

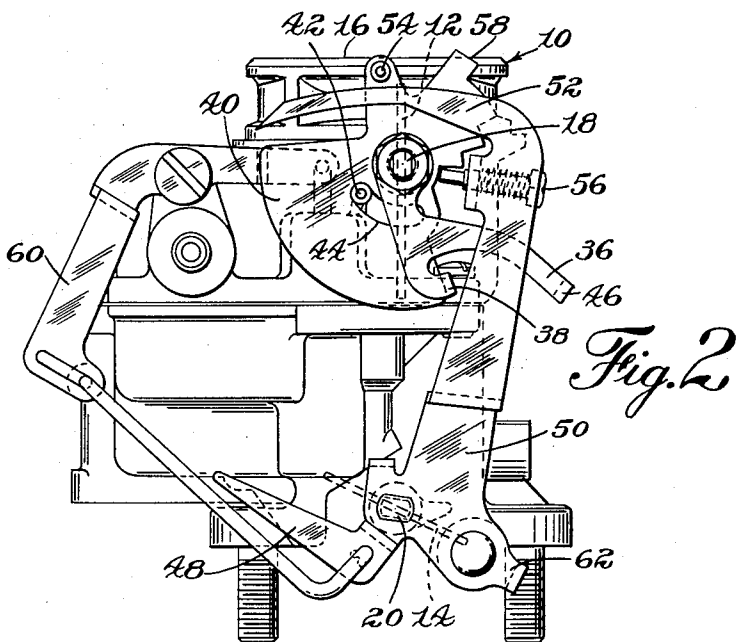
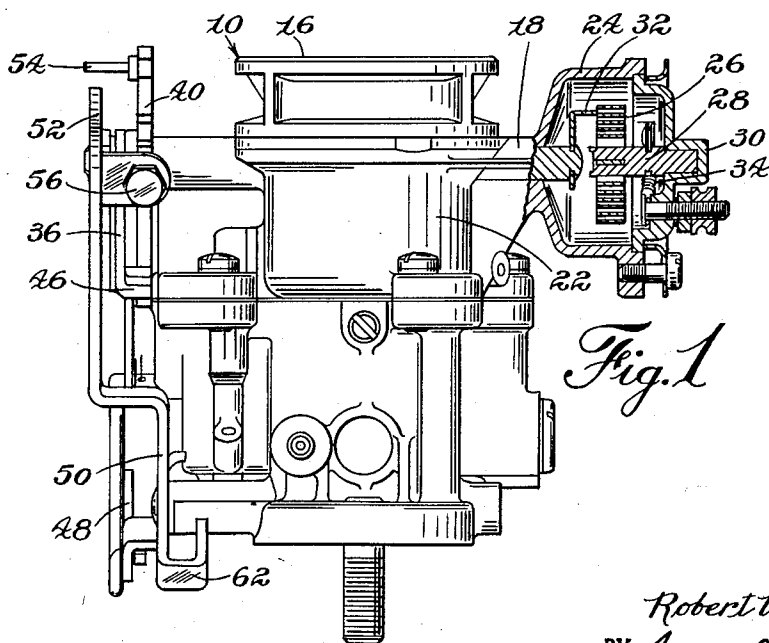
Jan. 6, 1959

R. W. SUTTON
CARBURETOR

2,867,424

Filed Feb. 18, 1957

2 Sheets-Sheet 1



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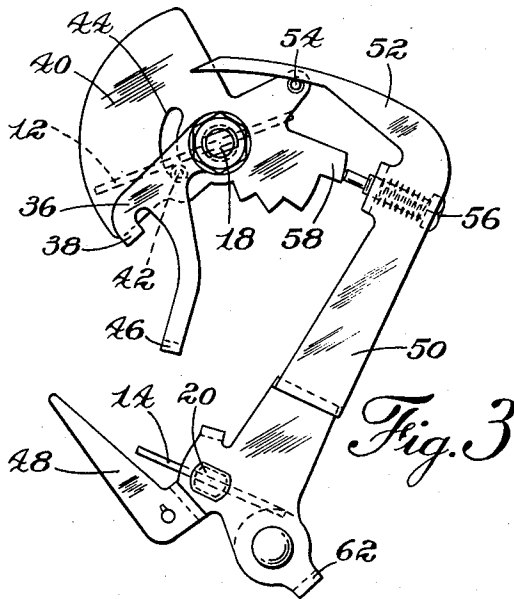
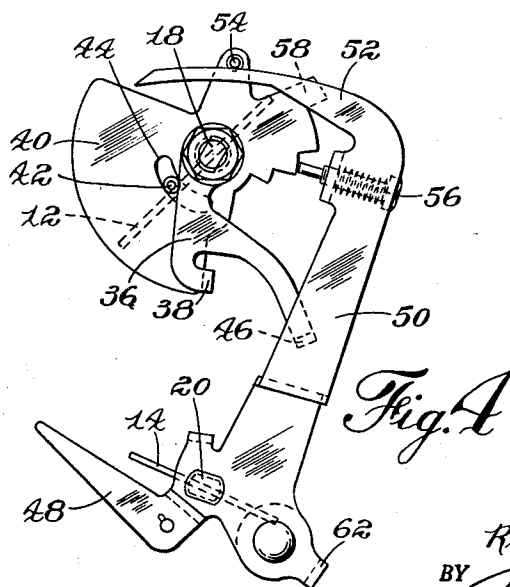
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CARBURETOR

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Application February 18, 1957, Serial No. 640,868

2 Claims. (Cl. 261—52)

This invention relates to carburetors for internal combustion engines and more particularly to means for automatically controlling the carburetor choke valve to vary the air to fuel ratio of the mixture in accordance to the requirements of the engine under various operating conditions.

The most commonly employed automatic choke mechanisms for controlling the choke valve include a thermostat and a suction responsive device. The thermostat is adapted to hold the valve in closed position when the ambient temperature is low and to gradually open said valve or permit it to open as the engine temperature rises. The suction device, which includes a piston operable within a cylinder, is responsive to manifold vacuum posterior to the carburetor throttle and is adapted to modify the reaction of the thermostat as soon as the engine begins to operate under its own power.

The piston arrangement of suction responsive devices of this character are, however, unsatisfactory in that they must be very sensitive and very fine particles of foreign matters, such as sand or dust, may impair the free movements of said piston and even cause the piston to stick which, if the choke valve is only partially open will result in excessive quantity of fuel in the mixture and in return will result in excessive fuel consumption and improper operation of the engine, overloading and the like. If the piston sticks in the manner to prevent closing of the choke valve it will be difficult or impossible to start the engine when cold.

It has been proposed in the past to provide an automatic choke control which eliminates the vacuum piston as exemplified in U. S. Patent No. 2,124,778 to Hunt and 2,420,917 to Sutton et al. and my copending application U. S. Serial No. 478,065 filed December 28, 1954, now Patent No. 2,786,657. With some engines equipped with carburetors having an automatic choke control such as is shown in my copending application it has been found necessary to hold the throttle valve opened a predetermined amount to start a cold engine. Unless the carburetor is equipped with a throttle actuated starting switch which requires the throttle to be opened during cranking of the engine, it has been found to be very difficult to educate operators of motor vehicles equipped with such automatic choke devices to hold the throttle valve opened a predetermined amount during starting.

It is an object of the present invention to provide an improved automatic choke control device having a simple construction whereby improved operation particularly during starting is obtained.

Other objects and advantages will be readily apparent in the following detailed description taken in connection with the appended drawings in which:

Figure 1 is a front elevation of a carburetor embodying my invention;

Figure 2 is a side view of the carburetor shown in Figure 1; and

Figures 3 and 4 are fragmentary views of the levers

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shown in Figure 2 illustrating the position of the levers during various conditions of engine operation.

Referring now to the drawings, numeral 10 designates a carburetor having a choke valve 12 and a throttle valve 14 mounted in an induction passage 16 on shafts 18 and 20 respectively. The choke shaft 18 is journaled in the airhorn 22 of the carburetor and extends at one end into a housing 24 which is formed on the airhorn. A thermostat 26 is mounted in housing 24 on a stud 28 which is secured to a cover plate 30. Thermostat 26 is operatively connected to choke shaft 18 through a lever 32. Also mounted in housing 24 on stud 28 is an electrical heating coil 34 which is adapted to be energized through appropriate electrical connectors (not shown). On the opposite end of choke shaft 18 there is secured a choke lever 36 having a turned over lug 38 to provide a one way connection with a fast idle cam 40 which is loosely mounted on shaft 18 adjacent lever 36. The fast idle cam 40 is weighted so as to assume the position shown in Figure 2. The rotation of fast idle cam 40 is limited by a pin 42 fixed to the airhorn which is disposed within a slot 44 formed in cam 40.

Choke lever 36 is formed with a second lug 46 which is adapted for engagement with a finger 48 formed on throttle lever 50 which is secured to throttle shaft 20. Throttle lever 50 is formed with a scythe like cam 52 which is arranged for engagement with an abutment or cam follower 54 on fast idle cam 40. Throttle lever 50 is also provided with an adjustable abutment 56 which is adapted for engagement with a series of stepped projections 58 formed on the fast idle cam 40. The remainder of the carburetor structure is conventional and includes actuating mechanism 60 for an accelerating pump and a throttle arm 62 for connection to the usual accelerator pedal (not shown). As is usual, the connection between the accelerating pedal in the throttle arm is provided with a spring to urge the throttle towards closed position.

In operation the parts of the choke control device assume the position shown in Figure 2 with the throttle closed and the choke valve opened. This is the position of parts when the engine has been stopped after the engine has been warmed sufficiently to permit the choke valve to open. As the thermostat cools the choke valve will be moved toward closed position but will be prevented from reaching fully closed position by the engagement of abutment 54 with cam 52. In order to start the engine when the thermostat is cold it is necessary to open the throttle valve sufficiently to move cam 52 out of engagement with abutment 54.

After the throttle has once been opened the operator may release the accelerating pedal permitting the parts of the choke control mechanism to assume the position shown in Figure 3 wherein the throttle is held in the fast idle position by engagement of abutment 56 on the highest of the stepped projections 58. With the choke closed as shown in Figure 3 the cam 52 assumes the position above the abutment 54 wherein it is ineffective to influence the position of the choke valve. Once the engine has started, the airflow through the induction passage 16 acting on the unbalanced portion of choke valve 12 is sufficient to open the choke valve to a predetermined partially opened position. When the thermostat is cold the airflow acting on the unbalanced portion of the choke valve is not of sufficient magnitude to open the choke valve sufficiently against the thermostat for part throttle operation. After the airflow has opened the choke valve a small amount the cam 52 is effective when the throttle is opened and returned toward closed position to engage the abutment 54 to forcibly open the choke valve to a predetermined position against the force

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of the thermostat. The amount of choke opening may be controlled by throttle position and the contour of cam 52. Once the cam 52 has engaged the abutment 54 to open the choke valve the parts assume the position shown in Figure 4 wherein the cam 52 is effective to limit the closing of the choke should the force of the airflow acting on the unbalanced portion of the choke fall below the force of the thermostat urging the choke toward closed position.

I claim:

1. In a carburetor having an induction passage, a choke in said passage, a shaft for said choke, a choke lever secured to said shaft, a fast idle cam rotatably mounted on said shaft and having a one-way connection with said choke lever, an abutment formed on said fast idle cam, a throttle in said passage, a throttle lever operatively connected to said throttle, a member formed on said throttle lever for engagement with said cam to determine the idle position of said throttle, and a cam formed on said throttle lever for engagement with said abutment to open said choke when said choke is in a predetermined partially open position and said throttle

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lever is moved from an open position toward a closed position, said last mentioned cam being formed to engage said abutment to prevent said choke from opening when said choke is in fully closed position and said throttle is moved from an open position to idle position.

2. In a carburetor having an induction passage with a choke and a throttle mounted therein, a lever operatively connected to said choke, an abutment on said lever, and a scythe like cam member operatively connected to said throttle and arranged to engage said abutment on one side when said choke and throttle are in closed position to prevent said choke from opening, said cam being arranged to engage said abutment on an opposite side when said choke is in partially closed position and said throttle is moved from an open position toward closed position to positively open said choke valve a predetermined amount.

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