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2,068,952

THERMOSTATIC BY-PASS RISER

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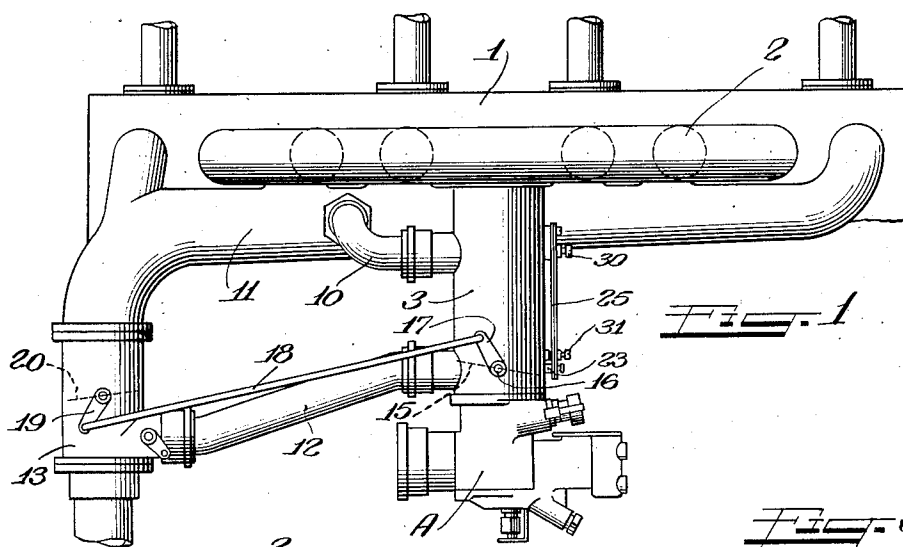


Fig. 1

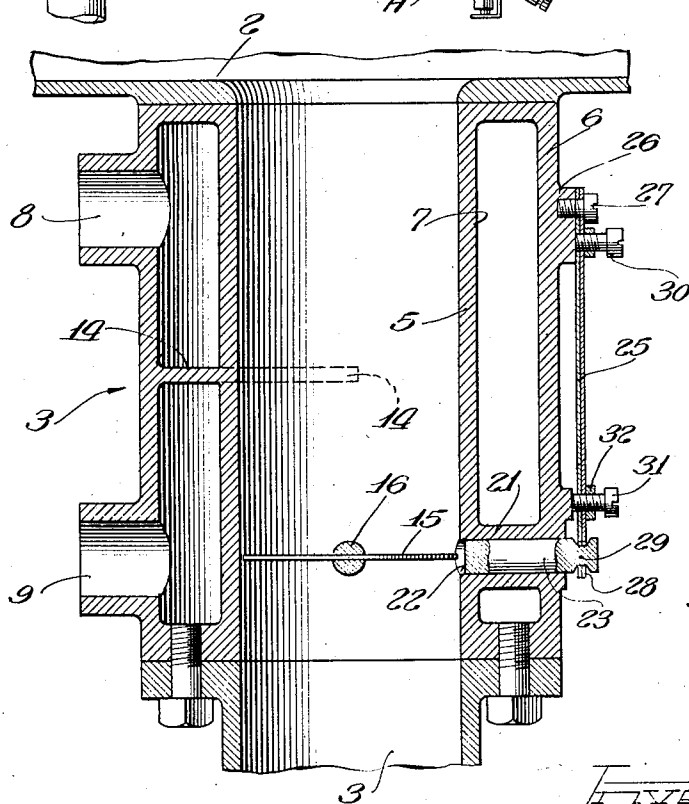


Fig. 2

Fig. 3

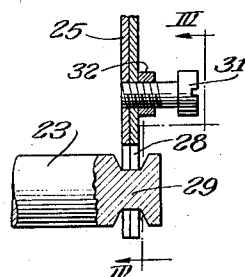
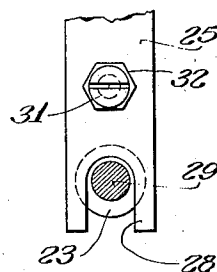


Fig. 4



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THERMOSTATIC BY-PASS RISER

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Application November 22, 1929, Serial No. 409,069
Renewed January 16, 1935

3 Claims. (Cl. 123—122)

This invention relates to improvements in risers of a type usable between the carbureter or other fuel mixing device and the intake opening to an internal combustion engine, and more particularly to a riser having a thermostatically controlled by-pass therein for admitting or not admitting fuel to the engine in accordance with variations in temperature even though the throttle valve be closed, although the invention may have many and various other uses as will be apparent in one skilled in the art.

In many instances, and especially in cold weather, internal combustion engines, and quite frequently those of the type commonly used in automobiles and similar vehicles, require greater than normal supply of fuel at a greater than normal richness for starting and idling purposes. Quite often, the operator of the vehicle or engine fails to properly manipulate the throttle and choker valves in order to supply a sufficient mixture at a proper richness. Heretofore, various means have been supplied to remedy this difficulty, including a combination choker valve and throttle control, whereby when the choker was actuated the throttle was automatically opened to a predetermined extent at the same time. However, it is not always desirable to have the throttle open or otherwise respond to a proportional extent to the movement of the choker valve. Therefore, this particular appliance has not proven satisfactory, or at least fails to sufficiently approach desirable and ideal operation.

Consequently, with the above and other difficulties in view, it is an object of the present invention to provide means permitting the customary manually operated throttle valve for feeding fuel to an internal combustion engine, and in addition thermostatically controlled means for feeding such fuel when the valve is closed or substantially closed.

Another object of this invention is to provide means for attachment between the fuel mixing device and intake manifold of an internal combustion engine, the means having mechanism associated therewith for automatically controlling the feeding of fuel to the engine.

Still another object of this invention is to provide a riser for communication between a carbureter or fuel mixing device and the intake of an internal combustion engine which has means associated therewith for automatically controlling the admission of fuel to the engine, the riser being mountable as a unit upon any desired engine.

It is still another object of this invention to provide a riser having thermostatically controlled means for bypassing fuel to the internal com-

bustion engine, the riser being jacketed, and the jacket being in communication with a direct source of engine heat so that the thermostatically controlled means will be effected not only by vicinity temperature but also by the temperature of the engine, whereby the proper amount and mixture of fuel supply will be passed to the engine.

A still further object of this invention is to provide a riser carrying means for automatically governing the flow of fuel to an internal combustion engine even though the throttle valve be closed or substantially closed, the riser being installable with the carbureter or subsequently thereto as is found desirable.

While some of the more salient features, characteristics and advantages of a device embodying the present invention have been above pointed out, others will become apparent from the following disclosure.

The invention includes these and other features of construction and combination of parts hereinafter described, and shown in one preferred form in the drawing, as more particularly indicated by the claims.

On the drawing:

Figure 1 is a fragmentary elevational view of an internal combustion engine and its carbureter equipped with a device embodying principles of the present invention.

Figure 2 is an enlarged fragmentary vertical sectional view showing the device and the adjacent portions of the intake manifold and carbureter.

Figure 3 is a fragmentary enlargement of the portion of the structure seen in the lower right hand portion of Figure 2.

Figure 4 is a vertical sectional view of the structure shown in Figure 3 taken substantially as indicated by the staggered line IV—IV of Figure 3.

As shown on the drawing:

In the structure selected to illustrate an embodiment of the present invention, there is shown in Figure 1, a cylinder block 1 of an internal combustion engine of the type commonly utilized in automotive vehicles. Properly connected to the cylinder block 1 is an intake manifold 2 which in turn is connected adjacent the central portion thereof to the upper end of a riser 3 embodying principles of the present invention. The lower end of the riser 3 is connected to the outlet end of any suitable carbureter 4 or other fuel mixing device.

As seen more clearly in Figure 2, the riser 3 embodies a conduit or similar passaged element 5 which preferably has a jacket 6 therearound

to provide a jacket chamber 7. This chamber is connected at the upper portion thereof through a boss 8 to a pipe or conduit 10 leading to the exhaust manifold 11 of the engine; and the jacket chamber 7 is connected at the lower end thereof through a boss 9 to a pipe or conduit 12 leading to a fitting 13 connected to the exit end of the exhaust manifold. This construction permits heated fluid to travel from the exhaust manifold into the upper portion of the jacket chamber, descending to the lower portion of the chamber after passing entirely around the conduit 5, and thence passing through the conduit 12 into the exhaust pipe. To prevent a direct descension of this heated fluid to the exit pipe, the adjacent one-half of the jacket chamber 7 is blocked substantially midway thereof by a circular baffle 14 extending preferably one-half the circumference of the jacket chamber 7.

Mounted within the conduit 5 of the riser 3, is a throttle valve 15, the valve being secured in any desired manner to a transversely extending shaft 16 which is actuated in any suitable or well-known manner to obtain the desired adjustment of the valve. In the present instance, this throttle valve 15 is also connected by means of a crank 17, a rod 18, and another crank 19 to a similarly mounted and similar valve 20 disposed in fitting 13 of the exhaust pipe, whereby when the throttle valve is opened, the valve 20 in the exhaust pipe will be opened a proportional amount, since a smaller amount of heated fluid is needed in the jacket after the engine has become warm or when it is actually moving the vehicle instead of idling.

On one side thereof, and preferably in the plane of the shaft 16, the riser is provided with an internal boss 21 extending between the conduit 5 and the jacket 6 which is hollowed to provide a central aperture 22 therein. A valve member 23 is reciprocable within the aperture 22. The valve 23 is actuated by means of a thermostatic element 25 secured at its upper end to a boss 26 on the exterior of the jacket 6 by means of a bolt 27 or in any other desired manner. This thermostatic element 25 is preferably, as shown, a bi-metallic element formed of separate metals or alloys having different coefficients of expansion. In this instance, the metals utilized are preferably such that when the temperature falls, the lower or free end of the element will tend to move outwardly from the conduit 5 and accordingly move the valve 23 toward open position, this end of the thermostatic element being preferably bifurcated as indicated at 28 and engaged over a narrow neck-line portion 29 on the valve. The inward movement of the thermostatic element and valve 23 may be limited as desired by a pair of adjustable screws 30 and 31, the screw 30 abutting the upper boss 26 on the jacket 6, and the screw 31 abutting a lower boss 32 on the jacket.

In operation, the present invention is extremely simple and yet highly accurate and efficient. Assuming now that the temperature is relatively low, that it is desired to start the engine, and that the throttle valve is closed or in the position as shown in Figure 2, the thermostatic element 25 in response to the low temperature will have drawn the valve 23 outwardly, thereby leaving a distinct passage around the rim of the valve 15 and permitting more fuel to flow into the exit. After the engine has run a length of time, the heated fluid flowing into the jacket from the exhaust manifold will create sufficient tem-

perature adjacent the thermostatic element 25 to cause this element to move inwardly and then to close the valve 23 in accordance with the relative increase in temperature of the exit. It will, therefore, be seen that the thermostatic element will provide proper and sufficient fuel for the engine under all degrees of temperature, and for various purposes, especially idling. Of course, through the adjustment screws 30 and 31 the thermostatic element 25 and valve 23 can be controlled so that they will move toward closed position only to a predetermined point.

It is to be appreciated that the present invention may be made in various ways and manners and for similar purposes as exemplified in my co-pending applications, namely, Serial No. 384,681, entitled "Thermostatic by-pass valve means", filed August 9, 1929, and Serial No. 365,009, entitled "Choker valve means" filed May 22, 1929, and now issued as Patent 1,968,553; but it is also to be understood that the present invention may easily be incorporated as a single item of manufacture for installation on engines already equipped with carbureters. For instance, if it is desired to incorporate the present invention with an engine already equipped with another carbureter, it is simply necessary to remove the throttle valve from the carbureter and connect the riser 3 between the carbureter outlet and engine intake, and then attach the throttle control to the valve 15 in the conduit 5. It should be noted, too, that the riser 3 may be made with or without the jacket 6 as desired. If, for example, the riser is placed in close proximity to a hot portion of the engine, it would be affected to some material extent by such temperature, and it is also to be understood that the riser will be affected by a general temperature or vicinity temperature regardless of its disposition so that it will function to a highly desirable state even without the jacket.

From the foregoing, it will be apparent that I have provided a riser for disposition between the fuel mixing device and intake manifold of an internal combustion engine, which automatically compensates for erroneous manipulation or failure to manipulate the throttle valve, and automatically feeds a sufficient and proper mixture to the engine in accordance with temperature variations. Moreover, the device may be installed simultaneously with the carbureter or may be installed at any subsequent time. In addition, the device is simple in construction and operation, with little or no parts to become out of order, light in weight, easy to mount, extremely durable, and economical to manufacture.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted, otherwise than necessitated by the prior art.

I claim as my invention:

1. In combination, an internal combustion engine, a carbureter therefor, a conduit connected between the outlet of said carbureter and the intake of said engine, means forming a jacket adjacent said conduit, means for passing exhaust gas from said engine through said jacket, means in said conduit for controlling the flow of fluid therethrough, and thermostatic means positioned in heat-exchange relation to said jacket and responsive to temperature changes therein for bypassing fluid through said conduit when said controlling means are closed a predetermined extent.

2. In combination, an internal combustion engine, a carburetor therefor, a fuel mixture conduit connected to the outlet of said carburetor and the intake of said engine, a jacket around said
5 conduit, means connecting said jacket to a hot part of said engine to establish a flow of hot fluid through said jacket, a throttle valve for controlling the passage of fuel through said conduit, and thermostatically controlled means positioned in heat-exchange relation to said jacket
10 and responsive to temperature changes including such changes in said jacket for controlling the by-passing of fuel from said carburetor to said engine when said valve is closed a predetermined
15 extent.

3. In combination with an internal combustion engine, a carburetor therefor, a fuel mixture conduit connecting the carburetor to the intake of the engine, a heating chamber adjacent a portion
5 of said conduit adapted to utilize exhaust gases from the engine to heat the fuel mixture in said conduit, a throttle valve controlling the passage of fuel mixture through said conduit, and temperature responsive means positioned in heat-exchange relation to said chamber and responsive
10 to temperature changes therein for controlling the bypassing of fuel mixture from the carburetor to the engine past said throttle valve when the same is closed or nearly closed.

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