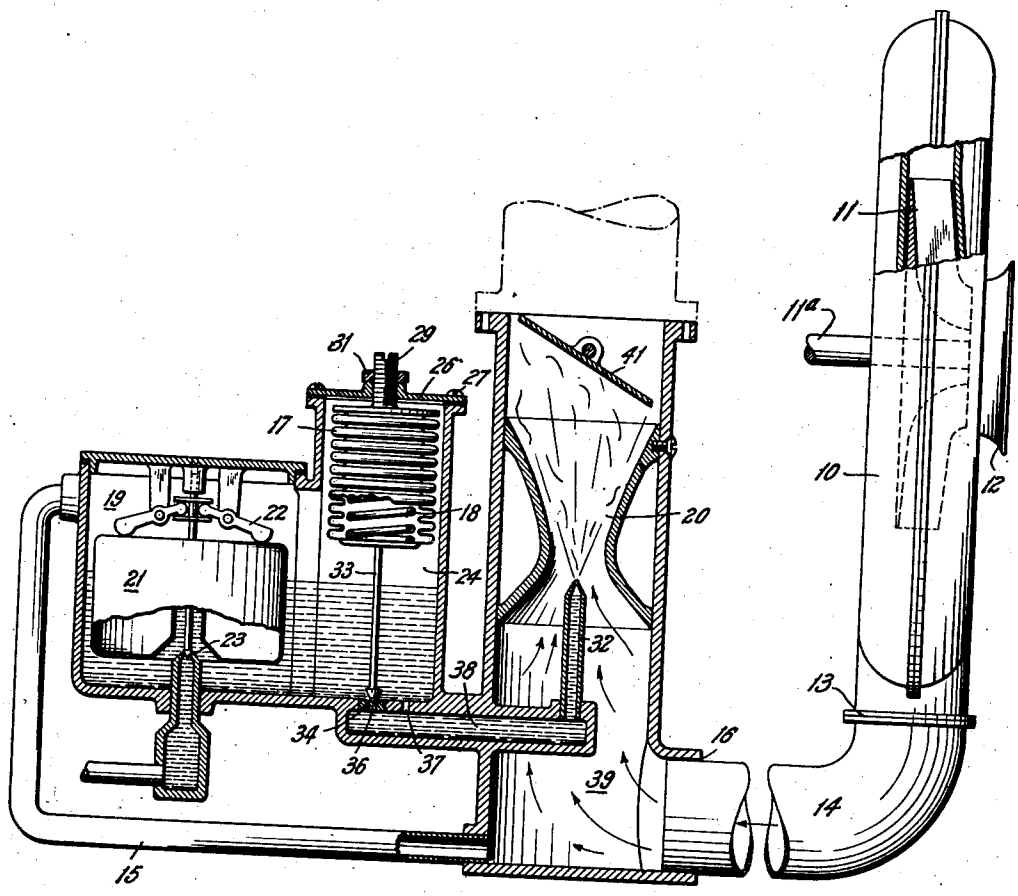

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CARBURETOR CONTROL

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16 Claims. (Cl. 261—39)

This invention relates to fuel mixing devices, and more particularly to a means for regulating or controlling the delivery of fuel to an internal combustion engine.

One of the objects of the invention is to provide a fuel control for a mixing device, or carburetor, that is actuated in accordance with the pressure in the fuel mixing chamber.

Another object of the invention is to provide a fuel control for a mixing device that increases the fuel flow as the internal pressure of the device increases.

Another object of the invention is to provide a carburetor that is adapted for use with a supercharger and which delivers a correct fuel mixture irrespective of large variations in pressure in the mixing chamber.

Another object of the invention is to provide a fuel control for a carburetor adapted for use in connection with a supercharger that increases the fuel flow as the supercharger pressure is increased.

Other objects of the invention will appear from the following description of a preferred embodiment which has been illustrated in the accompanying drawing, in which the figure is a vertical cross section of a carburetor or fuel mixing device constructed according to the invention and to which is connected a supercharger.

Referring to the drawing, 10 is the supercharger casing enclosing an impeller 11 and having an inlet 12 and a discharge opening 13. The supercharger is driven by means of shaft 11a, which preferably is connected to the engine (not shown) on which the carburetor or mixing device is installed, and delivers its air charge through pipe 14 to the carburetor inlet 16.

The above described connection of a supercharger with the carburetor is well known but occasions some carburetor problems which are not present when the carburetor takes its air supply at atmospheric pressure. It is obvious that the carburetor should deliver a constant weight ratio of air to fuel under all operative conditions. The ordinary carburetor is incapable of doing this, but within the narrow limits usually encountered, no correction is used.

The use of a supercharger increases the pressure range and causes the carburetor to deliver a noticeably incorrect mixture, which is due to the fact that the amount of fuel is governed by the suction at the jet, and as liquid fuel is comparatively inexpansible and the air expands under decreased pressure, the ratio of fuel to air increases as the pressure decreases.

The above difficulty is obviated in the present invention by the inclusion of a pressure responsive or barometric device exposed to the mixing chamber pressure for controlling the fuel orifice, which includes an expansible bellows 17 sealed with a predetermined internal pressure, preferably below atmospheric, and containing a compression spring 18 for expanding the bellows when the surrounding pressure is decreased.

In carburetors adapted for use in superchargers, the fuel chamber 19 is ordinarily subjected to supercharger pressure and the fuel is drawn therefrom by the differential pressure produced by the Venturi tube 20.

In the illustrated embodiment, the pressure from the supercharger is conducted to the fuel chamber by tube 15 at some point above fuel level, which is kept at a constant height by means of float 21 acting on the levers 22 to close valve 23 at the predetermined level. The bellows 17 is preferably installed in an extension 24 of the fuel chamber 19, in which it may be inserted upon removal of the cover 26, held in place by any desired means, such as screws 27. The upper end of bellows 17 is preferably provided with a threaded extension 29, by which it may be bodily moved with respect to cover 26 for adjustment and thereafter locked in position by nut 31. The lower or movable end of the bellows 17 is provided with means for regulating the fuel flow to jet 32 which, in the illustrated embodiment, comprises a stem 33 terminating in a valve 34 for varying the size of the auxiliary fuel orifice 36.

It is preferred to supply the primary fuel requirements by means of calibrated opening 37 in constant communication with jet 32 by means of cross-passage 38, but if desired, passage 37 may be eliminated and bellows 17 be so adjusted whereby controlled opening 36 provides the sole communication between the fuel chamber 19 and jet 32.

In the operation of the device, assuming that the supercharger is delivering a supply of air to the inlet of the carburetor in the direction of the arrows shown in the figure, the pressure at the mixing chamber 39 is transmitted to the fuel chamber 19 and is impressed on the expansible bellows 17. The relative position of valve 34 may be so adjusted with respect to fuel orifice 36 that at any predetermined pressure, valve 34 closes the orifice and allows all fuel to be delivered through the primary fuel orifice 37. At pressures in excess of the predetermined pressure, valve 34 will be raised by the collapse of bellows 17 and an increased amount of fuel supplied to jet 32 to com-

pensate for the increased weight of air passing through the Venturi tube 20.

An ordinary throttle valve 41 has been illustrated, but the inclusion of the valve does not affect the operation of the control, and the valve may be eliminated if desired and the regulation of the amount of fuel mixture controlled by any other desired means, such as speed control of the supercharger or by throttling the supercharger inlet 12.

While a preferred embodiment of the invention has been illustrated and described, it is understood that the showing and description are illustrative only and that the invention is not regarded as limited to the form shown, or otherwise, except by the terms of the following claims.

What is claimed is:

1. In a fuel mixing device, a constant level fuel chamber, a mixing chamber, a fuel jet therein, a supercharger connected to the mixing chamber, means for impressing supercharger pressure on the fuel chamber at all times, and a barometric device within the fuel chamber and actuated by fuel chamber pressure adapted to control the fuel delivered by the jet.

2. In a fuel mixing device, a fuel chamber, a mixing chamber, a fuel jet therein, a supercharger connected to the mixing chamber, means for impressing supercharger pressure on the fuel chamber at all times, and a sealed expansible member actuated by the fuel chamber pressure adapted to control the fuel delivered by the jet.

3. In a fuel mixing device, a fuel chamber, a mixing chamber, a fuel jet therein, a supercharger connected thereto, means for impressing supercharger pressure on the fuel chamber at all times, said chamber having an outlet orifice to the jet, an expansible sealed bellows having one end secured to an interior wall of the fuel chamber, and means secured to the movable end of the bellows adapted to control the fuel orifice.

4. In a fuel mixing device, a fuel chamber, a mixing chamber, a fuel jet therein, a supercharger connected thereto, means for impressing supercharger pressure on the fuel chamber at all times, said chamber having an outlet orifice to the jet, an expansible sealed bellows having one end secured to an interior wall of the fuel chamber, and means secured to the movable end of the bellows adapted to enlarge the fuel orifice as the pressure in the fuel chamber is increased.

5. In a fuel mixing device, a mixing chamber, a fuel jet therein, a fuel chamber having an outlet orifice to the jet, a supercharger connected to the mixing chamber, means forming a connection between the mixing chamber and fuel chamber at all times, a sealed expansible bellows within the fuel chamber, said bellows having a stem at one end projecting through the chamber wall for adjustably securing the bellows thereto, and means at the opposite end of the bellows adapted to control the orifice.

6. In a fuel mixing device, a fuel jet, a fuel mixing chamber having a throttle, a constant level fuel chamber, means forming two passageways from the fuel chamber to the jet, a sealed expansible member in the fuel chamber adapted to control one of said passageways, and means for conveying mixing chamber pressure to the fuel chamber from a point anterior of throttle to a point above the fuel level.

7. In a fuel mixing device, a fuel jet, a fuel mixing chamber having a throttle, a constant level fuel chamber, means forming two passageways from the fuel chamber to the jet, a sealed expansible member in the fuel chamber adapted to control one of said passageways, and means for conveying mixing chamber pressure to the fuel chamber from a point anterior of throttle to a point above the fuel level, said expansible member being wholly within the fuel chamber and supported by one of the chamber walls.

8. In combination with a carburetor for supplying a fuel mixture to an engine, a supercharger, an auxiliary fuel conduit for the carburetor, a device for controlling the flow of fuel through the auxiliary conduit, said device including an expansible member responsive to the differential between the supercharger pressure and a predetermined absolute pressure, and said device being arranged to close the auxiliary conduit when the differential pressure reaches a predetermined value.

9. In combination with a carburetor for supplying a fuel mixture to an engine, a supercharger, an auxiliary fuel conduit for the carburetor, a valve for said passage, an expansible device for controlling said valve, said device having interior and exterior surfaces one surface being exposed to the influence of supercharger pressure and the other surface being exposed to the influence of a predetermined absolute pressure.

10. In a fuel mixing device, a fuel jet having a plurality of fuel supply conduits connected in parallel, a mixing chamber having an air passage, a throttle therein, and means including an expansible member sealed with a predetermined internal pressure and externally exposed to the static pressure in the passage anterior of the throttle for controlling the amount of fuel supplied by one of said conduits.

11. In a fuel mixing device, a fuel jet, a mixing chamber having an air passage, a throttle therein, a constant level fuel chamber subjected to air passage pressure for supplying fuel to the jet and means in the fuel chamber actuated by the air pressure in the passage anterior of the throttle for increasing the fuel supplied by the jet as the air pressure in the passage is increased, said means including a sealed expansible bellows having its external surface exposed to the air passage pressure.

12. In a fuel mixing device, a fuel jet, a mixing chamber having a throttle therein, a supercharger connected to the chamber, and movable means actuated by the static pressure between the supercharger and throttle adapted to control the amount of fuel delivered by the jet whereby the weight ratio of air to fuel is kept substantially constant, said means including a resilient expansible member having limited expansive movement and exerting sufficient expansive force to prevent a change in member dimensions until the pressure reaches a predetermined value.

13. In a fuel mixing device, a fuel jet, a mixing chamber having a throttle valve therein, a supercharger connected to the chamber and a sealed expansible member having a predetermined internal pressure externally exposed to static supercharger pressure at a point anterior to the throttle valve adapted to control the amount of fuel delivered by the jet.

14. In a fuel mixing device, a fuel jet, a mixing chamber having a throttle valve therein, a supercharger connected to the chamber, a sealed expansible member having a predetermined internal pressure externally exposed to the static supercharger pressure at a point anterior of the throttle, and means controlled by said member

for increasing the fuel flow delivered by the jet when the supercharger pressure is increased.

15. In a fuel mixing device, a constant level fuel chamber, a mixing chamber, a fuel jet therein for delivering fuel from said fuel chamber, a supercharger connected to the fuel chamber, means for impressing supercharger pressure on the fuel chamber at all times, a sealed expansible member having a predetermined internal pressure and externally exposed to supercharger pressure at a point anterior of the throttle, said member having one end fixed to a support, and means connected to a movable portion of the member for controlling fuel flow through said jet.

16. In a fuel mixing device, a constant level fuel chamber, a mixing chamber, a fuel jet therein for delivering fuel from said fuel chamber, a supercharger connected to the fuel chamber, means for impressing supercharger pressure on the fuel chamber at all times, a sealed expansible member having a predetermined internal pressure and externally exposed to supercharger pressure at a point anterior of the throttle, said member having one end fixed to a support, and means connected to a movable portion of the member for increasing fuel flow through said jet when the supercharger pressure is increased.

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