

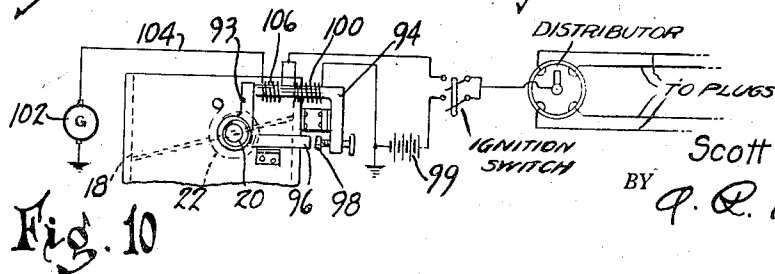
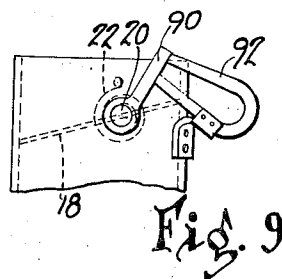
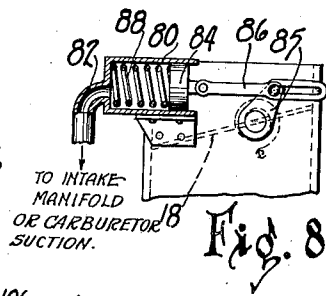
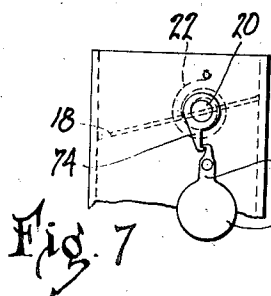
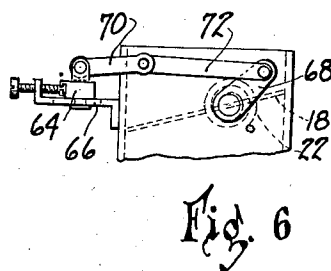
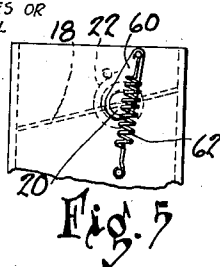
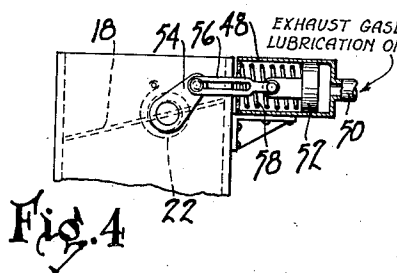
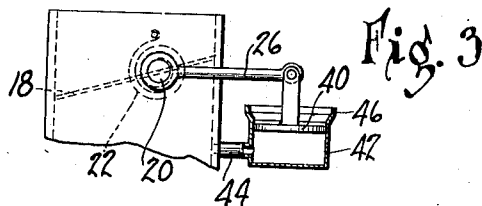
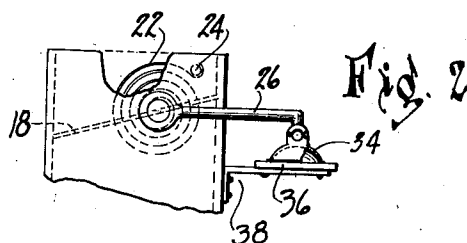
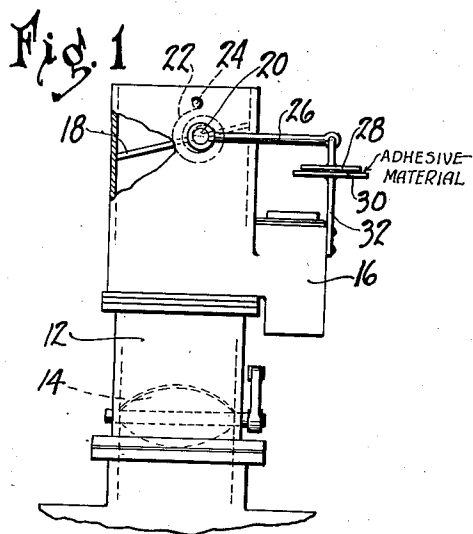
April 2, 1935.

S. F. HUNT

1,996,245

CARBURETOR

Filed Sept. 16, 1932



UNITED STATES PATENT OFFICE

1,996,245

CARBURETOR

Scott F. Hunt, South Bend, Ind., assignor to
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Application September 16, 1932, Serial No. 633,514

6 Claims. (Cl. 123—119)

This invention relates to carburetors and more particularly to a control for the choke valve of carburetors.

In my Patent No. 1,945,191, January 30, 1934, there is disclosed a carburetor having a pressure responsive choke valve, a thermostat opposing opening movement of the valve, and mechanism for opposing the opening movement of the valve only when it is near its closed position, such mechanism becoming less effective as the choke valve is moved to its open position. This application discloses various improvements and modifications of the apparatus disclosed in said patent, all designed to maintain the choke valve substantially closed while the engine is being cranked, but to permit the choke valve to open, to a degree determined by engine speed and temperature, when the engine begins to fire.

An object of the invention is to provide an automatic choke which functions in accordance with the needs of the engine and is responsive to the temperature changes.

Another object of the invention is to provide a choke which is held yieldingly closed, by mechanism which offers its maximum resistance to opening at or about the fully closed position of the choke valve.

Another object of the invention is to provide a choke in which the force tending to close the choke valve is decreased in proportion to the opening movement of the valve.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the appended drawing in which:

Figure 1 is a view in elevation of a carburetor having one form of the invention embodied therein;

Figures 2-10 are fragmentary views of other modified forms of the invention.

The carburetor disclosed in Figure 1 is of the downdraft type, although this is immaterial, and comprises any suitable arrangement of mixing chamber 12, throttle valve 14 and float chamber 16. The choke valve 18 is of the pressure-responsive type, being preferably a butterfly valve, secured to an off-center shaft 20, whereby the pressure of incoming air tends to open the valve. A thermostat 22, preferably in the form of a bi-metallic spiral spring, has one of its ends formed as a hook to engage a stop 24 and the other end secured to the shaft 20 in such relation as to tend to close the choke valve with a force inversely proportional to the temperature. With this arrangement, the hooked end of the thermostat may move out of engagement with stop 24 when the engine is fully warmed up. Any other suitable arrangement of the thermostat may be used.

A lever 26 is secured to shaft 20 and has pivoted

to its outer end a plate or shoe 28 designed to contact with a similar plate or shoe 30 supported on a bracket 32 which is fixed to the float chamber or other suitable portion of the carburetor. The contacting surfaces of shoes 28 and 30 are provided with adhesive material such as gum rubber, so that the choke valve is held shut by the force of adhesion, but upon being opened a slight distance is free from any force tending to close it except the force of the thermostat.

The construction shown in Figure 2 is similar to that in Figure 1 except that rod 26 supports a vacuum cup 34 at its outer end which is designed to cooperate with a plate 36, of glass or the like, supported adjacent the carburetor on a bracket 38. In this construction, the thermostat, inclosing the choke valve with the aid of gravity, presses the cup 34 into adhesive relation to the plate 36, thereby tending to hold the choke valve closed but releasing it entirely if it is opened beyond a slight angle.

In the construction shown in Figure 3, lever 26 carries a piston 40 which is reciprocable in a cylinder 42 connected by a duct 44 with the interior of the carburetor. The area of piston 40 is so related to the unbalanced segments of the choke valve that when suction is applied to the carburetor, as during cranking, the force tending to open valve 18 is nearly, but not quite, counteracted by the suction on piston 40 tending to hold the valve closed. During cranking, the force of friction will be sufficient to maintain the parts in equilibrium, but when the engine begins to fire the suction is greatly increased and valve 18 will overcome the force of piston 40 and move to open position. As soon as this occurs, piston 40 moves into juxtaposition with a flared mouth portion 46 of the cylinder, so that the suction acting through duct 44 becomes altogether inoperative to restrain the further opening movement of the choke valve. In all of the modifications shown in Figures 1, 2 and 3, the lever 26 is returned, when the engine is stopped, to its original position by gravity and by the force of the thermostat when the engine is cold, but this action may be assisted by a suitable tension spring, if desired.

In the modification disclosed in Figure 4, the cylinder 48 is mounted adjacent the choke valve and is connected by means of a tube 50 to the exhaust pipe or to the lubrication system of the automobile. A piston 52 is connected to the choke valve by means of an overrunning connection formed by a pin on the choke lever 54 riding in a slot in a link 56. A spring 58 maintains the piston 52 in such position as to hold the choke valve fully closed, but as soon as the engine fires the increased pressure of the exhaust gases or the lubrication oil will force piston 52 to the left, permitting the choke valve to open.

In the modification of Figure 5, a lever 60 is

fixed to the choke shaft 20, and a tension spring 62 is secured to the end of lever 60 and to the outer wall of the carburetor in such relation as to tend to hold the choke valve closed when it is in closed position. When the valve is opened by the suction developed by the engine when it begins to fire, however, the spring is moved past a dead-center position relative to shaft 20, and from then on exerts no force tending to close the choke valve.

In the modification shown in Figure 6, an adjustable stop 64 is supported on a bracket 66 attached to the carburetor, and is connected to the choke lever 68 by means of pivoted toggle levers 70 and 72. The stop 64 is so adjusted with respect to the closed position of the choke valve that levers 70 and 72 return nearly, but not quite, to a position of alignment, and tend to be held in such position by gravity. During cranking, the suction tending to open valve 18 is insufficient to break the toggle and permit the valve to open, since the mechanical advantage is small, but when the engine begins to fire the increased suction is sufficient to break the toggle and when once broken it exerts only a slight force tending to close the choke valve.

In the modification shown in Figure 7 a hooked lever 74 is secured to the choke shaft 20, and another hooked member 76 is pivoted to the outer wall of the carburetor in such relation that the two hooks engage when the choke valve is closed. A weight 78 is formed at the lower portion of member 76 to tend to maintain the hooked portion of member 76 in engagement with member 74. This arrangement maintains the choke valve in closed position until the force of suction acting upon it is sufficient to move the hooks past each other, whereupon the only force tending to maintain the choke valve closed is the force of the thermostat. The disengagement of the hooks upon the starting of the engine is aided by the vibration of the engine, which tends to cause member 76 to swing about its pivot and thereby disengage the hooks.

In the modification shown in Figure 8, a cylinder 80 is secured to the carburetor and is connected to the intake manifold or carburetor suction by a tube 82. A piston 84 in the cylinder is connected to the choke lever 85 by means of an overrunning connection formed by a pin on lever 85 riding in a slot in a link 86 which is pivoted to the piston. A spring 88 normally holds piston 84 in such position as to retain the choke valve in closed position, but when the engine begins to fire the suction acting through tube 82 draws the piston 84 to the left, thus permitting the valve 18 to open under the influence of carburetor suction.

In the modification disclosed in Figure 9, a lever 90 of ferrous metal is fixed to shaft 20, and a permanent magnet 92 is fixed to the carburetor in such relation as to contact with lever 90 when the valve 18 is closed. In this arrangement, it is evident that the maximum force tending to hold the valve closed is exerted when the parts are in the positions shown in Figure 9, but that when the valve 18 has once been opened an appreciable distance it is substantially free of the influence of magnet 92.

In the modification shown in Figure 10, a lever 93 of ferrous or other magnetic metal is secured to the choke valve shaft 20, in operative relation to an electro-magnet formed by a core member 94 and a second core member 96. An air gap between the two core members is made adjustable by means of a screw 98 threaded in member 94 to increase or decrease the strength of the magnet.

Assuming that the ignition switch of the automobile is closed, member 94 is magnetized in such sense as to attract member 93, by a current flowing from the storage battery 99 through the coil 100. This maintains the choke valve closed while the car is being cranked. When the engine begins to fire, however, current flows from the generator 102 through circuit 104 and coil 106, magnetizing member 94 in a sense opposite to that resulting from coil 100, thereby releasing the member 93 and permitting the choke valve 18 to open under the influence of carburetor suction.

In all the modifications, it will be understood that as soon as the choke valve moves out of its closed position it is substantially freed from the force tending to hold it closed, but that it remains under the influence of the thermostat, which exerts a resilient force tending to close the valve, the force varying inversely with the temperature at the carburetor. It should also be further noted that if the thermostat is omitted from any of the modifications shown, the device still has utility in that it is superior to a manually operated choke as a starting control for a carburetor.

Features disclosed but not claimed herein are being claimed in my copending application, Serial No. 746,993, filed October 5, 1934.

Although several embodiments of the invention have been disclosed herein, it will be understood that the principles involved may be embodied in many other forms, and that the invention is not limited to the modifications disclosed herein except as such limitations are expressed in the following claims.

I claim:

1. Control mechanism for a carburetor comprising a pressure responsive air inlet valve, and magnetic means constantly opposing opening movement of the valve with a force varying with the position of the valve.

2. Control mechanism for a carburetor for use in automotive vehicles, comprising a pressure responsive air inlet valve, a thermostat influencing the movement of the valve, and magnetic means constantly opposing opening movement of the valve during operation of the vehicle with a force varying with the position of the valve.

3. Control mechanism for a carburetor comprising a pressure responsive air inlet valve, and a permanent magnet opposing opening movement of the valve only when the valve is near its closed position.

4. Control mechanism for an internal combustion engine carburetor comprising an air inlet valve, magnetic means opposing opening movement of the valve, and magnetic means rendering the first mentioned magnetic means inoperative when the engine begins to fire.

5. Control mechanism for a carburetor for an internal combustion engine having an ignition circuit; comprising an air inlet valve, and electro-magnetic means energized by said ignition circuit to urge the valve toward closed position and becoming inoperative when the engine begins to fire.

6. Control mechanism for a carburetor for an internal combustion engine having an ignition circuit; comprising a pressure responsive air inlet valve, a thermostat influencing the opening of the valve, and electro-magnetic means energized by said ignition circuit to urge the valve toward closed position and becoming inoperative when the engine begins to fire.

SCOTT F. HUNT.

DISCLAIMER

1,996,245.—*Scott F. Hunt*, South Bend, Ind. CARBURETOR. Patent dated April 2, 1935. Disclaimer filed May 26, 1938, by the assignee, *Bendix Aviation Corporation*.

Hereby enters this disclaimer to claims 1, 2, and 3 of said patent.
[*Official Gazette June 21, 1938.*]