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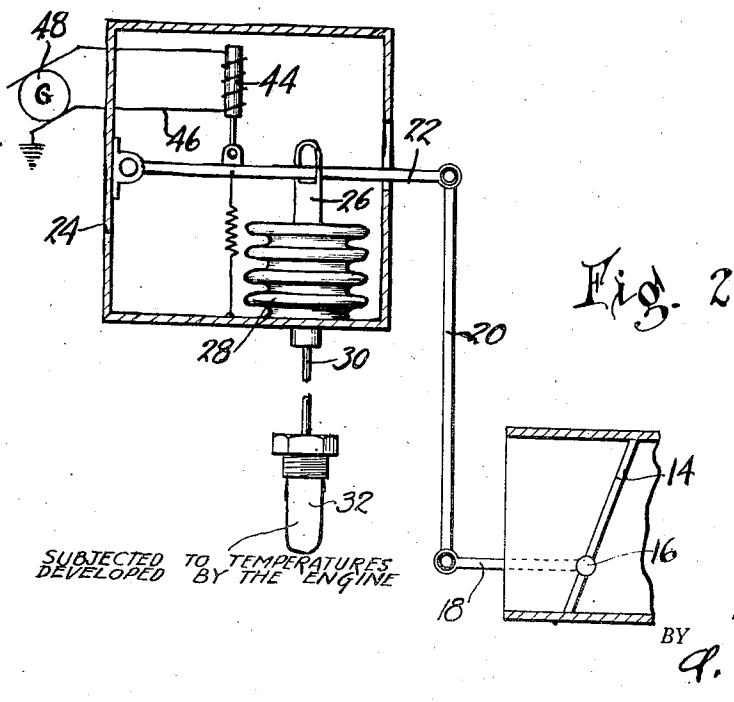
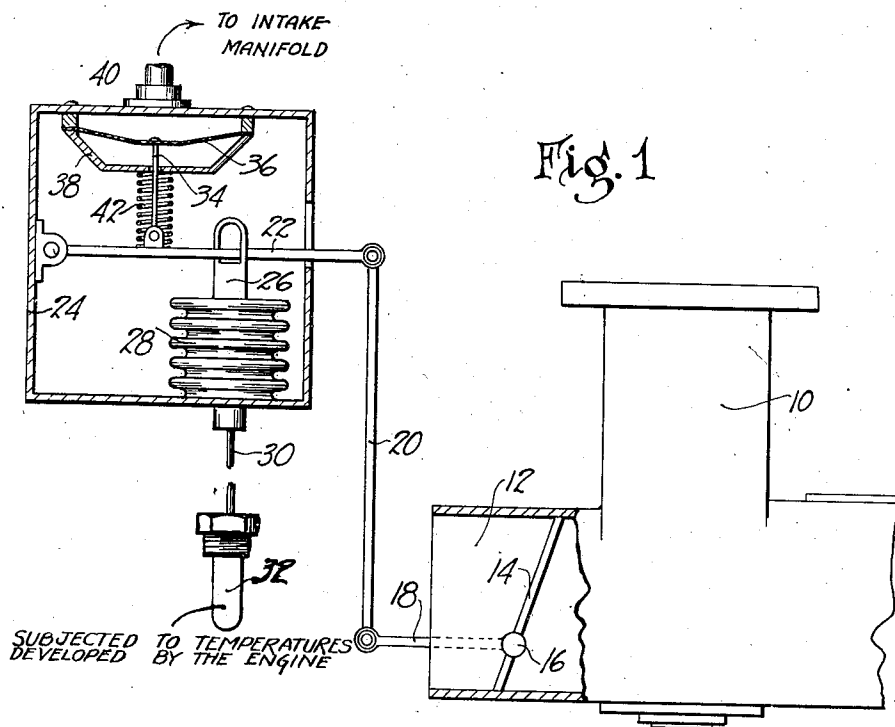
K. R. BLAKE

2,362,346

CARBURETOR

Filed Feb. 23, 1932

2 Sheets-Sheet 1



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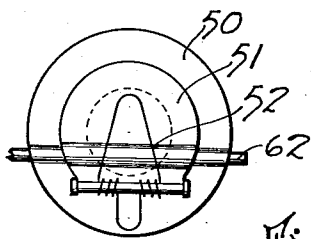
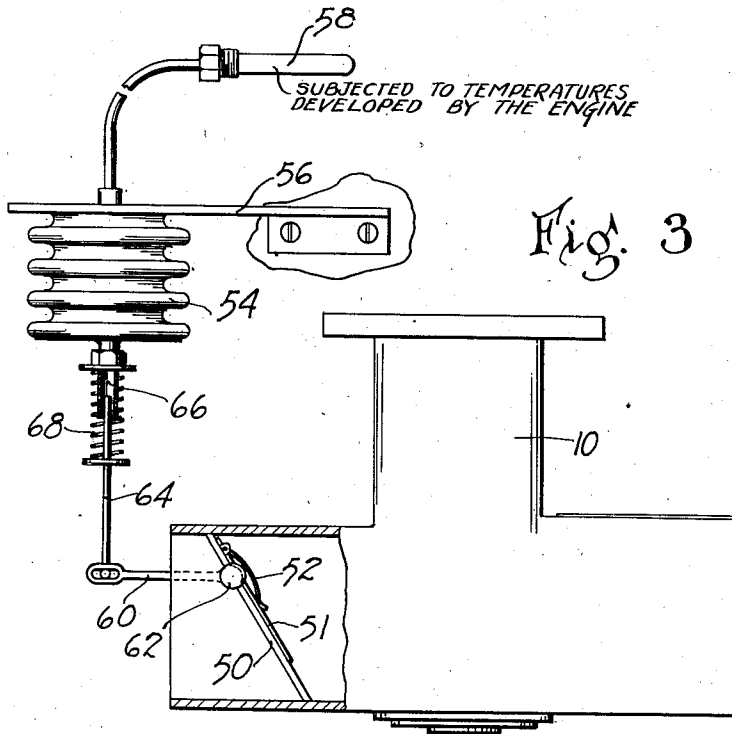
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UNITED STATES PATENT OFFICE

2,362,346

CARBURETOR

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Application February 23, 1932, Serial No. 594,707

8 Claims. (Cl. 123-119)

This invention relates to carburetors, and more particularly to a device for controlling the operation of the choke valve in a carburetor.

An object of the invention is to provide means responsive to temperature and other conditions for opening and closing the choke valve.

A further object of the invention is to provide a device responsive to temperature and engine speed and/or other factors for controlling the operation of the choke valve.

Further objects and advantages of the invention will be apparent from the following description, taken in connection with the appended drawings, in which:

Figure 1 is a diagrammatic view in elevation of a carburetor having connected thereto a choke control embodying the invention;

Figure 2 is a similar view of a modified form of the invention;

Figure 3 is a similar view of a further modification; and

Figure 4 is a view in elevation of the choke valve shown in Figure 3.

Referring more particularly to the drawings, which are to be construed as illustrating the invention rather than limiting it, the reference numeral 10 designates a carburetor of any suitable type, having an air horn 12 with a choke valve 14 rotatably mounted therein. The choke valve is preferably of the unbalanced type, rotatably mounted on a shaft 16 disposed eccentrically of the air horn, so that air pressure on the outer face of the valve tends to open it.

An operating lever 18 is fixed to shaft 16 and has a pivotal connection with a link 20 which in turn is pivoted to one end of a lever 22, the other end of the lever being pivoted to a bracket 24, of any suitable construction, fixed to the engine frame by means not shown. Lever 22 passes through the slot of a slotted member 26 which is fixed to the free end of a thermally expansible member or bellows 28. The bellows is secured to bracket 24 and is connected by tubing 30 to a fitting 32 which is inserted in the water cooling system or disposed in any other position where it is subjected to the variable temperatures developed by the engine in its operation.

A link 34 is pivotally connected to lever 22 at one end and has its other end connected to a flexible diaphragm 36 which is mounted in a housing 38 supported by the bracket 24. The lower surface of the diaphragm is exposed to atmospheric pressure, and its upper face to the variable suction existing in the intake manifold, to which it is connected by a conduit 40. A compression

spring 42 interposed between the housing 38 and lever 22 urges the lever downwardly. This spring may be supplemented or substituted by a spring applied directly to shaft 16 in the known manner.

In operation, assuming that the engine is at rest and cold, the choke valve will be maintained in its closed position by the force of spring 42, bellows 28 being collapsed and diaphragm 36 being in its lowermost position. If now the starter is actuated to crank the car the manifold suction acting through conduit 40 is not sufficient to raise diaphragm 36 substantially, and the differential of the air pressures acting on the opposite faces of valve 14 will be sufficient merely to open the valve very slightly. When the engine begins to fire, however, the manifold suction rises sharply, overcoming the force of spring 42 and allowing the choke valve to open to a degree determined by the slotted member 26 contacting with lever 22. The bellows remains collapsed at this stage, however, setting an upper limit to the opening of the choke valve, which fluctuates between closed and partially opened positions depending upon the speed of the engine.

As the engine warms up, the fitting 32 becomes warmer and expands the bellows, gradually permitting the choke valve to approach more nearly to its fully open position under the influence of manifold suction acting on diaphragm 36 and air pressure acting on the choke valve. If the engine is started while it is still warm from previous operation or due to external weather conditions the action is the same except that the bellows permits the choke valve to open more fully, or completely, as soon as the engine fires. When the engine is hot, the bellows overcomes the force of spring 42 and maintains the choke valve nearly or completely open even during the cranking operation.

The construction shown in Figure 2 is the same as that above described, except that the diaphragm 36 is substituted by the core 44 of a solenoid the winding of which is connected in the circuit 46 of the generator 48. The operation is the same, except that when the engine begins to fire the generator voltage rises sharply, so that core 44 exerts an upward force on lever 22 in the same manner as diaphragm 36. In this embodiment, the weight of core 44 takes the place of spring 42, although the spring may also be used if desired.

In the modification shown in Figures 3 and 4, the choke valve 50 is provided with an auxiliary flap valve 51 normally held closed by a spring 52, with the result that a comparatively small

pressure differential between the opposite faces of the choke valve will cause some air to be admitted to the carburetor. The thermostatic control of the choke valve consists of a bellows 54 supported by means of a bracket 56 and having a fitting 58 disposed in the cooling system or in any position where it is subjected to variable temperatures developed by the engine. The connection between the bellows and choke comprises a lever 60 fixed to the shaft 62 of the choke and having a pin-and-slot connection with a rod 64 the upper end of which is reciprocable within a sleeve 66 secured to the bellows. A compression spring 68 is positioned between flanges on the rod 64 and sleeve 66 to provide a yielding connection. The operation of this modification will be apparent from the above description.

Although the invention has been described with particular reference to certain specific embodiments thereof, it may be embodied in other forms, and is not limited except by the terms of the following claims.

I claim:

1. In combination with a carburetor for an internal combustion engine having a choke valve, and with the generator circuit of the engine of means actuated by said circuit for operating the choke valve, and means controlled by engine temperature for modifying the operation of the choke valve independently of said first mentioned means.

2. In combination with a carburetor for an internal combustion engine having a choke valve, and with the generator circuit of the engine of means actuated by said circuit for yieldingly opening the choke valve, and means controlled by engine temperature for limiting the opening of the choke valve independently of said first mentioned means.

3. In combination with a carburetor having an unbalanced pressure responsive choke valve, control means for the choke valve comprising a thermostat having an unyielding lost motion connection with said valve for operating it positively in both directions.

4. In combination with a carburetor having an unbalanced pressure responsive choke valve, control means for the choke valve comprising a thermostat and a pressure sensitive diaphragm both connected to said valve by unyielding connections and simultaneously effective under predetermined conditions of engine operation to move said valve toward open position.

5. A combination as defined in claim 4, wherein the thermostat is connected to the choke valve by a lost motion connection.

6. A device for controlling the air inlet of a carburetor associated with an internal combustion engine, comprising an air inlet valve responsive to suction within the carburetor, a flexible diaphragm responsive to suction posterior to the carburetor, and means responsive to temperature remote from the carburetor connected to the air valve by an unyielding overrunning connection, the valve, diaphragm, and temperature responsive means being simultaneously operative during the operation of said device.

7. In combination with a carburetor for an internal combustion engine provided with a generator circuit, a pressure responsive air inlet valve in the carburetor, means energized by said circuit for biasing the choke valve toward open position, and means controlled by engine temperature for influencing the operation of the choke valve independently of said first mentioned means.

8. In combination with an internal combustion engine having a generator circuit, a carburetor having a choke valve responsive to suction within the carburetor, yielding means urging the choke valve toward closed position, electrical means energized by the generator circuit for yieldingly urging the choke valve toward open position, and a thermostat controlled by temperatures developed by the engine in its operation for influencing the operation of the choke valve independently of said electrical means.

KENNETH R. BLAKE.