Aug. 15, 1961 J. W. RAYMOND 2,996,057

CARBURETOR

Filed Aug. 3, 1959

Fig. 1

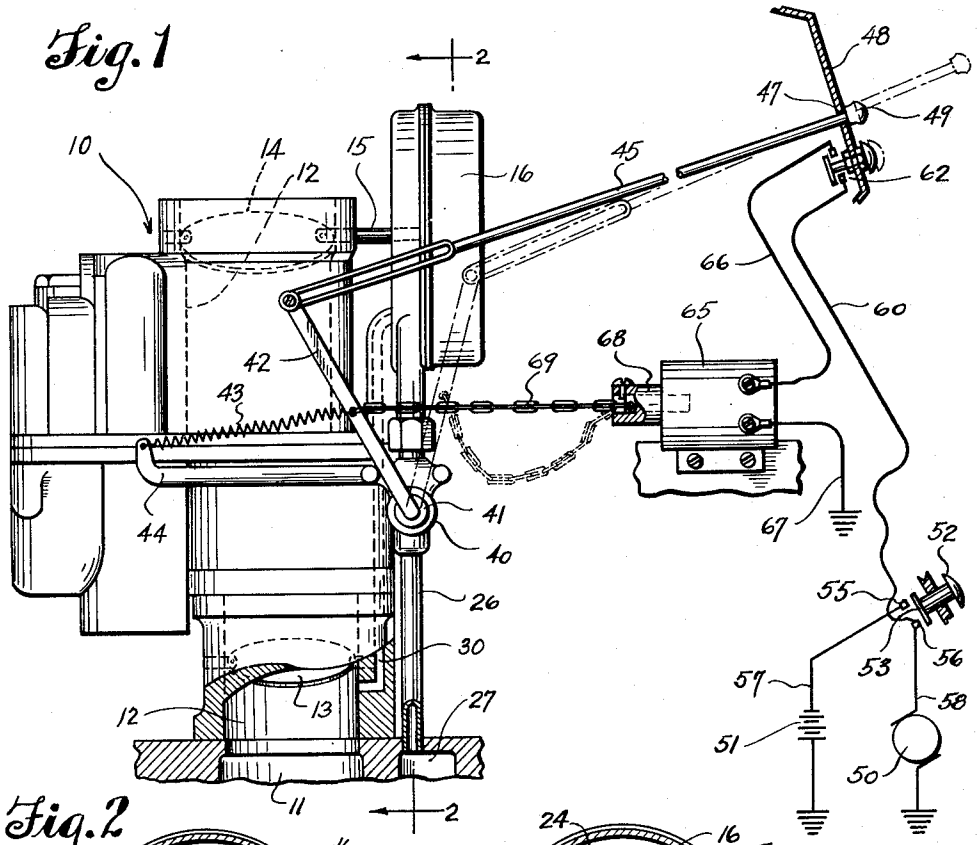
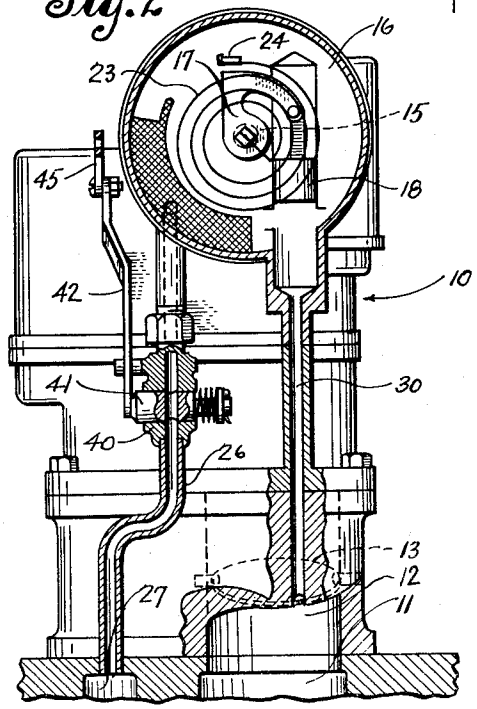


Fig. 2



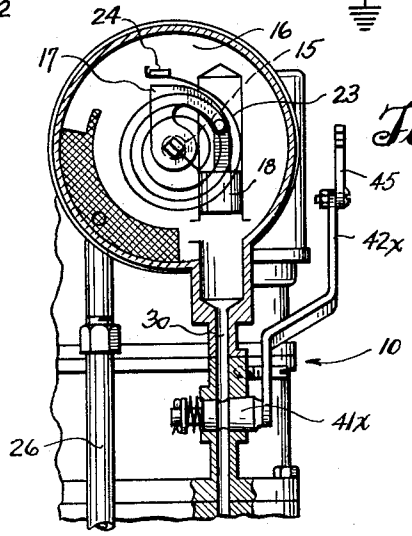


Fig. 3

INVENTOR.

JERRY W. RAYMOND

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CARBURETOR

Jerry W. Raymond, 1102 Crescent St., Wenatchee, Wash.

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This invention relates to carburetors and has reference more particularly to improvements that apply particularly to the means employed therein for the automatic "choking" operation of carburetors as used in connection with automobile engines.

The automatic "choke valve" of the typical present day automobile engine carburetor is intended to function in such manner as to effect a richer fuel mixture and an easier starting of a cold engine and then to automatically adjust itself as the engine warms up as required to maintain the best fuel mixtures in consideration of engine temperature. The choke valve operation is dependent upon various factors including intake manifold vacuum or suction, exhaust manifold temperatures and the velocity of the air stream through the air horn of the carburetor. The valve control devices now in use provide that upon starting the cold engine, suction or vacuum created in the intake manifold will operate to slightly open the closed choke valve sufficiently for the starting operation. Then, after starting, hot gas or air that is heated in means associated with the exhaust manifold, is caused to influence a thermostatic valve control element to cause it to open the valve gradually for normal running of the engine. The typical carburetor includes means in connection therewith whereby the hot gases which influence the thermostatic control element are drawn into a chamber in which the element is enclosed and are then delivered into the intake manifold of the engine at a point just beyond the carburetor. Since this air has not passed through the carburetor, it operates to detrimentally dilute the fuel mixture which has been prepared in the carburetor.

In view of the foregoing, it has been the principal object of the present invention to provide a practical and easy to use means whereby, in an engine starting operation, the intaking of outside air into the intake manifold at a point beyond the carburetor, may be prevented, thus to avoid the aforesaid detrimental diluting of the fuel mixture in the intake manifold.

More specifically stated, it is the object of the present invention to provide means for temporarily preventing the flow of cold air through the air circulatory system of the choke valve thermostat chamber into the intake manifold during the engine starting period and to provide means for doing this either manually or under automatic control.

Further objects and advantages of the present invention reside in the details of construction and combination of parts employed, and in the mode of operation of parts as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

FIG. 1 is a side view of a carburetor embodying the improvements of the present invention therein and showing the means for its manual operation and also a means for its automatic operation.

FIG. 2 is a vertical section of the carburetor, taken substantially on the line 2—2 in FIG. 1.

FIG. 3 is a similar sectional view showing an alternative location for the control valve.

In the present drawings, it is assumed that the carburetor is being used in connection with an automobile engine in a typical present day automobile.

Referring more in detail to the drawings:

In FIG. 1, a present day carburetor is designated in its entirety by reference numeral **10** and it is shown to be mounted upon what may be considered to be the suction or intake manifold **11** of an automobile engine. Outside air is adapted to be intaken by the carburetor through an opening **12** at its upper end and to be mixed with vaporized gasoline in the usual manner, by conventional means not herein shown, for delivery of the mixture into the section or intake manifold **11**. The intaking of air through the air horn of the carburetor is controlled by the usual throttle valve indicated in FIG. 1 at **13**; its operating means not being herein shown. The air passage **12** is equipped at its upper end with a choke valve **14** which is fixed to and actuated by a mounting shaft **15** that extends horizontally from the carburetor body wall into a closed chamber **16** adjacent thereto wherein it is equipped with a radial arm **17** operatively connected with a piston **18** for the automatic adjustment of the valve **14**. Contained within the chamber **16** about the shaft **15** is a helically formed thermostatic element **23** which is fixed at its inner end to shaft **15** and at its outer end is fixed to a lug **24** formed on the chamber wall. This element has the function of moving the valve **14** to a closed position, as the element cools, and to open it gradually as the element is warmed.

To control the action of the thermostatic element **23**, means is provided for causing air that is warmed by engine operation to be circulated through the chamber **16**. For this purpose warmed air is drawn through a tube **26** from a chamber or stove **27** which surrounds or is located close to the exhaust manifold, and is delivered into the chamber **16**. To induce such an indrawing or circulation of air into the chamber **16**, a suction channel **30** is formed within the body walls of the carburetor. This leads from chamber **16** into the lower end of passage **12**. Operation of the engine to which the carburetor is applied produces partial vacuum in the manifold **11**, and thus, suction is created which acts through passage **30** and chamber **16** to draw air from the stove or heater chamber **27**, through pipe **26** into the chamber **16** to heat the thermostatic coil **23** accordingly.

Without going into any detailed explanation of the operation of the carburetor, it will be here noted that with both the tube **26** and passage **30** open, the starting of the cold engine causes suction in the intake manifold **11** to draw a stream of cold air through pipe **26**, chamber **16** and passage **30** into the intake manifold. This cold air does not enter the carburetor, and does not mix with the gasoline in the carburetor and therefore by reason of its place of entry, it merely dilutes the fuel mixture which the carburetor has provided to the detriment of quick and easy starting of the cold engine.

It is only after the engine has been started and heated air is available in stove **27** that the flow of air through the chamber **16** should be permitted and it is to prevent the flow of cold air through the chamber that the present means is provided. Briefly stated, the present invention resides in provision of a normally open valve in the pipe **26** or passage **30** and in the provision of means for either a manual or an automatic closing of the valve especially at the time of starting the cold engine, as will now be explained.

Interposed in pipe **26** is a valve housing **40** containing a rotary valve plug **41** equipped with an upwardly directed operating lever arm **42**. A coiled spring **43**, attached at its opposite ends, under tension, to the lever and a stationary arm **44** fixed to the valve housing, yielding holds the valve plug in its open position, as shown in FIG. 2, thus providing for a free flow of air through pipe **26** from the heater **27** into chamber **16**. A pull rod **45** extends from the outer end of the arm **42** pass-

ing slidably through an opening 47 in what may be the automobile instrument panel, designated at 48, and is equipped at that end with a knob 49. Outward pull on the rod swings the lever arm 42 forwardly and rotates the valve plug to its closed position. Thus, it is possible when starting the cold engine, for the vehicle driver to close off the pipe 26 and prevent the drawing of cold air into the intake manifold therethrough. This will insure against fresh air dilution of the desired fuel mixture as provided by the carburetor for quick and easy starting of the engine in cold weather. When the pull rod is released the spring 43 acts to rotate the valve plug back to its open position for the normal functioning of the choke valve.

It is also provided that the valve plug 41 may be operated in conjunction with the starter switch if so desired; the means provided for this being diagrammatically shown in FIG. 1 wherein 50 designates the starter motor of an automobile engine, 51 the battery, 52 the starter switch has a contactor element 53 adapted to be pressed into circuit closing contact with contact members 55 and 56. Contact members 55 and 56 have circuit connections 57 and 58 leading therefrom respectively to one pole of the battery and one side of the motor; the other pole of the battery and other side of the motor being grounded. The contact 56 also has a circuit wire 60 leading therefrom to one side of a normally open instrument panel switch 62 through which a circuit connection may be made with a solenoid 65. The solenoid has one side connected by wire 66 with one side of the switch 62 and its other side grounded by wire 67. The movable core member 68 of the solenoid is connected by a chain 69 with the lever arm 42 of valve plug 41. When the solenoid is energized, the core bar moves inwardly to rotate the valve plug to its closed position. If it is not desired to employ the automatic valve closing feature, the switch 62 would be left open. When the automatic feature is to be used, the switch 62 is moved to its closed position.

With parts arranged as shown in FIG. 1 and the switch 62 open, the closing of the engine starter switch 52 closes the circuit to motor 50 and starts the engine. Then the manual switch 62 is closed. This causes energization of solenoid 65 and the closing of valve 40 for the purpose previously explained. If the switch 62 is closed first, this will close valve 40 even before the engine is started. However, it is preferably that the engine be started first by means of switch 52.

In view of the fact that the present valve mechanism is not required after an engine is warmed up, it is advisable that the switch 62 be normally open and manually closed, to close valve 40 if the engine is cold.

In FIG. 3, I have shown the passage 30 as equipped with a valve 41*x* and operating lever arm 42 which corresponds, in all respects, to the valve mechanism 40, 41 as applied in FIG. 2 to the pipe 26; it being optional as

to where the control valve 41 is located. The means for the operation of this valve 41*x* is the same as for the valve 41 shown in FIG. 1.

The present arrangement of parts eliminates one of the causes of hard starting of a cold engine. It is simple, relatively inexpensive and effective.

While I have illustrated my invention in a present preferred embodiment and as applied to a typical present day carburetor, it is to be understood that changes or modifications may be made therein without departing from the spirit of the invention and within the scope of the following claims, to meet the requirements of other forms of carburetors and the requirements of engines of various kinds.

What I claim as new is:

1. The combination with an engine having a suction manifold, and an oven in which air is heated by engine operation, of a carburetor for supplying fuel to said engine; said carburetor having an air passage therethrough, opening to said suction manifold for an inflow of atmospheric air to mix with vaporized gasoline to provide a carbureted fuel mixture for the operation of said engine, a choke valve in said air passage for regulating the air inflow, a closed thermostatic chamber, a thermostatic element in said chamber operatively connected with said choke valve for an automatic opening and closing adjustment thereof in accordance with increase and decrease of temperature in said closed chamber, an air duct leading from the said oven to said closed chamber, a duct leading from said closed chamber to said suction manifold and a manually operable cut-off valve in one of said ducts whereby flow of air through said thermostatic chamber can be prevented.

2. The structure as recited in claim 1 wherein a lever is provided for adjustment of said cut-off valve between closed and open positions and wherein spring means acts against said movable means to urge the cut-off valve to its open position.

3. The combination recited in claim 2 wherein said movable means comprises a solenoid operatively connected with said valve, an electric circuit for the solenoid, and switch for closing and opening said circuit.

4. The combination recited in claim 3 including also an engine starting motor, an electric circuit for the solenoid, and a circuit for the engine starting motor, and separate switches for said circuits and a manually operable switch means for maintaining the solenoid circuit closed independently of the starting of the engine.

References Cited in the file of this patent

UNITED STATES PATENTS

2,518,658	Boyce	Aug. 15, 1950
2,840,065	Brown	June 24, 1958
2,848,201	Bennett	Aug. 19, 1958
2,864,596	Dermond	Dec. 16, 1958