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TEMPERATURE CONTROLLED ACCELERATOR PUMP

Filed June 11, 1958

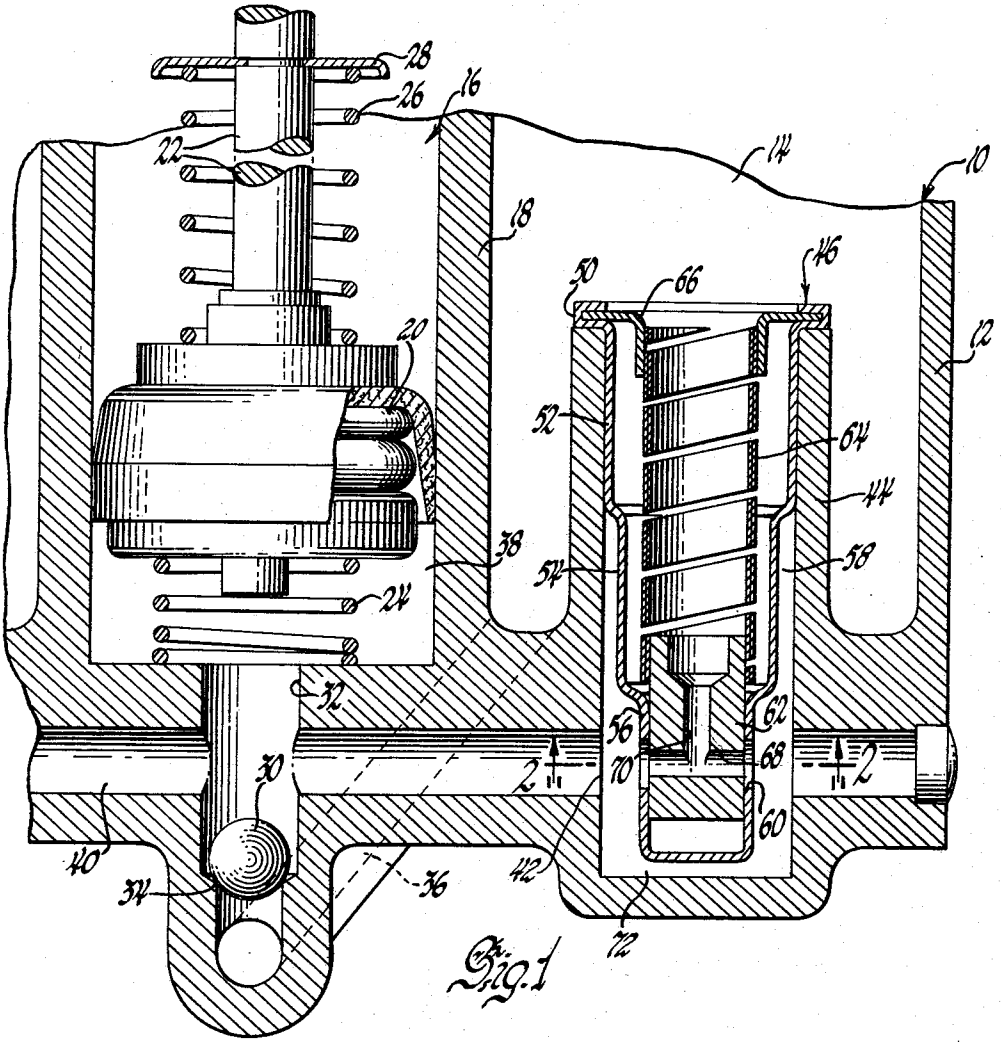


Fig. 1

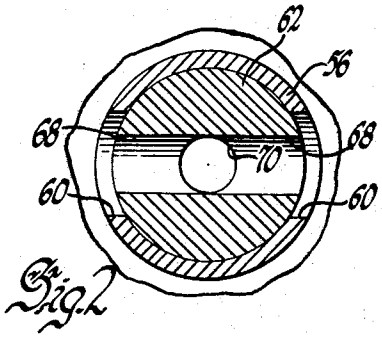


Fig. 2

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TEMPERATURE CONTROLLED ACCELERATOR PUMP

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The present invention relates to a mechanism for varying the quantity of the charge of an accelerator pump in accordance with engine temperature. Inasmuch as an engine requires a larger accelerating charge when cold than when warm, it is desirable from economy and performance points of view to provide means whereby the acceleration charge is responsive to engine temperature.

Engine temperature responsive acceleration charge devices are not broadly new, however, such devices have, in the past, been frequently too complicated and hence too costly to be commercially feasible. It is therefore an object of the present invention to provide a simple and reliable means for regulating the acceleration charge in accordance with engine temperature whereby more economical operation of a carburetor is realized.

In the present invention a temperature responsive valve mechanism is disposed within the fuel reservoir in such a way as to control the quantity of fuel supplied by the accelerator pump output passage in accordance with engine and more specifically fuel temperature.

The details as well as other objects and advantages of the present invention will be apparent from a perusal of the detail description which follows.

In the drawing:

FIG. 1 discloses a carburetor embodying the subject invention.

FIG. 2 is a view along line 2—2 of FIG. 1.

A carburetor is shown generally at **10** and includes a casing **12** within which a fuel reservoir **14** is formed. An accelerating pump is indicated generally at **16** and includes a cylinder casing **18** within which a piston **20** mounted on a rod **22** is slidably disposed. The piston rod **22** is suitably connected to the accelerator pedal, not shown, so as to cause the rod to move downwardly within casing **18** when the pedal is depressed.

As set forth in greater detail in Patent 2,771,282 Olson et al., the accelerator pump piston **20** is axially movable relative to rod **22**. A first spring **24** is seated within casing **18** and biases the piston in an upwardly or charging direction. A second spring **26** seats against a washer **28** fixed to rod **22** and at its other end biases piston **20** in a downwardly direction. Thus as the accelerator pedal is released, rod **22** moves upwardly decreasing the rate of spring **26** permitting spring **24** to move the piston upwardly. The upward movement of the piston causes a ball check valve **30** in casing passage **32** to lift off its seat **34** which in turn causes fuel from reservoir **14** to be drawn through a conduit **36** into the accelerating pump cylinder chamber **38**.

An accelerator pump output passage **40** communicates through passage **32** with accelerator pump chamber **38**. One end, the left as viewed in the drawing, communicates with the carburetor induction passage. Assume for the moment, that the other end **42** of passage **40** is to be blocked. As the accelerator pedal is depressed, the rate of spring **26** is increased so as to overcome the force of spring **24**, moving piston **20** downwardly. This movement seats ball check valve **30** forcing a charge of fuel to be delivered to the carburetor induction passage to enrichen the fuel-air mixture to permit rapid acceleration.

As thus far described, the accelerator pump is of conventional design and forms no part of the present invention

except insofar as it combines with a temperature sensitive mechanism now to be described.

The fuel reservoir casing **12** includes a hollow boss member **44** projecting upwardly within reservoir **14** and the interior of which boss communicates at its lower end with end **42** of accelerator pump discharge passage **40**. A valve mechanism **46** is disposed within the open end of casing boss **44** and is adapted to permit fuel from the discharge passage **40** to be bypassed back to the fuel reservoir **14** in accordance with engine temperature.

Valve mechanism **46** includes a sleeve member having a flange **50** at one end thereof adapted to dependingly support the valve mechanism within boss **44**. The sleeve member includes a plurality of sections **52**, **54**, and **56** of progressively reduced diameter and the largest **52** of which is open at its upper end and the smallest **56** of which is closed at its lower end to provide a valve supporting sleeve. The largest diameter portion **52** of the sleeve member coacts with the interior surface of boss **44** to provide a chamber **58** which is sealed from communication with fuel reservoir **14** except for a pair of diametral ports **60** formed in sleeve section **56**.

A cylindrical valve member **62** is rotatably supported within sleeve section **56** through a temperature responsive thermostatic coil element **64**. Coil **64** is in turn supported at its upper end through a washer-sleeve member **66**, the latter being peripherally supported upon sleeve flange **50**.

Cylindrical valve member **62** includes a diametral passage **68** adapted to be aligned with diametral sleeve ports **60**. Valve member **62** also includes a longitudinally extending passage **70** communicating diametral passage **68** with sleeve chamber **72** openly communicating with fuel reservoir **14**.

The thermostatic coil **64** is adapted to wind or unwind in accordance with the temperature of the fuel within reservoir which in turn reflects engine temperature. As the coil rotates, valve element diametral passage **68** will move into or out of registry with ports **60** in sleeve section **56** to thereby control the quantity of fuel bypassed back to the reservoir **14** as the accelerator pump piston **20** moves downwardly to provide an accelerating charge to the carburetor induction passage.

Since rotation of coil **64** will cause the same to be lengthened or shortened to a small extent, the diametral ports **60** are made somewhat larger than valve element passage **68**. In this way axial movement of member **62** due to changes in the aforenoted coil length, will not effect the registry between ports **60** and passage **62**.

With the engine cold, the maximum quantity of accelerating charge is required, therefore, under these conditions, thermostatic coil **64** is adapted to rotate valve member **62** to move passage **68** completely out of registry with sleeve ports **60** whereby end **42** of discharge passage **40**, is, in effect, blocked, permitting the entire accelerating charge to be supplied to the induction passage. As the engine warms, coil **64** gradually moves the diametral passage **68** into registry with the sleeve ports **60** progressively increasing the quantity of accelerating charge which is bypassed back to the fuel reservoir whereby the accelerating charge supplied to the induction passage is incrementally reduced in accordance with engine temperature.

I claim:

1. A charge forming device for an internal combustion engine including an induction passage, a fuel reservoir, an accelerator pump, said accelerator pump including a discharge passage means communicating at one end with said induction passage, and valve means disposed in said fuel reservoir cooperating with said discharge passage to bypass a portion of the fuel supplied by said accelerator pump to said discharge passage in accordance with changes in engine temperature, the other end of said discharge passage means communicating with said fuel reservoir, said

valve mechanism including a valve element disposed in said discharge passage means, and a helically coiled fuel temperature responsive member supported within said reservoir and operatively connected to said valve element for controlling the quantity of fuel bypassed from said discharge passage means back to said reservoir.

2. A charge forming device for an internal combustion engine including an induction passage, a fuel reservoir, an accelerator pump, said accelerator pump including a discharge passage means communicating at one end with said induction passage, a boss formed in and openly communicating with said fuel reservoir, said boss also communicating with the discharge passage means, valve means disposed in said boss and adapted to bypass a portion of the fuel supplied by said accelerator pump to said discharge passage in accordance with changes in engine temperature, the other end of said discharge passage means communicating with said fuel reservoir, said valve mechanism including a valve element disposed in said discharge passage means, and a fuel temperature responsive member operatively connected to said valve element for controlling the quantity of fuel bypassed from said discharge passage means back to said reservoir.

3. A charge forming device as set forth in claim 2 in which said valve mechanism comprises a sleeve member supported within said boss, said sleeve and boss cooperating with the discharge passage means to define a chamber, port means in said sleeve adapted to communicate said chamber with the reservoir, said valve element adapted to cooperate with the port means to control the quantity of accelerator pump fuel bypassed to said reservoir in accordance with engine fuel temperature.

4. A charge forming device as set forth in claim 3 in which the temperature responsive member comprises a helically coiled element supported at one end upon said sleeve and connected at its other end to the valve element.

5. A charge forming device as set forth in claim 3 in which the sleeve member includes a first portion supported within said boss and open to said reservoir at one end, a second portion of smaller cross-sectional area than the first portion, said port means being formed in the second sleeve portion, said second sleeve portion being adapted to rotatably support the valve element.

6. A charge forming device as set forth in claim 5 in which said valve element includes passage means, one end of said passage means in communication with the reservoir and the other end of which is adapted to register with said port means.

7. A charge forming device as set forth in claim 6 in which the temperature responsive member comprises a helically coiled element supported from the open end of the first sleeve portion, the other end of said temperature responsive element being connected to the valve element to rotate the same in accordance with engine temperature changes to vary the registry between the port means and said valve element passage means.

8. A charge forming device as set forth in claim 7 in which the port means is sufficiently larger in diameter than said valve element passage means that the degree of said registry will be unaffected by the axial movement of said valve element occasioned by changes in length of the temperature responsive element.

References Cited in the file of this patent

UNITED STATES PATENTS

1,905,284	Heitger	Apr. 25, 1933
2,625,382	Boyce	Jan. 13, 1953