

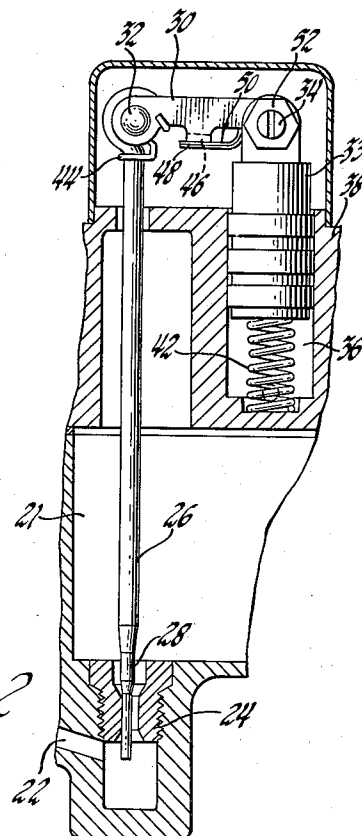
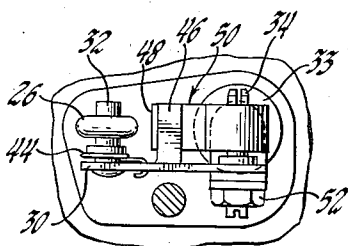
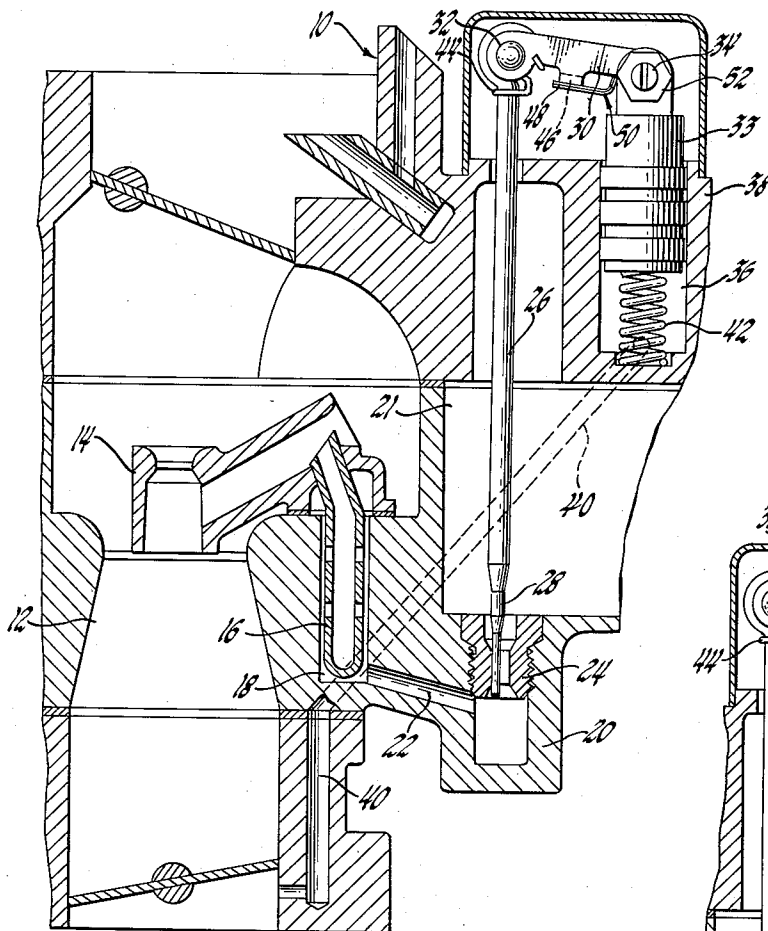
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FUEL METERING PIN

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FUEL METERING PIN

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The present invention relates to an improved fuel metering pin for a charge forming device for an internal combustion engine. In the conventional carburetor it is the practice to provide a fuel metering valve which is adapted to supply fuel to the main fuel nozzle in accordance with engine load. In other words, when the engine load is low, i.e. high manifold vacuum, the valve is adapted to restrict or reduce the flow of fuel whereas when the load is high the flow of fuel is adapted to be increased.

It has been found to be desirable, however, to modify the functioning of the fuel metering valve in accordance with carburetor air temperature. As an engine warms the density of the air being inducted thereinto decreases, therefore, unless the fuel quantity is proportionately reduced an undesired enrichment of the fuel-air mixture ensues. In the present device by providing a temperature responsive mechanism adapted to coact with the fuel metering valve, a means is provided for modifying the flow of fuel under all temperature operating conditions. It is obvious that such a device will increase the economy of carburetor operation.

In the present device the fuel metering mechanism comprises a pin having a tapered end adapted to coact with a fuel metering jet, a vacuum piston adapted to move the pin in relation to the metering jet in accordance with engine load and a thermostatic element intermediate the fuel pin and the vacuum piston whereby the positioning of the pin by the vacuum piston is modified in accordance with carburetor air temperature.

Further details as well as other objects and advantages will be apparent from a perusal of the detailed description which follows.

In the drawings:

Figure 1 shows a carburetor embodying the subject mechanism;

Figure 2 shows the fuel metering valve in a warm position; and

Figure 3 is a plan view of Figure 2.

A carburetor is shown generally at 10 and includes an induction passage 12, a booster venturi 14 and a main fuel nozzle 16 projecting within a nozzle well 18. The nozzle well 18 is formed in casing 20 within which is also formed a fuel reservoir 21. Air flow through induction passage 12 and booster venturi 14 will create a vacuum across the upper end of fuel nozzle 16 causing fuel to be drawn from the main fuel well 18. A passage 22 is adapted to supply the main fuel well 18 from reservoir 21.

Passage 22 communicates with fuel reservoir 21 through a fuel metering jet 24. A metering pin or rod 26 having a tapered end 28 is adapted to control the quantity of fuel flow through the metering jet.

The other end of pin 26 is pivotally connected to a lever 30 through a stud 32. The other end of lever 30 is loosely articulated to the upper end of piston 33 through a stud 34. Piston 33 is slidably disposed in a cylinder 36 formed in cover casing 38. Cylinder 36 is in com-

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munication with a source of manifold vacuum through a conduit 40. A spring 42 is disposed within vacuum cylinder 36 and normally biases the piston and hence the metering rod to an upper or flow increasing direction, as shown in Figure 1.

In order to insure a constant fuel flow through metering jet 24 for any given position of fuel metering pin 26, a torsion spring 44 is wound around stud 32 and is fixed at its respective ends to lever 30 and rod 26 so as to give the latter sideward bias as shown in the drawings. If this were not done, it is apparent that the tapered end 28 of the rod might be variously positioned within the fuel metering jet and thereby arbitrarily vary the quantity of fuel flow therethrough.

The fuel metering pin mechanism as thus far described is generally old and constitutes no part of the present invention except insofar as it will be combined with a temperature responsive device now to be described.

Lever 30 includes a tang or projection 46 extending transversely therefrom and which is adapted to be engaged by one end 48 of a thermostatic coil 50. The other end of coil 50 is suitably fixed to piston stud 34. Piston stud 34 is suitably threaded to receive a nut 52 which permits the stud to be rotatably adjusted to vary the rate and hence actuation of thermostatic coil 50.

Thus assuming constant carburetor air temperature, it will be seen that upon an increase in engine load, the vacuum in cylinder 36 will decrease permitting spring 42 to move piston 33 and metering rod 26 in an upwardly direction increasing fuel flow through metering jet 24. Now assuming a constant engine load, as represented in Figure 2, an increase in carburetor air temperature will cause coil 50 to wind in a counterclockwise direction causing lever 30, under the influence of gravity, to also pivot in a counterclockwise direction about piston stud 34 and in so doing lower tapered end 28 of the metering pin within the fuel metering jet 24 to reduce the flow of fuel therethrough. It will be seen, as described above, that this decrease in fuel flow through the metering jet is consistent with the decreased density of the warm air being inducted into the engine thereby permitting the maintenance of a constant fuel-air ratio.

It is apparent that various structural modifications may be made in the illustrated form of the invention within the scope of the appended claims.

I claim:

1. A charge forming device for an internal combustion engine comprising an induction passage, a fuel reservoir, passage means for supplying fuel from said fuel reservoir to the induction passage, a metering orifice intermediate said reservoir and said passage means, a tapered metering pin adapted to movably coact with said metering orifice to control the quantity of fuel flow therethrough, engine load responsive means for varying the position of said pin relative to said metering jet, and carburetor air temperature responsive means disposed between said pin and said engine load responsive means for modifying the position of said tapered pin in relation to the metering orifice to decrease the fuel flow through said orifice with an increase in temperature.

2. A charge forming device for an internal combustion engine comprising an induction passage, a fuel reservoir, passage means for supplying fuel from said fuel reservoir to the induction passage, a metering orifice intermediate said reservoir and said passage means, a tapered metering pin adapted to movably coact with said metering orifice to control the quantity of fuel flow therethrough, engine load responsive means operatively connected to said pin for varying the position of said pin relative to said metering jet, and carburetor air temperature responsive means

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connected intermediate the engine load responsive means and the metering pin for modifying the position of said tapered pin in relation to the metering orifice to decrease the fuel flow through said orifice with an increase in temperature.

3. A charge forming device for an internal combustion engine comprising an induction passage, a fuel reservoir, passage means for supplying fuel from said fuel reservoir to the induction passage, a metering orifice intermediate said reservoir and said passage means, a tapered metering pin adapted to movably coast with said metering orifice to control the quantity of fuel flow therethrough, a manifold vacuum responsive piston member, lever means interconnecting said piston member and said pin for varying the position of said pin relative to said metering jet, and carburetor air temperature responsive means operatively connected with the lever means for modifying the position of said tapered pin in relation to the metering orifice to decrease the fuel flow through said orifice with an increase in temperature.

4. A charge forming device as set forth in claim 2 in which said lever is loosely articulated between the piston and the pin and the temperature responsive means comprises a thermostatic element, said element being fixed at one end to said piston member, the other end of said element resiliently engaging said lever, said element be-

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ing adapted to vary the position of said pin relative to the piston member in accordance with changes in carburetor air temperature.

5. A charge forming device as set forth in claim 3 in which said piston member includes a first stud member adjustably mounted thereon, one end of said lever means being rotatably mounted on said stud, a second stud fixed to the other end of the lever means, said pin being loosely mounted upon said second stud, the temperature responsive means including a thermostatic coil element fixed at one end to the first stud, the other end of said coil engaging said lever and therethrough urging said pin in a fuel flow increasing direction with a force inversely proportional to carburetor air temperature.

6. A charge forming device as set forth in claim 5 in which said lever means includes a projection intermediate the first and second stud members, said other end of the coil element engaging said projection.

7. A charge forming device as set forth in claim 6 in which said lever means includes a spring element biasing said pin to an eccentric position relative to the metering jet.

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